Published in final edited form as:
Int J Eat Disord. 2010 November 1; 43(7): 628–632. doi:10.1002/eat.20746.

Psychological and Behavioral Correlates of Excess Weight: Misperception of Obese Status among Persons with Class II Obesity

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Abstract

Objective—This study examined psychological and behavioral correlates of weight status perception in 173 class II obese adult community volunteers.

Method—Participants completed the EDE-Q, TFEQ, Beck Depression Inventory, and Rosenberg Self-Esteem Scale online. Key items assessed dieting frequency, weight history, and perceived current weight status (normal weight, overweight, or obese). Actual weight status was determined using NIDDK/CDC classification schemes.

Results—Among class II obese participants, 50.9% incorrectly classified their weight as overweight versus obese, while 49.1% accurately perceived their weight status as obese. Inaccurate participants reported significantly less binge eating and less eating disorder psychopathology. Despite similar BMI, inaccurate participants reported less distress regarding overeating and loss of control over eating.

Discussion—Our findings suggest that obesity status under-estimation is associated with less eating disorder psychopathology. Under-estimation of obesity status may exacerbate risk for negative health consequences due to a failure to recognize and respond to excess weight.

Obesity is an increasingly common and serious problem in the United States [1]. Recent estimates suggest that 66.3% of adults are overweight or obese (BMI ≥ 25.0 kg/m^2) [2]. In spite of public health efforts promoting increased awareness of overweight and obesity, a substantial proportion of adults may inaccurately identify their weight status [3,4]. Among overweight and obese individuals, under-estimation of weight status may contribute to minimization or denial that current weight is a health risk [3], and may thus contribute to health problems associated with obesity due to a failure to respond [5,6].

Earlier studies have explored demographic differences in weight status perception among overweight and obese as a unitary group. Accuracy in overweight perception has been associated with age, gender, race, BMI, physical activity level, smoking behavior, income, and educational background [3,4,7-11]. However few studies have examined psychological and behavioral correlates of weight status misclassification among obese individuals. Psychological and behavioral characteristics are particularly important to examine among more severely obese individuals (e.g., class II) who under-estimate their weight status.

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These individuals are also at higher risk of medical problems than overweight or less severely obese individuals due to greater adiposity. Given that research consistently demonstrates an association between obesity and depression, low self-esteem, and poorer quality of life [12,13], it is important to understand the relationship between psychological factors and accuracy of weight status perception.

While several studies suggest that accuracy of self-reported weight appears to be unrelated to psychological features (e.g., [11,14-16], the literature remains very limited. Notably, these studies did not ask participants to identify their weight status as under weight, normal weight, overweight, or obese but rather examined the discrepancy between self-reported and actual weight. It may be more relevant from a behavioral or clinical perspective to examine how obese individuals who identify as "obese" differ from those who misidentify their weight status as "overweight." Additionally, previous research on weight misperception has classified individuals as accurate or inaccurate according to standard cut-offs for weight classifications. Therefore individuals who are just beyond a given cutoff are grouped alongside individuals with much greater disparity between actual and reported classifications. The current study seeks to examine weight status misperception among individuals classified as Class II obese (35≤BMI<40), and to determine whether, within this group, accuracy in weight status perception is associated with psychological and behavioral factors.

Methods

Participants

Participants were 173 male and female adults with class II obesity who responded to online advertisements requesting participation in a research study on eating and dieting. Participants were required to be at least 18 years of age and have a body mass index (BMI) between 35.0 to 39.9 kg/m^2. The sample mean BMI was 37.4 (sd = 1.4) and mean age was 37.9 (sd=11.7) years. The sample consisted of 28 men and 143 women; 2 participants did not report their gender. The racial/ethnic distribution was 76.9 % (n = 133) white, 7.5% (n=13) black, 5.8% (n=10) Hispanic, 2.3% (n=5) Asian, and 6.9% (n=12) "other" or unknown.

