HHS Public Access

Author manuscript

Int J Eat Disord. Author manuscript; available in PMC 2022 August 17.

Published in final edited form as:

Int J Eat Disord. 2020 June ; 53(6): 954–963. doi:10.1002/eat.23277.

Not all body image constructs are created equal: Predicting eating disorder outcomes from preoccupation, dissatisfaction, and overvaluation

Autumn J. Askew, B.S.[1], **Carol B. Peterson, Ph.D.**[1,2], **Scott J. Crow, M.D.**[1,2], **James E. Mitchell, M.D.**[3], **Katherine A. Halmi, M.D.**[4], **W. Stewart Agras, M.D.**[5], **Ann F. Haynos, Ph.D.**[1]

[1]Department of Psychiatry, University of Minnesota Medical School, Minneapolis, Minnesota

[2]The Emily Program, Minneapolis, Minnesota

[3]Department of Psychiatry and Behavioral Science, University of North Dakota School of Medicine and Health Sciences, Fargo, North Dakota

[4]New York Presbyterian Hospital-Westchester Division, Weill Medical College of Cornell University, White Plains, New York

[5]Department of Psychiatry, Stanford University School of Medicine, Stanford, California

Abstract

Objective: Diverse terminology has been used to operationalize body image disturbance in eating disorders. However, the differential validity of these terms and their underlying constructs to predict outcomes among heterogeneous eating disorders is unknown. This study evaluated the validity of body image constructs to predict eating disorder and negative psychological symptoms concurrently and prospectively over 2 years in a transdiagnostic clinical sample.

Methods: Women with heterogeneous eating disorder diagnoses (n = 448) completed assessments at baseline, 12-month, and 24-month follow-up. Cross-sectional and cross-lagged generalized linear models examined effects of three body image constructs (i.e., weight and shape preoccupation, overvaluation, and dissatisfaction) on concurrent and subsequent outcomes (i.e., global eating disorder symptoms, binge eating, purging, fasting, self-esteem, and depression).

Results: In concurrent analyses, preoccupation was significantly associated with all outcomes (ps = .01 to <.001), overvaluation with all outcomes (ps = .01 to <.001) except binge eating (p = .06), and dissatisfaction with all outcomes (ps < .001) except purging (p = .38). In prospective analyses, preoccupation predicted Eating Disorder Examination global (p = .003) and fasting (p < .001), overvaluation predicted binge eating (p = .01), and body dissatisfaction did not predict any outcomes.

Discussion: Preoccupation, overvaluation, and dissatisfaction are differentially related to eating disorder and psychiatric outcomes, indicating that no one body image construct can capture

Correspondence Autumn J. Askew, Department of Psychiatry and Behavioral Sciences, University of Minnesota, 2450 Riverside Ave., F228, Minneapolis, MN 55454. askew019@umn.edu.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

clinical risk in eating disorders. Preoccupation was the most consistent concurrent and longitudinal predictor; this construct may warrant further attention in assessment and diagnosis. Further investigation of these constructs in diverse samples is encouraged.

Keywords

anorexia nervosa; binge-eating disorder; body image; bulimia nervosa; feeding and eating disorders

1 | INTRODUCTION

Disturbance in the experiencing of weight and shape is a central cognitive facet of bulimia nervosa (BN; APA, 2013), anorexia nervosa (AN), and binge-eating disorder (BED) (Coffino, Udo, & Grilo, 2019; Wilfley, Schwartz, Spurrell, & Fairburn, 2000). Within the Diagnostic and Statistical Manual of Mental Disorders (DSM), criteria related to body image disturbance were first introduced for BN and AN in the DSM-III (APA, 1980) as "overconcern about shape and weight," which was later changed to "undue influence of body weight or shape on self-evaluation" in the DSM-IV (APA, 1994) and maintained in the DSM-5 (2013). Both of these phrases imply valuation of one's weight and shape in excess of a normative standard. As such, overvaluation of weight and shape has been referred to as the core psychopathology for eating disorders and is the central target of standard cognitive-behavioral therapy for eating disorders (Fairburn, 2008). However, the terminology that has been used to describe body image disturbance, as well as the constructs these terms represent, has varied across diagnostic criteria and assessments, limiting the ability to assess the validity of these concepts for identifying and predicting eating disorder symptoms.

