

# Clinical Correlates of the Weight Bias Internalization Scale in a Sample of Obese Adolescents Seeking Bariatric Surgery

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The aim of this study was to evaluate psychometric properties and clinical correlates of the Weight Bias Internalization Scale (WBIS) in a sample of obese adolescents seeking bariatric surgery. Sixty five adolescents enrolled in a bariatric surgery program at a large, urban medical center completed psychiatric evaluations, self-report questionnaires including the WBIS and other measures of psychopathology and physical assessments. The WBIS had high internal consistency (Cronbach's  $\alpha = 0.92$ ). As in previous research with adults, the one underlying factor structure was replicated and 10 of the original 11 items were retained. The scale had significant partial correlations with depression ( $r = 0.19$ ), anxiety ( $r = 0.465$ ), social, and behavioral problems ( $r = 0.364$ ), quality of life ( $r = -0.480$ ), and eating ( $r = 0.579$ ), shape ( $r = 0.815$ ), and weight concerns ( $r = 0.545$ ), controlling for BMI. However, WBIS scores did not predict current or past psychiatric diagnosis or treatment or past suicidal ideation. Overall, the WBIS had excellent psychometric properties in a sample of obese treatment-seeking adolescents and correlated significantly with levels of psychopathology. These findings suggest that the WBIS could be a useful tool for healthcare providers to assess internalized weight bias among treatment-seeking obese youth. Assessment of internalized weight bias among this clinical population has the potential to identify adolescents who might benefit from information on coping with weight stigma, which in turn may augment weight loss efforts.

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## INTRODUCTION

Public health concerns regarding the high prevalence of obesity among children and adults worldwide often stem from the health and financial costs associated with obesity's medical sequelae (1–3). However, obesity is also associated with a host of psychosocial difficulties including psychiatric diagnoses, mood disturbances, binge eating, and decreased self-esteem and quality of life (3–6). While little is known about the mechanisms linking obesity with psychological problems, one possibility is that this relationship is partially explained by the experience of weight bias.

The incidence of weight-based discrimination has increased by 66% since 1995 (7), and is now on par with rates of racial discrimination (8). Further, weight bias is more socially acceptable than other common forms of bias such as racism or sexism, and is observed in multiple domains, including employment, education, housing opportunities, healthcare, and portrayal in the media (9). The widespread social acceptability of weight bias, as

illustrated by its ubiquity in the media and lack of preventative legislation (9), contributes to strong antifat attitudes expressed by nonoverweight as well as overweight and obese people (10). Such antifat attitudes have also been shown among overweight children (11) and weight bias directed towards obese children has increased over the last several decades (12), with stigmatizing attitudes beginning as early as preschool (13).

Research demonstrates that youth who have experienced weight-based stigmatization and teasing have increased risk of depression, low self-esteem, body dissatisfaction, suicidality, unhealthy weight control behaviors, and disordered eating (11). Importantly, many of these studies control for BMI, indicating that the stigmatizing experience itself, rather than body weight alone, is also contributing to these adverse psychological outcomes.

While individuals from ethnic and racial minority groups tend to demonstrate “in-group” preferences (14), the extant literature has found that overweight and obese individuals

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lack these favorable “in-group” attitudes. In fact, overweight and obese persons endorse similarly high antifat attitudes as their normal weight counterparts (10). The lack of favorable “in-group” attitudes observed in overweight and obese individuals may be a result of the widespread social acceptability and prevalence of weight bias. This may partially explain why overweight individuals are especially likely to internalize negative weight-based stereotypes (10,15).

Durso and Latner (16) developed the Weight Bias Internalization Scale (WBIS) to separate weight-based attributions made about “the other” from weight-based attributions made about “the self.” The authors suggest that attributions about one’s self, which reflect the internalization of weight bias, rather than just the presence of antifat attitudes, is an important contributing factor to negative psychological outcomes among overweight or obese individuals. The distinction between perceptions of the attitudes of others and attitudes toward one’s group is critical for understanding responses to stigma. With respect to racial and ethnic bias, for example, Crocker *et al.* found that whereas perceptions of others’ attitudes were not consistently related to well-being, members of racial and ethnic minority groups who personally held their own group in lower esteem systematically experience lower levels of personal well-being (17).

