The Association of Body Mass Index, Perceived Body Mass Index, and Predictors of Eating Disorders Among a Sample of College Students

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ABSTRACT

Rates of eating disorders have increased recently and are a public health concern especially among college students. Understanding variables that are associated with eating disorders could be helpful in preventing them. Participants (N=525) were students from a large southwestern university. It was hypothesized that a desire for an underweight body mass index (BMI) would be predicted by one's ability to accurately identify one's current BMI while controlling for variables previously shown to be associated with eating behaviors, which included body dissatisfaction; drive for thinness; social physique anxiety; bulimia tendencies; dietary restraint; age; race; Greek membership; and gender were included in the regression model. Women scored higher than men on measures of social physique anxiety, body dissatisfaction, drive for thinness, and dietary restraint, although more then twice the proportion of men (49%) as compared with women (22%) were overweight or obese. Women were more accurate in correctly identifying their own BMI category. However, incorrectly identifying one's BMI was the only significant predictor of desiring an underweight BMI among women. No independent variables predicted the desire for an underweight BMI among men. Future research should assess the preventive and predictive power of accurately assessing one's BMI with eating behaviors.

In recent years the incidence of eating disorders has increased (Garfinkel, 1995; Latzer & Schatz, 1999; Shisslak, Crago, & Estes, 1995), and they are now the third most common chronic illness among women in the United States (Steiner-Adair & Purcell, 1996). It is estimated that 5 million Americans, which is 1.7% of the estimated population of 290,000,000 (U.S. Census Bureau, 2002) are affected by eating disorders annually (Becker, Grinspoon, Kilbanski, & Herzog, 1999). Adolescent girls and young women are at the highest risk for eating disorders (Becker et al., 1999; Latzer & Schatz, 1999), and accordingly, gender has been identified as the most influential factor associated with the prevalence of eating disorders (Cox, Lantz, & Mayhew, 1997), as both clinical and epidemiological studies support a gender ratio of approximately 10 female cases to 1 male eating disorder case (Anderson & Holman, 1997). The most striking prevalence of disordered eating behaviors is among college-aged women (Hesse-Biber, 1992).

Obesity is a highly stigmatized condition because American culture values thinness. This value judgment has led to a continual shift toward a thinner body size standard (Streigal-Moore, McAvay, & Rodin, 1986). Despite this, over the last decade the percentage of overweight and obese adults age 20 years or older has increased to 54.9%

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(National Heart Lung and Blood Institute [NHLBI], 1998). This increase has widened the gap between the "thin-ideal" and individual's actual body weights, resulting in a continual pursuit of thinness and the potential for an unceasing drive for thinness, which can potentially lead to disordered eating (Stice, 1994).

Most evidence suggests that eating disorders are linked to multiple factors that include female gender, age, weight, and race, and sociocultural factors such as body dissatisfaction, drive for thinness, social physique anxiety, and dietary restraint. Another sociocultural factor that is related to eating disorders is bulimic tendencies (Garner, Olmstead, & Polivy, 1983). Because sociocultural factors and individual perceptions are potentially changeable, they are the foci of this study. As stated, body dissatisfaction is a factor that could lead to the development of an eating disorder (Wong & Huang, 1999). Body dissatisfaction reflects the belief that specific parts of the body associated with shape are too large (Garner et al., 1983). Studies investigating gender differences consistently show that men and women differ in their perceptions of and dissatisfaction with their bodies (Anderson & Holman, 1997; Connor-Green, Striegel-Moore, & Cronan, 1994). Another factor that can influence eating disorder development is drive for thinness. This variable reflects an excessive concern with dieting, preoccupation with weight, and determined pursuit of thinness (Garner et al., 1983). A fourth factor that may predict disordered eating is dietary restraint. This factor is defined as a person's intent to restrict dietary intake to control body weight. An additional factor shown to be associated with eating disorders is social physique anxiety, defined as a subtype of social anxiety that occurs as a result of the prospect or presence of interpersonal evaluation involving one's physique (Hart, Leary, & Rajeski, 1989). Finally, bulimia is the tendency toward episodes of overeating and may be followed by the impulse to engage in self-induced vomiting (Garner et al., 1983).

Research has demonstrated that men and women view their bodies differently. Women tend to overestimate their body size, whereas men are less critical of their bodies and tend to perceive their size and shape as normal (Hart et al., 1989). Therefore, it would be interesting and potentially valuable to study whether men and women who accurately assess their own body mass index (BMI) differ in regard to desiring an underweight BMI from those who inaccurately assess their BMI, while controlling for drive for thinness; body dissatisfaction; bulimia; social physique anxiety; dietary restraint; age; and Greek membership. NHLBI uses the following classifications for BMI: underweight (<18.5), normal (>18.5 but <25), overweight (>25 but <30) or obese (>30). The NHLBI lists no health benefits associated with underweight BMIs, but there are numerous health risks correlated with being overweight or obese (NHLBI, 1998).