Within prior literature, three major constructs related to body image have been most consistently examined using various methods. These include overvaluation or undue influence of weight and shape (hereafter described only as overvaluation for purposes of clarity and consistency), which describes excessive influence of weight and shape on self-evaluation; dissatisfaction with shape and weight, which reflects discontentment with one's body; and preoccupation with shape and weight, which describes obsession with or engrossment in thoughts of one's shape and weight. Additionally, the term overconcern with weight and shape has been used to refer to some combination of the above body image constructs (Goldfein, Walsh, & Midlarsky, 2000; Wade, Zhu, & Martin, 2011). Historically, these terms have been used interchangeably to describe body image concerns among individuals with and without eating disorders which can produce conflicting conceptualizations of eating pathology as there exists significant evidence that these are nonoverlapping constructs. For example, one study found that overvaluation and overconcern with shape and weight demonstrated shared genetic and environmental risk factors, whereas body dissatisfaction stemmed from disparate sources of risk (Wade et al., 2011). Another study found that overvaluation and overconcern were able to differentiate between those with and without disordered eating, whereas body dissatisfaction was not (Goldfein et al., 2000), raising concerns about the discriminant validity of this construct. Within the same sample, 20% of participants diagnosed with BN did not meet the clinical

cutoff for elevated body dissatisfaction, 10% did not meet for overvaluation, and only 4% did not meet clinical standard for overconcern, demonstrating that these terms differ in their diagnostic precision. Other research by the same group found that 12% of participants with BN did not present an overconcern with shape and weight, and 20% did not endorse being dissatisfied with their shape and weight (Hadigan & Walsh, 1991). The same study found that body dissatisfaction did not differ between individuals with BN and individuals seeking treatment for other psychiatric concerns. The lack of consistency in the endorsement of the body image constructs that are considered a cornerstone of eating disorder assessment and diagnosis has been long acknowledged as generating confusion in the literature (Hsu & Sobkiewicz, 1991).

A contributor to this issue may be that some body image disturbances are present at high rates in the general population. It is recognized that body dissatisfaction is a “normative” experience for individuals in Western societies (Rodin, Silberstein, & Striegel-Moore, 1984; Tantleff-Dunn, Barnes, & Larose, 2011). A study of 4,746 adolescents demonstrated that 36.4% of girls and 23.9% of boys meet clinical criteria for overvaluing their weight and shape, and 41.5% of girls and 24.9% of boys displayed clinically significant body dissatisfaction (e.g., endorsed being somewhat or very overweight despite a healthy or underweight BMI). Of the individuals who endorsed clinically significant overvaluation of weight and shape in this sample, only 0.8% had AN and 8.9% had BN (Ackard, Fulkerson, & Neumark-Sztainer, 2007). Furthermore, there is evidence that the population prevalence of weight and shape overvaluation is increasing, with endorsement of overvaluation changing from 18.1 to 40% between 2005 and 2016 (Santana et al., 2019). The high rate at which these specific body image constructs are experienced in the general population suggests that their clinical relevance over time should be examined, as there may be limitations to using them as indicators of eating disorder outcomes.

Additionally, the various methods with which these constructs have been assessed make the clinical relevance of prior findings difficult to interpret. This is especially true for overconcern and dissatisfaction with weight and shape, measurements of which have been inconsistent and have occasionally overlapped. Dissatisfaction with weight and shape has been examined using the discrepancy between current and ideal body size, scores of dissatisfaction items from the Eating Disorder Examination (EDE) (Fairburn & Cooper, 1993), dissatisfaction with body proportions, and desire for weight loss despite an underweight or healthy BMI (Ackard et al., 2007; Goldfein et al., 2000; Hadigan & Walsh, 1991; Wade et al., 2011). It remains unclear which of these methods produces the most meaningful conceptualization of body dissatisfaction. Occasionally, body dissatisfaction has even been subsumed in measures of overconcern with weight and shape which amalgamates a variety of body image cognitions and behaviors, such as body dissatisfaction, feelings and fear of fatness, preoccupation, discomfort seeing one’s body, and desire to lose weight (Goldfein et al., 2000; Hadigan & Walsh, 1991; Wade et al., 2011). Often these individual constructs are not parsed apart, leaving in question the impact of each construct in isolate.

