Body Dissatisfaction Adjusted for Weight: The Body Illusion Index

David M. Garner
Maureen V. Garner
Lawrence F. Van Egeren

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The current study extends earlier observations that body dissatisfaction is positively associated with body weight for eating disorder patients and for nonpatient college women. An adjustment to the Eating Disorder Inventory (EDI) Body Dissatisfaction score (i.e., the "Body Illusion Index" or "BII") is proposed to statistically eliminate the effects of relative body weight on Body Dissatisfaction scores and to systematically increase Body Dissatisfaction scores at lower relative weights. The adjustment results in a mean adjusted body dissatisfaction score for the anorexia nervosa patients more closely resembling that for bulimia nervosa patients and differing significantly from normal weight college women. The "Body Illusion Index" addresses the different meanings and clinical significance that body dissatisfaction implies for individuals at different weights.

Attitudinal disturbances such as extreme body dissatisfaction and overconcern with weight and shape have proven to be useful constructs in both the understanding and the treatment of eating disorders. They have intuitive appeal since, on a very basic level, they help to explain the substantial numbers of young women who use harmful weight control behaviors such as self-induced vomiting, with a subgroup of these manifesting serious eating disorders (Fairburn & Cooper, 1982; Killen et al., 1987; Pyle, Halvorson, Neuman, & Mitchell, 1986). The consensus that these attitudes are central features of eating disorders has led to their incorporation into existing diagnostic criteria for both anorexia nervosa and bulimia nervosa by the American Psychiatric Association (APA, 1987). It has also resulted in the proliferation of questionnaires, interviews, and other operational measures, each with their respective merits and limitations (cf. Cash & Pruzinsky, 1990; Hsu & Soblkiewicz, 1991; Rosen, 1990; Thompson, Penner, & Altabe, 1990).

There are many facets to the disturbed beliefs about the body, and one that has re-

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David M. Garner, Ph.D., is Professor of Psychiatry and Director of Research, Eating Disorders Program, Department of Psychiatry, Michigan State University. **Maureen V. Garner, Ph.D.,** is a psychologist, Neurobehavioral Clinic and Research Center, Department of Psychiatry, Michigan State University. **Lawrence F. Van Egeren, Ph.D.,** is Professor, Department of Psychiatry, Michigan State University. *Address reprint requests to Dr. David M. Garner, Department of Psychiatry, West Fee Hall, Michigan State University, East Lansing, MI 48824.*

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ceived considerable attention is body dissatisfaction. Body dissatisfaction has been shown to be associated with various problematic eating attitudes and behavioral patterns including dietary restraint, weight preoccupation, binge eating, and the risk of the development of eating disorders (Rosen, 1990). Rosen, Gross, and Vara (1987) reported that body dissatisfaction was the strongest predictor of dietary restraint for a group of high school girls when entered into a multiple regression analysis along with measures of depression, social anxiety, self-esteem, body cathexis, and desired and actual weight. In a prospective study of ballet students, Garner, Garfinkel, Rockert, and Olmsted (1987) found that Body Dissatisfaction and Drive for Thinness were the only scales on the Eating Disorder Inventory (EDI) that significantly predicted the development of eating disorders in ballet students 2 years later. Striegel-Moore, Silberstein, Frensch, and Rodin (1989) found that body dissatisfaction was a better predictor of students whose eating symptoms became worse during their first year of studies than perceived stress, ineffectiveness, perfectionism, and competitiveness. Body dissatisfaction has been shown to be associated with symptom severity (Post & Crowther, 1987; Ruderman & Grace, 1988), poor treatment outcome (Connors, Johnson, & Stuckey, 1984; Garner et al., 1990), and treatment relapse (Freeman, Beach, Davis, & Solyom, 1985) in bulimia nervosa. Treatment has been found to lead to improvement in body dissatisfaction in women without eating disorders but with disturbed body image (Rosen, Saltzberb, & Srebnik, 1989).