METHODS

Pilot Testing

Selected students attending the University of North Texas were asked to complete a pilot test of a questionnaire in classroom settings. The pilot was conducted to detect unclear directions, ambiguously worded questions, and potential problems in administrating the questionnaire. Fifty-one students enrolled in undergraduate health promotion courses completed the questionnaire. Requested information included demographic data and assessments of drive for thinness, body dissatisfaction, bulimia (Garner et al., 1983), dietary restraint (Herman, 1978), and social physique anxiety (Hart et al., 1989). Approval to conduct this study was granted by the university's Institutional Review Board.

Instrumentation

The questionnaire utilized for the formal study consisted of 52 items, including the demographic items. Items to assess the sociodemographic factors were derived from the scales of three instruments. The Eating Disorder Inventory (Garner et al., 1983) supplied the items for dietary restraint (k=7), body dissatisfaction (k=9), and bulimia (k=7). Dietary restraint items (k=10) were gleaned from the Drive for Thinness Scale (Herman, 1978) and the Social Physique Anxiety Scale (Hart et al., 1989), which is comprised of 12 items. Participants responded to forced-choice item scales by rating whether each item applied always, usually, often, sometimes, rarely, or never. Scale scores were the summation of all item scores for that scale. Three-week test–retest reliabilities on a sample of 70 nonclinical subjects were above .81 for the dietary restraint, body dissatisfaction, and bulimia scales (Williamson, Anderson, Jackman, & Jackson, 1995).

The Drive for Thinness Scale (Herman, 1978) is a 10-item self-report questionnaire assessing weight fluctuations, degrees of chronic dieting, and related attitudes toward weight and eating. The Social Physique Anxiety scale (Hart et al., 1989) is a 12-item self-report inventory and is designed to measure levels of anxiety one senses in regard to his or her own physique. Subjects were asked to indicate the degree to which each of the 12-item statements was characteristic or true of themselves. Answers were based on a 5-point Likert-type scale with numerical values of 1 to 5 assigned accordingly. Numerical values were summed to produce a total score (Hart et al., 1989; Cox et al., 1997). With an 8-week interval, test–retest administrations have demonstrated acceptable reliability (r= .82), and construct validity through moderate correlations with measures that include fear of negative evaluation (r=.35) and body cathexis (r=.51) (Hart et al., 1989). Furthermore, Petrie, Diehl, Rogers, and Johnson (1996) demonstrated construct validity and reliability for these scales among undergraduate women and men.

The questionnaire also requested demographic data that included date of birth; gender; height; present weight; desired weight; race/ethnicity; and Greek membership. Self-reported height, present body weight, and desirable body weight were used to calculate actual and desirable BMIs. Subjects were also asked to describe their current perceived BMIs according to the

four categories (e.g., underweight, normal, overweight, or obese) established by the NHLBI (1998).

Sample

Undergraduate students who were enrolled in health-related fitness, weight training, and self-defense courses were approached after one of the investigators contacted the instructors and requested permission to survey these students. All instructors allowed their students the opportunity to be a part of the study. On the prearranged day, students were asked to complete the survey. No students refused to participate, and no effort was made to include students not in attendance on the date of survey administration. No benefits or incentives were offered to the students for their participation.

Data Analysis

Data were analyzed using the Statistical Package of the Social Sciences (SPSS, Chicago, IL). Descriptive statistics were employed to describe age, race/ethnic background, BMI (actual and desired), and body perception for male and female participants. Analysis of variance was performed to identify statistical differences in scale scores, separately by sex, between those who correctly identified their BMI, and those who incorrectly identified their BMI on five variables: (1) drive for thinness, (2) body dissatisfaction, (3) bulimia, (4) dietary restraint, and (5) social physique anxiety. To determine which means were statistically significant, a Student-Newman-Keuls post hoc test was performed. Logistic regression was used to identify predictors of desiring an underweight BMI while controlling for social physique anxiety; drive for thinness; dietary restraint; bulimia; race; age; and Greek membership. Alpha for all statistical procedures was set at .05.

RESULTS

Respondents

Data were available and analyzed for 525 participants. The gender distribution of the sample was fairly even; 47.2% were men (n=248) and 52.8% (n=277) were women. Mean respondent age was 22.2 (SD=3.9) years. Racial/ethnic distribution was 64.0% Caucasian (n=336); 19.0% African American (n=100); 8.2% Hispanic (n=43); 5.5% Asian/Pacific Islander (n=29); and 3.2% other, including Native American (n=17). Self-reported heights and weights were used to calculate the actual and desirable BMI for each subject. The mean BMI for all subjects was 24.03 (SD=4.2), whereas the mean desired BMI was 22.8 (SD=3.3). Table 1 presents actual, desired, and perceived body weights by gender. A plurality of men (48%) and a majority of women (72%) were categorized as "normal weight." It should be noted that 3% of men were actually underweight, but 14% perceived themselves to be underweight. Among women, 72% were of normal weight, but only 54% perceived themselves as such. And 22% of women were overweight or obese, but 42% considered themselves to be in those categories.