However, preoccupation with weight and shape is a body image construct that shows promise with reference to predictive and discriminative ability that has received less specific attention in the literature to date. Preoccupation with weight and shape has commonly been

examined alongside other symptoms as an aspect of overconcern with shape and weight (Goldfein et al., 2000; Hadigan & Walsh, 1991; Wade et al., 2011), and in this context has exhibited mixed findings. However, when singularly examined, this construct has shown clinical relevance. Prior research has suggested that preoccupation with weight and shape is a core aspect of eating disorders and has as strong of a relationship with eating disorder pathology as weight and shape overvaluation for women and girls with AN and BN (Forrest, Jones, Ortiz, & Smith, 2018). Compared to overvaluation and dissatisfaction with weight and shape, preoccupation has been found to most strongly predict symptom severity for dieting, restraint, binge eating, and unhealthy weight in girls (Mitchison et al., 2017; Sharpe et al., 2018), and has also been shown to be most strongly related to eating concerns among adults with BED (Lydecker, White, & Grilo, 2017). There is also evidence that preoccupation with weight and shape, but not overvaluation or dissatisfaction, discriminates between women with and without eating disorders (Abraham, von Lojewski, Anderson, Clarke, & Russell, 2009). However, the concurrent and longitudinal relationship between disordered eating symptom severity and preoccupation, overvaluation, and dissatisfaction has yet to be examined in a transdiagnostic sample.

In order to compare the predictive validity of these three important body image constructs, the current study examined the degree to which “preoccupation with weight and shape,” “overvaluation of weight and shape,” and “dissatisfaction with weight and shape” predicted the severity of eating disorder symptoms and other psychological concerns (e.g., depression and self-esteem) known to be linked to both body image disturbance and long-term eating disorder outcomes (Fairburn, Peveler, Jones, Hope, Fairburn, Cooper, & O’Connor, 2014; Lydecker et al., 2017; Sharpe et al., 2018; Vall & Wade, 2015). These predictors were examined in relation to six outcome variables (i.e., EDE global score, binge eating, purging, fasting, self-esteem, and depression) cross-sectionally and longitudinally over 2 years in a transdiagnostic eating disorder sample. To the best of our knowledge, this is the first study to examine these three constructs in a transdiagnostic sample. Based on prior research from nonclinical and single diagnosis samples (Lydecker et al., 2017; Mitchison et al., 2017; Sharpe et al., 2018), we hypothesized that preoccupation with weight and shape would more consistently predict eating disorder and related psychological symptoms than dissatisfaction or overvaluation in both cross-sectional and longitudinal analyses.

2 | METHODS

2.1 | Participants and procedures

Participants (n = 448) were recruited via inpatient and outpatient clinics and various forms of local media at three sites: Cornell University, Stanford University, and the University of Minnesota. This research was approved by the Insitiutional Review Board at each site, and data were collected from 1995 to 2002. Participants were required to be female, between 14 and 50 years of age (in order to reflect the demographic representation typical of eating disorders; Hay, 1998), available to participate in the duration of the study, and be diagnosed with a full- or sub-threshold criteria for AN, BN, or BED. Diagnoses were made using DSM-IV criteria. To be classified as having sub-threshold AN, participants must have either met full criteria for AN in the preceding 12 months, or in the preceding 6 months have

met all criteria for AN except weight ≤90% of ideal body weight accompanied by either amenorrhea, body image disturbance, or intense fear of fat. To be classified as having sub-threshold BN, participants must have exhibited binge eating and purging at a frequency below threshold but at least once per month on average for six or more months or have met all criteria for BN except body image disturbance. To be classified as having sub-threshold BED, participants must have engaged in binge eating at a frequency below threshold, but at least once per month on average for six or more months. Diagnostic classification was only evaluated at baseline; however, later analysis in this sample showed a probability between 0.40 and 0.75 of remaining in the same diagnostic class over the two-year course of this study (Peterson et al., 2011). Further detail regarding recruitment, inclusion/exclusion, and diagnostic classification of participants has been provided in previous publications (Agras, Crow, Mitchell, Halmi, & Bryson, 2009; Crow, Agras, Halmi, Mitchell, & Kraemer, 2002).

Participants completed assessment at baseline and every 6 months thereafter for the four-year study period for a total of nine assessment points. This study analyzed associations from baseline, 12-month follow-up, and 24-month follow-up. Missing data ranged from 3.1 to 7.8% at baseline, 22.5 to 28.3% at 12-month follow-up, 30.3 to 34.2% at 24-month follow-up. Assessments following the 24-month follow-up were excluded from analyses due to large amounts of data missing at these waves (33.7 to 50%).