While current methods of reporting body dissatisfaction provide an important index of subjective distress regarding weight or shape, they do not take into account two notable facts: (1) body dissatisfaction is positively correlated with body weight, and (2) the same level of body dissatisfaction may have a very different meaning for individuals at different weights. The positive association between body dissatisfaction and body weight is evident in studies of eating disorder and nonpatient samples. Bulimia nervosa patients report significantly higher body dissatisfaction than those with anorexia nervosa (Garner, Garfinkel, & O'Shaughnessy, 1985; Touyz, Beumont, Collins, & Cowie, 1985); however, the bulimia nervosa patients are, by definition, heavier. Even within the bulimia nervosa group, patients reporting relatively high levels of body dissatisfaction weigh significantly more than those with lower body dissatisfaction (Garfinkel et al., in press). Similarly, young women who are the most dissatisfied with their body are those who are above their age and height matched norms for weight (Huenemann, Shapiro, Hampton, & Mitchell, 1966).

It is also evident that high levels of body dissatisfaction may connote more serious body image disturbance for bulimia nervosa patients who are below the weight norms, but are not thin enough to earn a diagnosis of anorexia nervosa, than for those who are heavier. The clinical significance of body image disturbance is even more striking for the subgroup of anorexia nervosa patients who express marked body dissatisfaction within the context of emaciation. On the other hand, low levels of body dissatisfaction in heavier individuals may be a positive sign, while equally low scores for emaciated patients are an anomaly since they denote contentment with an aberrant condition. Similarly, anorexia nervosa patients and nonpatient college women have comparable means on the Body Dissatisfaction subscale of the EDI; however, the eating disorder patients are, on average, about 30% thinner than the college students (Garner, 1991). Although both said to be equally satisfied, the eating disorder patients are satisfied within the context of an abnormal body weight.

The primary aims of this report are to determine the magnitude of the positive association between body dissatisfaction and body weight and to propose an adjustment to the EDI Body Dissatisfaction score that takes relative weight into account (i.e., statisti-

cally eliminates the effects of body weight on Body Dissatisfaction scores). The effect of the adjustment is to systematically augment the dissatisfaction score for thinner individuals to reflect the potential significance of high dissatisfaction at lower weights. The adjustment is referred to as a "Body Illusion Index" defining "illusion," in the literary sense, as "deception, delusion; (instance of) sense-perception of an external object involving a false belief as to its nature; misapprehension of true state of affairs . . ." (Concise Oxford Dictionary of Current English, 1984).

The current study will also examine the clinical relevance of high levels of body dissatisfaction at different weights by comparing eating disorder patients at different relative weights on measures of psychological disturbance.

METHODS

The current report involved analysis of data from the patient standardization sample (N = 889) used in the recent validation of the EDI-2 (Garner, 1991). The patients were consecutive female referrals from three sources: the Toronto General Hospital eating disorder program between 1984–1988 and thereafter, the Michigan State University eating disorder program, and the Mid-Michigan eating disorder program. The patients were divided into diagnostic subgroups consisting of 657 bulimia nervosa (BN), 103 anorexia nervosa (bulimic subtype, AN-B), and 129 anorexia nervosa (restrictor subtype, AN-R) patients according to criteria described in earlier reports (see Garner et al., 1985) with the stipulation that AN patients had to have a current weight of 80% or less than matched population mean weight (MPMW, Society of Actuaries, 1979) and BN patients had to weigh more than 80% of MPMW.

All patients completed the EDI or its revision (EDI-2), which is a self-report instrument designed to assess a broad range of psychological features that are common in eating disorders (Garner, Olmsted, & Polivy, 1983). The EDI-2 retains the eight subscales of the original instrument and adds three new subscales: Asceticism, Impulse Regulation, and Social Insecurity (Garner, 1991). The primary measure of interest in the current study was the Body Dissatisfaction subscale of the EDI, which consists of nine items pertaining to satisfaction with overall shape of the body as well as to specific regions of greatest concern to those with eating disorders (i.e., stomach, hips, thighs, buttocks).

Participants also included a nonpatient female college sample (N = 205) from the EDI-2 validation study. These college women were first and second year students between 18 and 25 years of age from Michigan State University who completed the EDI-2 anonymously during regular class time (98% completed the measure even though participation was voluntary).