Descriptive statistics for drive for thinness, body dissatisfaction, bulimia, social physique anxiety, and dietary restraint are presented in Table 2 by gender. Higher scores indicate greater anxiety in response to others' evaluation of their physique. A significant gender difference between group means existed for all independent variables

Table 1. Comparison of Actual (ABMI), Desired (DBMI), and Perceived Body Mass Index (PBMI) of Male and Female College Students

Variable	Men *N* (%)	Women *N* (%)	Total *N* (%)
ABMI (underweight)	7 (3)	17 (6)	24 (5)
(normal)	119 (48)	198 (72)	317 (61)
(overweight)	87 (35)	46 (17)	133 (26)
(obese)	34 (14)	14 (5)	48 (9)
DBMI (underweight)	4 (2)	35 (13)	39 (8)
(normal)	121 (50)	226 (83)	347 (67)
(overweight)	105 (43)	9 (3)	114 (22)
(obese)	14 (6)	2 (1)	16 (3)
PBMI (underweight)	35 (14)	11 (4)	46 (9)
(normal)	136 (55)	149 (54)	285 (63)
(overweight)	71 (29)	108 (39)	179 (34)
(obese)	6 (2)	8 (3)	14 (3)

Note: N=248 men, 277 women.

Table 2. Mean and Standard Deviations of Variable Scores Categorized by Actual Body Mass Index Category for Male and Female College Students

Independent Variable	Men *M* (*SD*)	Women *M* (*SD*)	Combined *M* (*SD*)
Social physique anxiety	30.0 (8.5)	36.8 (8.9)	33.6 (9.4)
Bulimia	0.7 (1.6)	0.8 (1.9)	0.7 (1.7)
Body dissatisfaction	5.3 (5.8)	10.8 (7.5)	8.3 (7.2)
Drive for thinness	4.4 (3.7)	7.2 (5.3)	5.9 (4.8)
Dietary restraint	9.4 (5.9)	13.2 (5.8)	11.4 (6.2)

Note: N=248 men, 277 women.

Table 3. Actual Body Mass Index (BMI) Versus Perceived BMI for Men and Women

	Actual BMI			
	Under *N*	Normal *N*	Overweight *N*	Obese *N*
Perceived normal BMI, men	3	83	37	4
Under	4	27	2	2
Overweight	-	6	37	23
Obese	-	-	1	5
Perceived normal BMI, women	11	130	3	1
Under	6	5	-	-
Overweight	2	55	38	9
Obese	-	-	1	-

Note: *N*=248 men and 277 women.

except for bulimia [$F(3,513) = 1.161, p > .05$] and drive for thinness [$F(3,508) = 2.159, p > .05$].

When assessing status of their body size as defined by the NHLBI, women (65%, *n*=177) were more accurate in assigning themselves to the corresponding categories than were men (55%, 129). Of the women who incorrectly assigned themselves a BMI, 80% (74/92) classified themselves as heavier than they were. Among men who incorrectly assigned themselves, 85% described their own body weight to be lighter than the NHLBI category to which their actual BMI corresponded. A description of male and female actual and perceived BMIs is presented in Table 3. The data also indicate that 13% of women desired to be "underweight," whereas only 1.6% of men desired to be in that category. An additional gender difference in how men and women evaluate their body size is that 49% of men were overweight or obese, although only 31% assigned themselves to one of those groups, whereas 22% of women were overweight or obese, and 42% thought they were.

There were no statistically significant differences in scores of the predictor variables between those men who correctly and incorrectly identified their actual BMI classification. However, women who incorrectly identified their BMI scored higher on the drive for thinness scale [$F(1, 263)=15.60, p < .05$] and social physique anxiety [$F(1,263)=5.59, p < .05$] than women who accurately described their body shapes.

Among men the regression analysis utilized to predict the desire for an underweight body revealed no significant predictors. For women only incorrectly identifying one's BMI [$F(1,263)=2.56, p < .05$) predicted that same aspiration. Women who incorrectly classified their BMIs were 2.6 (confidence interval=1.24, 5.42) times as apt to desire an underweight BMI as those who accurately described their BMI.