Assessment Methods and Measures

Participants completed self-report questionnaires through an online data gathering website, SurveyMonkey (http://www.surveymonkey.com). Participants were required to provide informed consent prior to accessing the questionnaires. No identifying information was collected. Participants provided basic demographic information including age, sex, and race/ethnicity and completed a battery of measures:

The *Eating Disorder Examination-Self-Report* (EDE-Q; [17]) was used to assess eating-related problems, including the frequency of various forms of overeating and binge eating. The EDE-Q yields a global score and assesses four features of eating disorders: dietary restraint, eating concerns, weight concerns, and shape concerns. The EDE-Q also measures distress associated with overeating and loss of control over eating. The *Three Factor Eating Questionnaire* (TFEQ) [18] is a widely used measure of eating behaviors with three factors: cognitive restraint, disinhibition, and hunger. The *Questionnaire for Eating and Weight Patterns -- Revised* (QEWP-R; [19]) assesses each criterion of binge eating disorder, and assesses historical variables (age onset of obesity, dieting, and weight cycling). The *Emotional Overeating Questionnaire* (EOQ; [20]) measures the frequency of overeating in response to various emotions (e.g., loneliness, anger, sadness) over the previous 28 days. The Beck Depression Inventory (BDI; [21]) 21-item version assesses current depression

level and symptoms of depression. Higher scores on the BDI reflect higher levels of depression and, more broadly, negative affect and signals more disturbed eating behaviors [22]. The *Rosenberg Self-Esteem Scale* (RSES; [23] is a 10-item well-established and widely used measure of global self-esteem. Subjects rate the items on a scale from 1 (strongly agree) to 4 (strongly disagree); higher scores reflect higher self-esteem.

Creation of Study Groups: Accurate versus Inaccurate

Self-perception of weight status was assessed with the following question, "In terms of your current weight, do you perceive yourself to be: underweight, normal weight, overweight, obese." Participants provided self-reported weight and height, which were converted to BMI. We divided the study population into two groups for the primary analyses: obese participants who inaccurately perceived their weight status as overweight (OB-In; n=89), and obese individuals who accurately perceived obese status (OB-Ac, n=84). No participants described themselves as normal weight or underweight. We chose to examine weight misperception among individuals with Class II obesity (i.e., BMI range 35-40) [24] because this classification allowed a more clear examination of widely disparate self-classification. For all individuals in the current study, weight misclassification as overweight required a difference of at least 5 BMI points (i.e., perception of weight status consistent with a BMI less than 30, whereas actual BMI is greater than 35).

Results

Accuracy of Weight Status Perception and Participant Characteristics

Among participants with class II obesity, 50.9% classified their weight as overweight versus obese (Obese-Inaccurate, OB-In), while 49.1% accurately perceived their weight status as obese (Obese-Accurate, OB-Ac). Male participants (67.9%; n = 19 of 28) were more likely to under-estimate their weight status than female participants (47.6%; n = 68 of 143), χ^2 (1, 171) =3.86, p=.049. The weight perception groups did not differ significantly on age, ethnicity (white vs. non-white), or BMI.

Psychological and Behavioral Features Associated with Weight Status Misperception

Table 1 presents the psychological and behavioral characteristics of OB-In and OB-Ac participants. The overall MANOVA to compare weight perception groups on outcome variables was significant (F(19, 58) = 1.98, p=.025; Wilke's Lambda = .607). Follow-up ANOVAs revealed a consistent pattern of significant group differences. OB-In participants had significantly lower levels of most eating-related psychopathology and eating behavior than OB-Ac participants. Although the group differences were consistently statistically significant the effect sizes were small with one notable exception. OB-In participants reported significantly fewer binge eating episodes (OBEs) than OB-Ac individuals and the effect size (partial eta-squared = .143) was medium. The groups did not differ on two general psychological variables (depression or self-esteem). The OB-In group reported less distress regarding overeating and less distress regarding loss of control over eating as well as a non-significant (p=.07) trend towards less time spent dieting. Although the weight perception groups did not differ on BMI, we performed ANCOVA to control for a potential effect of BMI on psychological variables. After controlling for BMI, the same pattern of group differences was observed with all main effects remaining significant (Table 1).

Discussion

This study found that a substantial proportion of individuals with class II obesity inaccurately classified their weight status. We also found that a significantly higher proportion of obese men than women under-estimate their weight status. These findings

replicate and extend previous research findings that many persons tend to under-report their weight [3,4,25] and especially men [7-9]. Our study specifically examined weight status misperception among individuals classified as Class II obese (35≤BMI<40) and explored for correlates of correct classification. This strategy seemed indicated because presumably the inaccurate "self-definition" of being overweight or obese would have greater behavioral implication (i.e., dieting or help-seeking) than inaccurate weight reporting per se.