In their initial study of the WBIS, Durso and Latner (16) demonstrated excellent reliability and validity of the scale based on an Internet community sample of overweight and obese adults. The scale showed strong partial correlations with self-esteem, eating disturbances, depression, and anxiety while controlling for BMI. Furthermore, they demonstrated that the WBIS was able to explain variance in measures of psychopathology and self-esteem beyond other measures of explicit antifat attitudes as well as BMI, which were not found to be associated with those psychological measures.

Given that youth are particularly vulnerable to weight stigma (18), and disordered-eating patterns and mood disturbances frequently emerge during adolescence (19–21), it is critical to explore the impact of internalized weight stigma on the psychological well-being of obese adolescents. To our knowledge, no studies have explored weight bias internalization using the WBIS in obese youth. Thus, the goal of the current study was to examine the psychometric properties and clinical correlates of internalized weight bias as measured by the WBIS in a sample of male and female adolescents seeking weight-loss surgery. Based on Durso and Latner’s findings (16), we hypothesized that the WBIS would exhibit good psychometric properties in a sample of severely obese youth and that internalized weight bias would be associated with greater levels of psychopathology. Specifically, we expected that higher scores on the WBIS would be associated with higher levels of depression, anxiety, general maladaptive behaviors and disordered-eating behaviors and cognitions and lower quality of life. Given research indicating that weight- and appearance-based teasing are related to increased likelihood of depression and suicidal ideation and attempts (22–27), we also hypothesized that the WBIS would be positively associated with the presence of current or past psychiatric diagnoses, psychiatric treatment, and past serious suicidal ideation.

## METHODS AND PROCEDURES

### Participants

Participants were 65 severely obese adolescents enrolled in the Center for Adolescent Bariatric Surgery (CABS) program at the Morgan Stanley Children’s Hospital of New York Presbyterian at the Columbia University Medical Center (CUMC) between February 2006 and March 2008. Adolescents were eligible for bariatric surgery if they met the following criteria: (i) age between 14 and 18 years, (ii) BMI >40 kg/m<sup>2</sup> or BMI >35 kg/m<sup>2</sup> with serious comorbid conditions (e.g., type II diabetes, hyperlipidemia, sleep apnea); (iii) long-standing severe obesity with documented attempts of weight loss for at least 6 months; (iv) evidence of sufficient emotional maturity to comply with the study protocol (i.e., compliance with pre-surgery eating guidelines, knowledge of postsurgery expectations); (v) appropriate contraception and not planning to become pregnant over the year following surgery; (vi) absence of medical contraindications (e.g., anomalies of the gastrointestinal tract, prior gastric surgery, etc.); and (vii) absence of self-induced vomiting.

### Procedures

A more detailed description of the psychiatric evaluations conducted as part of the CABS program are reported elsewhere (R. Sysko, E.B. Finkelson, M.J. Devlin, and B.T. Walsh, unpublished data). Clinical interviews were conducted by a psychologist or psychiatrist trained in the assessment of eating and weight disorders with the surgery candidates and at least one parent. A semi-structured interview template was developed by two of the study investigators and assessed the following domains: demographic characteristics, motivation for weight-loss surgery (adolescent and parent), a weight history, eating disorder psychopathology, psychiatric symptoms, including current and past Diagnostic and Statistical Manual of Mental Disorders fourth edition Axis I diagnoses, a school and social history and family history of medical and psychiatric problems (adolescent and parent). Self-report questionnaires were also completed and written informed consent and assent were obtained from the parents and adolescents respectively prior to the evaluations. The CUMC institutional review board approved this study.

### Measures

**WBIS.** This 11 item self-report scale measures the degree to which a respondent believes that negative stereotypes about overweight and obese persons are applicable to him or her (16). Responses are measured on a 7-point Likert scale ranging from “strongly disagree” to “strongly agree.” Excellent reliability (Cronbach’s  $\alpha = 0.90$ ) and validity of the scale was demonstrated in an Internet community sample of overweight and obese participants (16).