RESULTS

The Relationship Between Body Dissatisfaction and Body Weight

The linear regression of Body Dissatisfaction on body weight (expressed as a percent of MPMW) was computed for the entire eating disorder sample as well as for the bulimia nervosa and anorexia nervosa subsamples. The correlation between Body Dissat isfaction and body weight was .39 for the entire eating disorder sample ($p < .00001$), .33 for the bulimia nervosa sample only ($p < .00001$), and .21 for the anorexia nervosa

sample only ($p < .001$). Thus, body weight accounted for between 4%–15% of the variance in Body Dissatisfaction scores.

Adjusting Body Dissatisfaction Scores

The slope of the line of regression for the total eating disorder group was .208 indicating that for every five units of increase in body weight, there is an increase of approximately one unit in Body Dissatisfaction. This formed the basis for the "adjustment scores" presented in Table 1, which simply involve adding one point to the individual's Body Dissatisfaction score for every five units that body weight falls below 120% of MPMW. This stepwise adjustment was designed to statistically eliminate the effects of relative body weight on Body Dissatisfaction scores by systematically increasing Body Dissatisfaction scores at lower relative weights. The same effect could have been achieved by decreasing the values of Body Dissatisfaction as weight increased or by using residual scores of the regression equation to adjust Body Dissatisfaction scores. The adjustment shown in Table 1 was chosen because of its simplicity.

As a check of the effectiveness of the proposed adjustment, "adjusted" Body Dissatisfaction scores were regressed on body weights for the entire eating disorder sample. The correlation between body weight and Adjusted Body Dissatisfaction was .0211 ($p = .5631$), with a flat regression line slope (.0106).

Weight Adjusted Body Dissatisfaction Scores for Eating Disorder and Female College Groups

Table 2 presents the mean Body Dissatisfaction and Adjusted Body Dissatisfaction scores for the eating disorder subgroups (BN, AN-R, and AN-B) and college female comparison group. A one-way analysis of variance (ANOVA) indicated significant

Table 1. Adjustment to Eating Disorder Inventory Body Dissatisfaction Score

Weight (% of MPMW)	Add to Raw Body Dissatisfaction Score
≥120	0
115–119	1
110–114	2
105–109	3
100–104	4
95–99	5
90–94	6
85–89	7
80–84	8
75–79	9
70–74	10
65–69	11
60–64	12
55–59	13
50–54	14
<50	15

Note: MPMW = matched population mean weight.

Table 2. Weight, Body Dissatisfaction, and Adjusted Body Dissatisfaction for eating disorder subgroups and nonpatient female comparison group

	Bulimia Nervosa (N = 657)	Anorexia Nervosa Restrictors (N = 129)	Anorexia Nervosa Bulimics (N = 103)	Nonpatient Female College Students (N = 205)
Weight (% of MPMW)				
Mean (SD)	99.6 (14.3)[ab]	68.6 (11.8)[ac]	72.4 (11.5)[bc]	99.6 (14.3)[c]
Body Dissatisfaction				
Mean (SD)	17.9 (7.9)[abc]	11.9 (7.9)[a]	14.4 (8.5)[b]	12.2 (8.3)[c]
Median	19	11	14	12
Adjusted Body Dissatisfaction				
Mean (SD)	22.6 (7.3)[a]	22.4 (7.6)[b]	24.4 (8.7)[c]	16.4 (7.5)[abc]
Median	24	21	25	16

Note: Shared superscripts indicate significant group differences ($p < .001$). MPMW = Matched population mean weight; SD = standard deviation.

overall group differences on Body Dissatisfaction [$F(3,1,090) = 40.23$, $p < .00001$]. Subsequent pairwise comparisons showed that the anorexia nervosa groups did not differ from the female controls ($p > .05$). An ANOVA of Adjusted Body Dissatisfaction scores indicated significant overall group differences [$F(3,1,090) = 41.09$, $p < .00001$]. Anorexia nervosa patients differed significantly from the female controls ($p < .05$).