DISCUSSION

In this study women differed from men in that they reported statistically higher mean scores for drive for thinness, body dissatisfaction, dietary restraint, and social physique anxiety. However, this was expected, because college-aged women are at higher risk for developing eating disorders and perceive more social pressure to be thin than do men (Anderson & Holman, 1997). Although this finding was anticipated, it is interesting, because a much higher proportion of men (49%) were overweight or obese than women (21.8%), yet women scored higher on the psychological scales that indicate concern about their body size. This finding suggests that the pressures women perceive in evaluating their bodies is more pronounced than among men, even though a higher proportion of men have BMIs that are in the unhealthy ranges of overweight and obese. The finding also implies that women's evaluation of their bodies transcends health indicators and agrees with findings that show women feel pressure to maintain thin body shapes (Anderson & Holman, 1997; Rolls, Fedoroff, & Guthrie, 1991).

The present data demonstrate that women are generally more accurate in assessing their own BMI category than men, but the patterns of that inaccuracy between men and women differs, and in fact, are opposite. In agreement with others (Heatherton, Nichols, Mahamedi, & Keel, 1995; Sciacca, Melby, Hyner, Brown, & Femea, 1991; Wong & Huang, 1999), when women incorrectly assessed their body shape, it was probable that they assigned themselves to a category that was heavier than their actual weight. Men, on the other hand, who incorrectly assigned themselves to a BMI group were apt to perceive that they were lighter than was actually the case (Wong, Chen, Chan, Wang, & Yamamoto, 1999). This divergence in actual versus perceived body weight is partially explained by the cultural ideal for body shape, in that women are to be slender and men strong, athletic, and muscular. The discrepancy between women's actual body weight and their self-perceived body weight likely reflects an unrealistic view of the "ideal" female body. This may encourage the development of disordered attitudes and behaviors toward weight, body shape, and eating. The discrepancy between men's actual body weight and their perceived weight remains ambiguous. However, it has been hypothesized that, unlike women who tend to perceive themselves as larger than they actually are, some men perceive themselves to be smaller than is the case.

Findings from this study are also in

agreement with studies (Rolls et al., 1991; Stice, 1994) indicating that women appear to be more concerned with aspects of their appearance, particularly their weight, whereas men are more likely to report that if they are fit and exercise they feel positive about their bodies. The desire to be fit may reflect the desire to be heavier or the drive for bulk. However, fitness or bulk is not congruent with obesity. The drive for bulk has been described as the desire to gain muscle (Wong et al., 1999).

Results from the logistic regression model predicting the desire for an underweight BMI also warrant discussion. The data from men indicate that none of the independent variables predicted the desire for being below an 18.5 BMI. This finding could be expected, as only four men (1.6%) desired an underweight BMI. Consequently, the statistical power to predict this phenomenon is small. For women the sole significant predictor of desiring an underweight BMI, which 14% did desire, was incorrectly identifying their actual BMI. Because eating disorders are more prevalent among women, these findings, when viewed in isolation, suggest that the ability to accurately describe one's BMI is not likely a predictor of eating behaviors, as women may be more able to identify their BMIs as compared with men. However, among those women who inaccurately identified their BMIs, there was more than double the risk of being assigned to the group that desires an underweight BMI. As stated previously, the NHLBI listed no health benefits associated with underweight BMIs, but there are unhealthy consequences such as osteoporosis that are associated with low body weights (National Eating Disorders Association, 2002).

A potential implication of the present findings for health educators is a need to correct the mistaken perceptions that some men and women have about their BMIs. That most men who inaccurately identified their BMIs were overweight or obese and thought that they were in the normal range suggests that overweight or obese men who believe their weight is normal could benefit from interventions that rectify this misperception by serving as a cue to take weight reduction measures such as diet and exercise. Conversely, most women who inaccurately identified their BMI thought that they were overweight or obese and were actually of normal weight. A correction of this erroneous belief could attenuate body shape-related anxiety and perhaps reduce the likelihood of engaging in unhealthy eating behaviors.

Finally, the limitations of this study need to be considered. Although the current findings merit discussion, the cross-sectional study design allows threats to validity to affect the results. Because of the nature of this study we are unable to determine whether it is the failure to accurately describe their BMI that creates the desire for an underweight BMI or whether this finding is tapping the possibility that those with eating disorder tendencies have distorted body images. Further, the notion that those who desire an underweight BMI are apt to engage in disordered eating behaviors holds intuitive appeal, but a longitudinal study design will be required to establish that relationship.

Present researchers are not suggesting that eating disorders are not serious and complicated illnesses, but efforts to assist those tending toward disordered eating in accurately describing their own body shape may play a role in preventing or predicting these illnesses. Prospective studies are needed to determine whether simply asking college students to describe their own BMIs might be an inexpensive and yet effective screening instrument for eating disorders. Further, self-report was used to assess body weights in this study. To the extent that the self-reports were inaccurate, this would be a potential threat to the internal validity of the findings. However, others have concluded that self-reporting weight is a feasible method of data collection (Burton, Chen, Schultz, & Edington, 1998).

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