2.2 | Materials

2.2.1 | Predictor variables—The EDE, 12th Edition was used to measure body image constructs (i.e., preoccupation, overvaluation, and dissatisfaction) that served as independent variables in this investigation. The EDE is an investigator-based interview that assesses severity of eating disorder symptoms in the preceding 3 months that demonstrates strong reliability and validity (Berg, Peterson, Frazier, & Crow, 2012). Assessors were trained to administer the EDE and had on-site supervision. Inter-rater reliability for the EDE was found to be high, with subscales ranging from 0.90–0.99 (Agras et al., 2009). Preoccupation reflected scores on the *Preoccupation with Shape and Weight* item ("Over the past four weeks have you spent much time between meals thinking about your shape or weight?"). Overvaluation scores consisted of the average of the items *Importance of Shape* ("Over the past four weeks has your shape been important in influencing how you feel about yourself as a person?") and *Importance of Weight* ("Over the past four weeks has your weight been important in influencing how you feel about yourself as a person?"). For this composite overvaluation measure, inter-item correlations ranged from .75 to .81. Dissatisfaction scores consisted of the average of items *Dissatisfaction with Weight* ("Over the past four weeks have you been dissatisfied with your weight?") and *Dissatisfaction with Shape* ("Over the past four weeks have you been dissatisfied with your shape?"). For this composite Dissatisfaction measure, inter-item correlations ranged from .77 to .83.

2.2.2 | Outcome variables—Dependent variables included key eating disorder symptoms (i.e., global symptom severity, binge eating, purging, and fasting) and relevant psychiatric variables of self-esteem and depression. The EDE Global score (α = .88 to .90) measured overall severity of eating pathology. EDE Global score was modified to remove the items included as predictor variables in this study (*Preoccupation with Weight*

and Shape, Overvaluation of Shape, Overvaluation of Weight, Dissatisfaction with Shape, and Dissatisfaction with Weight) in order to avoid inflated relationships between predictors and outcomes resulting from shared items. Number of objective binge-eating episodes (i.e., episodes in which an objectively large amount of food was eaten while experiencing a loss of control) and number of self-induced vomiting episodes from the EDE assessed binge eating and purging over the preceding 3 months. Scores on the EDE *Avoidance of Eating* item ("Over the past four weeks have you gone for periods of eight or more waking hours without eating anything?") assessed fasting. The Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) (α = .94 to 98) and Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) (α = .91 to .93) were used to evaluate self-esteem and depressive symptoms, respectively. Both measures have established reliability and validity (Beck, Steer, & Garbin, 1988; Sinclair et al., 2010).

3 | PROCEDURE AND STATISTICAL ANALYSES

Participants completing follow-up visits were compared to participants who did not complete follow-ups on baseline demographic and clinical variables using independent *t*-tests and chi-square analyses to identify any systematic differences between the baseline and follow-up samples. Expectation–maximization estimation using maximum likelihood was used to impute missing data for subsequent analyses. Two sets of generalized linear models were conducted to examine the association of body image constructs to outcomes (i.e., EDE global score, binge-eating episodes, purging episodes, fasting score, RSES scores, and BDI scores). The first set examined concurrent prediction across all three time points (baseline, 12-month follow-up, and 24-month follow-up). The second set tested prospective incremental prediction using cross-lagged analyses (time + 1 − time), in which body image predictors predicted outcomes at the next time period, statistically adjusting for the values of outcome variables at the first time point. Covariates (age, ethnicity, and BMI) were selected to correspond with prior similar investigations (Sharpe et al., 2018), and were statistically adjusted for in all analyses. Linear models were utilized for normally distributed outcomes (i.e., EDE Global and RSES), gamma with log link models were used for skewed scale variables (i.e., fasting and BDI), and negative binomial models were used for skewed count data (i.e., binge eating and purging). All analyses were corrected for multiple comparisons using the Benjamini and Hochberg (1995) procedure with a 5% false discovery rate.