**The Eating Disorder Examination Questionnaire (EDE-Q).** This self-report questionnaire assesses the diagnostic criteria for eating disorders and other clinical symptoms (28). The EDE-Q captures the frequency of objective bulimic episodes (OBES; experiencing a loss of control while consuming unusually large amounts of food), subjective bulimic episodes (SBES; experiencing a loss of control while eating subjectively, rather than unusually, large quantities of food), in addition to inappropriate compensatory behaviors (self-induced vomiting, laxative misuse, etc). The EDE-Q also generates four subscales: dietary restraint, eating concerns, weight concerns, and shape concerns. This questionnaire has adequate test-retest reliability (29,30), good convergence with the interview-based version with various disordered-eating groups (31,32) and is superior to the interview format at capturing compensatory behaviors (33). Among adults seeking bariatric surgery, the EDE-Q subscales have been found to be significantly correlated with the interview (34,35).

**The Beck Depression Inventory (BDI).** This is a widely used, well-established measure to assess depressive symptoms and negative affect (36). Higher scores correspond to higher levels of depression and the scale has excellent reliability (Cronbach’s  $\alpha$  ranging from 0.90 to 0.94) and validity (37,38).

**Multidimensional Anxiety Scale for Children (MASC).** This 39 item self-report scale captures a range of anxiety symptoms among children and adolescents (aged 8–19) (39). The scale produces a total score and four main factors: physical symptoms, social anxiety, harm avoidance, and separation anxiety. It has demonstrated excellent internal reliability (Cronbach's  $\alpha = 0.90$ ), satisfactory test-retest reliability and adequate validity (39,40).

**Child Behavior Checklist and Youth Self-Report (CBCL, YSR).** These widely used measures capture the following eight constructs or syndromes among children and adolescents: social withdrawal, somatic complaints, anxiety/depression, social problems, thought problems, attention problems, delinquent behavior, and aggressive behavior (41). The CBCL is completed by the child's parent and the YSR is completed by the child. The CBCL has excellent reliability (Cronbach's  $\alpha = 0.96$ ). The YSR has excellent reliability for the total problem score (Cronbach's  $\alpha = 0.95$ ), but lower reliability for competence items (Cronbach's  $\alpha = 0.47$ ) (41,42).

**Pediatric Quality of Life Inventory 4.0 (PEDI-Q).** This scale, which includes child self-report and parent proxy-report scales, is a measure of health-related quality of life designed for children and adolescents aged 2–18 (43). Four generic core scales (physical, emotional, social, and school) comprise the total 23 items, which also yield an overall score. Good scale reliability (Cronbach's  $\alpha = 0.88$  child report, 0.90 parent report) and validity has been demonstrated in both healthy participants and those with acute or chronic conditions (43).

**Clinical interview.** A psychiatrist or psychologist who captured information about age, gender, and race/ethnicity from the adolescent participants conducted this interview, which was developed for the study (44). In addition, current and past psychiatric diagnoses as well as psychological treatment history and past serious suicidal ideation were established during the interview. Parents were interviewed separately following their child's interview. The parent interview included a subset of questions that were asked of the adolescent to ascertain parent's perceptions of the child's compliance and satisfaction with the program. However, psychiatric diagnoses were determined primarily through adolescent report.

**BMI.** Height and weight were measured by a member of the CABS staff and were used to calculate BMI generated by dividing weight in kilograms over height in meters squared ( $\text{kg}/\text{m}^2$ ).

### Statistical analysis

All analyses were conducted using SPSS 18.0 (SPSS, Chicago, IL). Parallel analysis was performed prior to principal factors extraction to estimate the number of factors of the WBIS. Parallel analysis is preferred to other common methods of factor identification and retention such as the Kaiser–Guttman rule, which suggests that factors with eigenvalues of one or greater be retained or Cattell's scree test (45). Factors are identified via parallel analysis by creating random datasets and extracting eigenvalues from these data via principal components analysis. The mean and 95th percentile of eigenvalues across the random datasets are then calculated and the 95th percentile average eigenvalues are compared to the eigenvalues extracted from the original dataset (45). Only factors with eigenvalues greater than those of the randomly generated dataset should be retained (45). Since using the 95th percentile average eigenvalues is a more conservative approach than using the mean eigenvalues, it was selected for this study. Following parallel analysis, principal factors extraction with oblique rotation was performed on 11 items from the WBIS and factor loadings were examined. Pearson product moment item-total correlations and Cronbach's  $\alpha$  were then calculated to assess reliability of the final scale in this sample of obese youth.