Table 3 presents correlations between the two indices of Body Dissatisfaction and the

Table 3. Correlations between Body Dissatisfaction, Adjusted Body Dissatisfaction, Weight, Eating Disorder Inventory-2, and EAT-26 for eating disorder sample (N = 889)

	Body Dissatisfaction	Adjusted Body Dissatisfaction
Weight (% of MPMW)	.39	.01
Eating Disorder Inventory		
Drive for Thinness	.62	.52
Bulimia	.39	.19
Body Dissatisfaction	—	.92
Adjusted Body Dissatisfaction	.92	—
Ineffectiveness	.29	.46
Perfectionism	.12	.21
Interpersonal Distrust	.12	.32
Interoceptive Awareness	.39	.39
Maturity Fears	.15	.24
Asceticism*	.12	.12
Impulse Regulation*	.26	.30
Social Insecurity*	.17	.22
EAT-26 Total	.44	.49

Note: MPMW = Matched population mean weight. EAT = Eating Attitudes Test.
*N = 107.

EDI-2 subscales and the EAT-26 (Garner, Olmsted, Bohr and Garfinked, 1982.) It is noteworthy that the Adjusted and Unadjusted Body Dissatisfaction scores are highly correlated (.92) and that the differences between the correlations for the two measures of Body Dissatisfaction are trivial except for MPMW, Bulimia, and Ineffectiveness.

High Body Dissatisfaction in Eating Disorder Patients at Different Body Weights

One of the aims of this study was to determine if a high Body Dissatisfaction score reflects greater psychopathology in thinner compared to heavier patients. Following Garfinkel et al. (in press), patients were divided into "high," "moderate," and "low" body dissatisfaction groups based on EDI Body Dissatisfaction scores (>21 = high, 11–20 = moderate, <11 = low). The patients with "high" Body Dissatisfaction scores were further divided by weight (expressed as a percent of MPMW) into three subgroups: <80% MPMW (i.e., anorexia nervosa), 81%–90% MPMW ("thin" bulimia nervosa), and >90% MPMW (bulimia nervosa). Table 4 presents the results of ANOVAs and pairwise group comparisons of the three body weight groups with "high" Body Dissatisfaction scores on body weight (MPMW), EDI subscales, EDI-2 Provisional subscales and the EAT-26. There were significant overall body weight group differences on Drive for Thinness [$F(2,352) = 3.55$, $p < .03$], Bulimia [$F(2,352) = 29.81$, $p < .00001$], Ineffectiveness [$F(2,352) = 8.72$, $p < .0002$], Perfectionism [$F(2,352) = 12.62$, $p < .00001$], Interpersonal Distrust [$F = (2,352) = 21.20$, $p < .00001$], Asceticism [$F(2,45) =$

Table 4. Comparison of anorexia nervosa, "thin" bulimia nervosa, and "normal" weight bulimia nervosa patients with high Body Dissatisfaction on Eating Disorder Inventory-2 subscales

	Anorexia Nervosa ($N = 57$)	"Thin" Bulimia Nervosa ($N = 55$)	"Normal" Weight Bulimia Nervosa ($N = 243$)	p
Weight (% of MPMW)	74.0 (4.5)[a]	85.4 (3.0)[a]	108.2 (15.2)[a]	.00001
Eating Disorder Inventory				
Drive for Thinness	18.3 (3.3)	18.1 (2.7)	17.2 (3.3)	.03
Bulimia	6.6 (6.3)[ab]	11.1 (5.5)[a]	12.6 (5.0)[b]	.00001
Body Dissatisfaction	24.8 (2.3)	24.5 (2.2)	25.2 (2.0)	ns
Adjusted Body Dissatisfaction	34.4 (2.3)[a]	31.8 (2.2)[a]	28.4 (2.8)[a]	.00001
Ineffectiveness	18.4 (7.9)[ab]	14.8 (6.8)[a]	13.8 (7.5)[b]	.0002
Perfectionism	12.9 (4.5)[ab]	10.0 (5.2)[a]	9.3 (4.9)[b]	.00001
Interpersonal Distrust	9.9 (5.3)[a]	8.8 (4.8)[b]	5.8 (4.7)[ab]	.00001
Interoceptive Awareness	15.7 (7.7)	13.9 (6.3)	13.4 (6.6)	ns
Maturity Fears	6.2 (6.2)	6.0 (6.2)	5.2 (4.6)	ns
	($N = 11$)	($N = 11$)	($N = 26$)	
Asceticism	6.9 (4.1)	10.5 (4.2)	7.8 (2.7)	.05
Impulse Regulation	5.0 (5.7)[a]	12.7 (6.5)[ab]	5.7 (5.0)[b]	.002
Social Insecurity	10.2 (6.7)	10.9 (4.2)	7.5 (4.4)	ns
	($N = 40$)	($N = 42$)	($N = 213$)	
EAT-26 Total	53.2 (8.8)[a]	46.0 (11.7)[a]	38.4 (10.1)[a]	.00001