Our findings suggest that obese individuals who under-estimate their weight status (i.e., perceive themselves as "overweight" rather than "obese") do not differ significantly on two important general psychological variables (depression or self-esteem) but report significantly less eating disorder psychopathology, including less binge eating, than obese individuals who accurately identify their weight status. These differences were observed even after controlling for BMI. Of course, we can not rule out the possibility that obese patients who under-report their obesity status also under-report their eating disorder psychopathology. The fact that patients who under-report their obesity status did not differ in depression or self-esteem levels would argue somewhat against a "generic" minimization or denial response style. The general pattern of results indicating greater eating disorder psychopathology among individuals who perceive their weight status as "obese" is also consistent with Atlantis and Ball's [14] finding that the *perception* of being overweight was associated with greater psychological distress, whereas merely *being* overweight was not associated with distress.

Although there may be psychological benefits associated with weight status underestimation (i.e., less ED psychopathology) these findings need to be interpreted in the context of research showing that weight status underestimation is also associated with minimization of health risks and lower motivation to lose weight [3,26]. We note here that the OB-In group reported significantly less distress regarding overeating and less distress regarding loss of control over eating as well as a non-significant trend towards less time spent dieting. This raises a key question for the design of public health messages and weight management interventions: how to balance the need for accurate weight status perception, appraisal of health risks, and appropriate weight management with the importance of promoting psychological health including positive body image, self-esteem, and healthy eating attitudes and behaviors.

Strengths of this study include a large and geographically diverse sample and the use of multiple well-validated measures to examine psychological and behavioral correlates. Limitations include the cross-sectional study design, which precludes any discussion of causality. Secondly, self-reported height and weight were used to compute BMI. It should be noted, however, that self-reported height and weight are highly correlated (i.e., r's >.9) [14,27] with clinic measures, even among obese groups [11], suggesting that self-reported height and weight are an adequate proxy for measured weights. Future studies should examine longitudinal trajectories, specifically weight changes and weight loss behaviors, weight status perception, and psychological status, of individuals who over- and underestimate weight status. This would provide information about the long-term effects of weight status perception and allow weight management interventions to be tailored to individual needs.

Acknowledgments

We were supported by grants from the National Institutes of Health (K24 DK070052, K23 DK071646, R01 DK49587, R01 DK073542, and R21 MH077290). No additional funding was received for the completion of this work.

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Table 1

Psychological and Behavioral Characteristics of Participants

	OB-In (n=87)		OB-Ac (n=84)					ANCOVA (control BMI)		
	M	***SD***	***M***	***SD***	**F**	**p**	**eta^2**	**F**	**p**	**eta^2**
BMI	37.35	1.45	37.53	1.40	0.71	.40	.004			
Beck Depression Inventory	16.32	8.89	19.28	10.30	3.26	.07	.023	3.08	.08	.022
Rosenberg Self-Esteem Scale	27.02	5.68	25.20	6.97	2.76	.10	.020	2.57	.11	.019
Eating Disorder Examination Questionnaire										
Dietary Restraint	2.45	1.58	2.64	1.68	.53	.47	.003	0.54	.46	.003
Eating Concern	1.91	1.48	2.59	1.72	7.27	.01	.043	7.33	.01	.044
Weight Concern	3.70	1.39	4.20	1.22	6.44	.01	.039	6.12	.01	.037
Shape Concern	4.15	1.57	4.68	1.23	5.80	.02	.035	5.49	.02	.033
Global Score	3.05	1.30	3.53	1.18	5.98	.02	.036	5.83	.02	.035
Objective Bulimic Episodes	4.63	3.79	11.00	8.88	21.34	.00	.143	16.93	.00	.145
Distress Re: Loss of Control	2.96	1.18	3.40	1.20	5.67	.02	.033	5.63	.02	.033
Distress Re: Overeating	3.25	1.09	3.60	1.08	4.29	.04	.026	4.64	.03	.028
Three-Factor Eating Questionnaire										
Hunger	7.73	3.90	8.67	3.45	2.49	.12	.016	2.33	.13	.015
Cognitive Restraint	9.47	4.26	9.09	4.69	.28	.60	.002	0.12	.73	.001
Disinhibition	9.68	3.59	10.90	3.24	4.81	.03	.031	4.85	.03	.032
Emotional Overeating Questionnaire	1.16	1.21	1.79	1.63	7.24	.01	.046	6.76	.01	.043
Age at Onset of Overweight	15.62	7.68	14.47	8.17	0.84	.36	.005	0.86	.35	.005
Time Dieting	2.86	1.21	3.21	1.23	3.40	.07	.020	3.48	.06	.021
Weight Cycling	2.71	1.02	2.90	0.99	1.61	.21	.010	1.51	.22	.009