Once the final scale items were identified, Pearson correlations were performed to assess clinical correlates of the WBIS. Associations between the WBIS and variables that were highly skewed were examined with Kendall's  $\tau$  correlations. An exploratory independent sample one-way ANOVA was also conducted to examine potential differences in WBIS

scores between males and females. Finally, three logistic regression analyses using simultaneous variable entry were conducted to evaluate relationships between the WBIS while controlling for other key clinical variables and psychiatric diagnosis, treatment history and past suicidal ideation. An  $\alpha$  level of less than 0.05 was used to evaluate statistical significance and all tests were two-tailed.

## RESULTS

### Participant characteristics

A total of 65 adolescents completed the WBIS and all participants were included in the factor analysis. Eight of the 65 did not complete the other measures, so were excluded from other analyses. The sample of 57 participants was composed of 11 males (19.3%) and 46 females (80.7%). The racial/ethnic distribution of the sample was: 50.9% white, 31.6% Hispanic, 12.3% African American and 5.3% identifying as other. The mean age was  $15.65 \pm 1.08$  years and the mean BMI was  $46.92 \pm 7.86 \text{ kg}/\text{m}^2$  (range 35.90–72.30  $\text{kg}/\text{m}^2$ ). Twenty seven (42%) adolescents met criteria for at least one current or past psychiatric diagnosis, 40 (70%) reported ever receiving psychiatric treatment, and 10 (18%) endorsed past serious suicidal ideation. Fourteen (33%) of the adolescents completing the OBE question of the EDE-Q ( $N = 43$ ) reported at least one OBE during the previous month. Ten (23%) of the adolescents ( $N = 44$ ) answering the SBE question reported at least one SBE in the previous month.

### Scale psychometric properties

**Test reliability.** Comparison of the raw data eigenvalues and randomly generated eigenvalues suggested that one factor should be retained (see Table 1 for eigenvalues).

Total-item correlations performed on the eleven WBIS questions revealed correlations above 0.2 for each item-total pair. Principal factors extraction performed on the 11-item scale indicated that all items had loadings of 0.4 or greater, with the exception of item nine (loading = 0.387) and item one (loading = 0.140, "As an overweight person, I feel that I am just as

**Table 1** Actual and random eigenvalues from parallel analysis performed on weight bias internalization scale

Actual eigenvalue	Average eigenvalue	95th Percentile eigenvalue
5.667 <sup>a</sup>	0.912	1.132
0.788	0.664	0.861
0.369	0.488	0.652
0.147	0.333	0.463
0.111	0.200	0.308
-0.014	0.081	0.170
-0.036	-0.025	0.046
-0.061	-0.115	-0.047
-0.087	-0.200	-0.140
-0.141	-0.287	-0.222
-0.210	-0.370	-0.323

<sup>a</sup>One factor retained based on comparison of actual eigenvalue to 95th percentile eigenvalue.

competent as anyone).” Item nine was retained because it was very close to the 0.4 threshold, while item one’s low loading led to its removal (see **Table 2** for factor loadings). Cronbach’s  $\alpha$ , reflecting the internal consistency of the new 10-item WBIS, was 0.92 and all total-item correlations for this 10-item scale were above 0.4. (**Table 2**)

**Correlations with psychopathology.** The average WBIS score was  $4.29 \pm 1.52$  (range: 1.5–6.6) compared to a mean of  $3.95 \pm 1.28$  (range: 1.33–6.50) in the Durso and Latner study (16). The item

means for the WBIS (see **Table 2**) in this adolescent sample were similar to those observed in Durso and Latner’s adult sample (16). **Table 3** presents correlations between the WBIS average scores and measures of psychopathology. Based on Pearson correlations, age, BMI, and dietary restraint as measured by the EDE-Q were not associated with WBIS scores. The WBIS was significantly positively correlated with the BDI, CBCL, YSR, MASC and the eating, shape, and weight concerns subscales of the EDE-Q. The WBIS was also negatively correlated with the PEDS-QL. To assess possible overlap between the WBIS and