Note: Shared superscripts indicate group differences at $p < .05$. Mean scores are indicated with standard deviations in parentheses.

3.32, $p < .05$], and Impulse Regulation [$F(2,45) = 7.40$, $p < .002$]. The differences on Bulimia simply reflect the effects of including the anorexia nervosa restrictor patients in the analysis. Pairwise comparisons showed that the heavier bulimia nervosa patients had less psychopathology than their lighter counterparts on subscales on which overall group differences were significant.

DISCUSSION

The findings of this report extend earlier observations that body dissatisfaction is positively associated with body weight for eating disorder patients and for nonpatient college women. An adjustment to the EDI Body Dissatisfaction score (i.e., the "Body Illusion Index" or "BII") was proposed to statistically eliminate the effects of relative body weight on Body Dissatisfaction scores and to systematically increase Body Dissatisfaction scores at lower relative weights. The adjustment resulted in a mean Adjusted Body Dissatisfaction score for the anorexia nervosa patients more closely resembling that for bulimia nervosa patients and differing significantly from normal weight college women. Similarly, college women who express marked body dissatisfaction at lower relative body weights received higher scores than those who obtained the same scores but at higher weights.

The preliminary findings from this study tend to support the notion that high body dissatisfaction denotes more general psychopathology in thinner compared to heavier eating disorder patients. "Thin" bulimia nervosa patients with high body dissatisfaction displayed greater psychopathology than their heavier counterparts on the Interpersonal Distrust and Impulse Regulation subscales of the EDI-2. The anorexia nervosa patients with high body dissatisfaction reported more disturbance than one or both of the bulimia nervosa groups on Ineffectiveness, Perfectionism, and Interpersonal Disturst. Not surprisingly, there were significant differences among all three weight groups on the BII score since it systematically increased Body Dissatisfaction scores as a function of lower body weight.

The Body Illusion Index attempts to address the different meaning and clinical significance that body dissatisfaction implies for individuals at different body weights. High levels of body dissatisfaction for anorexia nervosa or for "thinner" bulimia nervosa patients may connote a more serious "body image disturbance" than for heavier eating disorder patients. It must be emphasized that the Body Illusion Index is not intended as a substitute for Body Dissatisfaction scores on the EDI or for measures of body weight. *Body Dissatisfaction is clearly the more meaningful measure of subjective distress regardless of where the individual falls along the weight spectrum.* This distress should not be minimized in those who are objectively well above weight norms. Indeed, there is considerable evidence that body disparagement, rather than body weight, should be the target for intervention in obesity (cf. Garner & Wooley, 1991). Nevertheless, body weight is an important consideration for eating disorder patients and for other individuals being assessed for eating, weight, or shape concerns. Therefore, the Body Illusion Index should be considered as an *additional measure* that may have clinical meaning and practical value by statistically eliminating or reducing the effects of body weight on Body Dissatisfaction scores. It may be a more useful index of change in psychotherapy than either body dissatisfaction or weight change alone. In anorexia nervosa, it can be argued that optimal treatment results in both weight gain *and* greater satisfaction with the body. Although less obvious with bulimia nervosa, there is evidence that statisti-

cally significant weight gain does occur with treatment (Fairburn, Kirk, O'Connor, & Cooper, 1986; Fairburn et al., 1991).

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