**Table 2 Weight bias internalization scale items and factor loadings**

Item number	Scale item	Item mean	Item-total correlation	Final scale item-total correlation	Final scale factor loading
1	As an overweight person, I feel that I am just as competent as anyone.	3.11	0.344		
2	I am less attractive than most other people because of my weight	4.62	0.699	0.721	0.741
3	I feel anxious about being overweight because of what people might think of me	4.60	0.770	0.770	0.753
4	I wish I could drastically change my weight	5.65	0.658	0.682	0.690
5	Whenever I think a lot about being overweight, I feel depressed	4.43	0.904	0.904	0.871
6	I hate myself for being overweight	3.46	0.854	0.851	0.703
7	My weight is a major way that I judge my value as a person	3.25	0.812	0.815	0.656
8	I don't feel that I deserve to have a really fulfilling social life, as long as I'm overweight	2.31	0.633	0.636	0.448
9	I am OK being the weight that I am	5.45	0.497	0.485	0.398
10	Because I'm overweight, I don't feel like my true self	4.62	0.809	0.816	0.834
11	Because of my weight, I don't understand how anyone attractive would want to date me	4.49	0.896	0.902	0.913

**Table 3 Correlations and partial correlations for the weight bias internalization scale and other psychological variables**

	AGE	BMI	BDI	YSR	CBCL	Restraint	EC	SC	WC	Peds-QL	MASC
Age (years)	1										
BMI (kg/m <sup>2</sup> )	0.013	1									
Beck Depression Inventory (BDI)	-0.043	0.027	1								
Youth Self-Report Total (YSR)	0.130	0.105	0.533 <sup>b</sup>	1							
Child Behavior Checklist Total (CBCL)	0.083	0.059	0.494 <sup>b</sup>	0.374 <sup>b</sup>	1						
<i>Eating Disorder Examination-Questionnaire</i>											
Restraint subscale (Restraint)	0.091	-0.045	-0.002	0.004	0.010	1					
Eating Concerns subscale (EC)	0.109	0.157	0.569 <sup>b</sup>	0.345 <sup>a</sup>	0.274	0.118	1				
Shape Concerns subscale (SC)	0.092	-0.047	0.563 <sup>b</sup>	0.247	0.288	0.033	0.688 <sup>b</sup>	1			
Weight Concerns subscale (WC)	0.073	-0.148	0.554 <sup>b</sup>	0.223	0.323	0.152	0.528 <sup>b</sup>	0.824 <sup>b</sup>	1		
Pediatric Quality of Life-teen self-report (Peds-QL)	-0.047	-0.106	-0.548 <sup>b</sup>	-0.124	-0.596 <sup>b</sup>	0.124	-0.427 <sup>b</sup>	-0.477 <sup>b</sup>	-0.406 <sup>a</sup>	1	
Multidimensional Anxiety Scale for Children (MASC)	0.075	0.221	0.379 <sup>b</sup>	0.379 <sup>b</sup>	0.324 <sup>a</sup>	-0.234	0.347 <sup>a</sup>	0.366 <sup>a</sup>	0.105	-0.487 <sup>b</sup>	1
Weight Bias Internalization Scale (WBIS)	0.169	0.044	0.520 <sup>b</sup>	0.366 <sup>b</sup>	0.310 <sup>a</sup>	-0.081	0.581 <sup>b</sup>	0.813 <sup>b</sup>	0.570 <sup>b</sup>	-0.483 <sup>b</sup>	0.467 <sup>b</sup>
WBIS partial correlations controlling for BMI	0.169		0.519 <sup>b</sup>	0.364 <sup>b</sup>	0.307 <sup>a</sup>	-0.106	0.579 <sup>b</sup>	0.815 <sup>b</sup>	0.545 <sup>b</sup>	-0.480	0.465 <sup>b</sup>

<sup>a</sup>Correlation is significant at the 0.05 level (two-tailed).<sup>b</sup>Correlation is significant at the 0.01 level (two-tailed).

**Table 4 Odds ratios (ORs), 95% confidence intervals (CIs) and *P* values for logistic regression analyses**

Independent variable	Psychiatric diagnosis		Psychiatric treatment		Past suicidal ideation	
	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>
BMI	1.01 (0.94, 1.09)	0.799	1.10 (0.99, 1.22)	0.072	0.95 (0.85, 1.05)	0.320
BDI	1.14 (1.03, 1.27)	0.013 <sup>a</sup>	1.01 (0.93, 1.11)	0.773	1.03 (0.93, 1.15)	0.541
MASC	1.00 (0.94, 1.07)	0.943	1.00 (0.94, 1.07)	0.992	1.02 (0.94, 1.10)	0.713
WBIS	0.89 (0.54, 1.46)	0.638	0.98 (0.59, 1.61)	0.921	0.77 (0.43, 1.39)	0.385

BDI, Beck Depression Inventory; MASC, Multidimensional Anxiety Scale for Children; WBIS, Weight Bias Internalization 10-item Scale. <sup>a</sup>Significant at *P* < 0.05.

dissatisfaction and desire to change weight because of weight-related health problems, we examined the correlation between the Physical Quality of Life subscale of the PEDS-QL and the WBIS. There was a significant correlation between the two ( $r = 0.373$ ,  $P = 0.007$ ). Partial correlations, which controlled for BMI, replicated the findings from the first correlation analyses. Because the reported number of OBEs and SBEs were significantly skewed, Kendall's  $\tau$  correlations were performed to examine the relationship between frequency of OBEs, SBEs, and the WBIS. These analyses revealed a significant positive relationship between the number of OBEs ( $\tau = 0.325$ ,  $P = 0.007$ ) and the WBIS, but the relationship was not significant between the WBIS and the number of SBEs ( $\tau = 0.229$ ,  $P = 0.061$ ) (Table 3).

Though the sample size was small, an exploratory independent samples one-way ANOVA was conducted, but did not detect any significant differences in WBIS scores between males and females ( $F(1, 55) = 0.571$ ,  $P = 0.453$ ,  $\eta^2 = 0.01$ ).

**Logistic regression analyses.** Results from the logistic regression analyses are presented in Table 4. All predictor variables included in the analyses were mean-centered. Three logistic regression analyses were performed to examine whether BMI, BDI, MASC, and the WBIS were significant predictors of (i) current or past psychiatric diagnoses; (ii) any psychiatric treatment; or (iii) past serious suicidal ideation. Due to the small sample size and concerns about multicollinearity among the psychological variables, only the BDI and MASC were included as psychological predictors in the logistic regression models along with BMI and the WBIS. These predictors were chosen because they are measures of depression and anxiety symptoms, which were likely to be the strongest predictors of psychiatric diagnosis and suicide attempts compared to measures of quality of life, eating variables and conduct problems. All response variables were coded zero or one to reflect the presence or absence of the variable of interest. The BDI was the only psychological variable associated with a current or past psychiatric diagnosis. None of the other variables, including the WBIS, were significantly associated with any of the three response variables (Table 4).

## DISCUSSION

This was the first study to examine the WBIS in a sample of severely obese adolescents seeking weight-loss surgery. In this sample, the WBIS had high internal consistency and the same unitary factor structure identified by Durso and Latner (16) was replicated, though one additional item was removed from the scale creating a final 10-item version. In addition, similar

item means were reported in this obese adolescent sample when compared to Durso and Latner's adult overweight and obese sample (16). We replicated Durso and Latner's (16) finding that the WBIS scale is positively correlated with a variety of measures of psychopathology, but not correlated with BMI. It is possible that the internalization of weight bias is not contingent upon degree of overweight, or it may be due to the fact that there was little variability in BMI in this sample because all participants had a BMI greater than 35 kg/m<sup>2</sup>. Similar to Durso and Latner (16), there was also a significant relationship between frequency of binge eating and the WBIS, but no relationship between SBEs, which indicate a loss of control while eating a subjectively large amount of food. In addition, the WBIS correlated highly with measures of eating concerns and shape and weight concerns and did not correlate with dietary restraint. We also expanded upon Durso and Latner's (16) work by showing that the WBIS was positively related to a measure of social problems and maladaptive behaviors and inversely related to quality of life. However, the WBIS was correlated with the Physical Quality of Life subscale of the PEDS-QL as well, suggesting that it might also be capturing dissatisfaction with and desire to change weight due to weight-related health problems.

Contrary to our hypotheses, which were based on research identifying a relationship between weight- and appearance-based teasing and psychiatric problems, the WBIS did not predict the presence of a current or past psychiatric diagnosis, receipt of psychiatric treatment or past serious suicidal ideation after controlling for BDI and MASC scores and BMI. However, with the exception of BDI predicting psychiatric diagnosis status, none of the other variables were associated with diagnosis, psychiatric treatment history or past suicidal ideation. The lack of a relationship between the psychological variables and suicidal ideation may reflect the discrepancy between assessing current psychological status and past suicidal ideation. It is also possible that pursuit of psychiatric treatment in this sample is more strongly driven by other factors like the parents and/or adolescents seeking possible explanations for severe obesity in the absence of significant psychiatric symptoms. Finally, it is possible that in anticipation of bariatric surgery, the reporting of psychological symptoms was dampened and may partially explain the lack of associations between the predictors and response variables.

This study is limited by a small sample size. However, the single factor and strong item factor loadings suggest the 5:1 item to factor ratio is reasonable, though replication of the factor

structure in larger samples is needed (46). An additional limitation is that no other measure of antifat attitudes was collected in this sample, preventing an evaluation of whether the WBIS predicts psychological outcomes above and beyond a measure of antifat attitudes as Durso and Latner demonstrated (16).

While this study has several limitations, it also has a number of strengths. This is the first study to examine the WBIS in a racially/ethnically diverse obese adolescent treatment-seeking sample. In addition, weight and height were obtained in person to calculate BMI, rather than relying on self-report.

Future research should longitudinally follow adolescents receiving bariatric surgery to examine the relationship between internalized weight stigma and surgery outcome and assess how internalized weight stigma changes with weight loss. Similar to the results of the current study, another study of overweight and obese adults undergoing a behavioral weight-loss program found that the WBIS was associated with depression, body dissatisfaction, and binge frequency at baseline (47). Following 14 weeks of treatment, participants demonstrated decreased internalized weight bias; additionally, they reported decreased explicit antifat biases, depression, body image disturbance, and binge-eating behaviors following the program, though the mechanisms explaining these changes are unknown and require further study in both adults and adolescents.

The current study in conjunction with existing research finds that internalized weight stigma is associated with elevated levels of psychopathology, but more work is needed to understand the ways in which the internalization of weight stigma influences behaviors and impacts long-term psychological and health outcomes among adolescents. Research suggests that adults who internalize weight bias and negative weight-based stereotypes are more likely to engage in binge-eating behaviors and are more likely to report coping with stigma by refusing to diet and consuming more food (11). In fact, the experience of weight stigma has been shown to hinder weight-loss efforts; it was associated with increased caloric intake, decreased exercise, and increased attrition in a sample of overweight and obese adults participating in a behavioral weight-loss trial (48). However, when healthcare providers sensitively addressed the issue of weight stigma and appropriate coping mechanisms with overweight patients, weight-loss efforts were bolstered and psychological distress was decreased (49).

Therefore, greater efforts should be made to inform healthcare providers of the potential presence of weight bias internalization and its psychological correlates, such as depression and binge eating, among overweight and obese patients. As overweight and obese youth are particularly vulnerable to weight stigma, psychopathology, and disordered-eating behaviors healthcare providers have a unique opportunity to assess and address weight bias internalization in treatment-seeking children and adolescents. The WBIS could be a helpful tool to quickly assess weight bias internalization in these clinical populations and identify patients who need support from healthcare providers to cope with weight stigma. Such efforts have the potential to increase weight loss and improve psychological health and functioning.

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## DISCLOSURE

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