4 | RESULTS

4.1 | Sample characteristics

At baseline, 22.8% met criteria for full- or sub-threshold AN, 36.8% for full- or sub-threshold BN, 36.2% full- or subthreshold BED, and 4.2% had an unspecified diagnosis. Distribution of ethnicity was as follows: 91.1% Caucasian, 4.7% Hispanic, 2.3% Black, 1.2% Asian, and 0.7% Native American. When comparing individuals who were retained in the sample at follow-up versus those who did not attend follow-up visits, some differences were detected. These differences as well as additional baseline participant characteristics can be found in Table 1. Individuals who did not complete 12-month follow-up were more likely to have a BED diagnoses and to report lower EDE global, preoccupation, and fasting scores.

Similarly, participants who did not complete 24-month follow-up were older, more likely to have a BED diagnosis and less likely to have a BN diagnosis, and reported lower baseline EDE global scores.

Table 2 summarizes average scores for body image predictors and outcome variables across time points and a correlation matrix of predictors and outcomes can be found in Table S1. At each timepoint, participants reported highest scores for overvaluation, followed by dissatisfaction, and preoccupation. At baseline, age was significantly, but weakly, negatively correlated with preoccupation ($p < .001$) and overvaluation ($p = .004$) suggesting that individuals who were younger had greater body image preoccupation and overvaluation. On the other hand, baseline BMI was moderately positively correlated with body dissatisfaction ($p < .001$), such that higher BMI was associated with greater dissatisfaction. No other significant relations were identified between predictor variables and covariates. Body image constructs were moderately correlated at all timepoints (rs = .40–.48, ps < .001).

4.2 | Concurrent associations between body image predictors and outcome variables

Table 3 summarizes generalized linear models evaluating the cross-sectional associations between predictor and outcome variables across time periods. Adjusting for covariates, preoccupation was concurrently associated with all outcomes (ps = .01 to <.001), overvaluation was associated with all outcomes (ps = .01 to <.001) with the exception of binge eating ($p = .06$), and dissatisfaction was associated with allout comes (ps < .001) with the exception of purging ($p = .38$).

4.3 | Longitudinal associations between body image predictors and outcome variables

Table 4 summarizes the cross-lagged generalized linear models evaluating the incremental predictive relationships between predictors and outcomes across time periods, adjusting for covariates and prior scores on outcome measures. In these models, preoccupation significantly predicted subsequent EDE Global ($p = .003$) and fasting ($p < .001$) scores. Overvaluation significantly predicted subsequent binge-eating episodes ($p = .01$). Dissatisfaction did not emerge as a significant predictor for any longitudinal outcomes, and none of the body image variables significantly predicted subsequent purging, self-esteem, or depression.

5 | DISCUSSION

This study examined the convergent and predictive validity of weight and shape preoccupation, overvaluation, and dissatisfaction in a clinically diverse sample of women with eating disorders. Cross-sectional findings demonstrated that all three body image constructs showed significant relationships with most concurrent eating disorder symptoms and related psychological phenomena (apart from overvaluation and binge eating, as well as dissatisfaction and purging), even after adjusting for relevant covariates. However, paralleling prior findings (Goldfein et al., 2000; Hadigan & Walsh, 1991; Lydecker et al., 2017; Mitchison et al., 2017; Sharpe et al., 2018), the results highlighted some distinctions between these body image constructs in their ability to predict severity of eating disorder and psychiatric symptoms, especially longitudinally. Specifically, in line with our

hypotheses, preoccupation with weight and shape had the most consistent concurrent and longitudinal associations with study outcomes. Although overvaluation and dissatisfaction of weight and shape both performed well as predictors concurrently, preoccupation was associated with all outcome variables cross-sectionally and more outcomes (i.e., EDE global and fasting scores) longitudinally. These findings have important clinical implications regarding the validity of these body image constructs, including diagnostic assessment.

The results of this study deepen the understanding that various forms of body image disturbance have distinct relationships with concurrent symptoms and subsequent outcomes. On the one hand, the concurrent findings suggest that weight and shape preoccupation, overvaluation, and dissatisfaction should each be considered effective markers of current symptom severity. On the contrary, in the prospective findings, all three body image constructs demonstrated fairly inconsistent prediction of eating disorder and psychiatric outcomes. This highlights the inadequacy of the current conceptualizations of body image disturbance, including that of overvaluation, which has been considered central to eating psychopathology, to capture experiences important to longer-term clinical outcomes. This was most relevant regarding purging, self-esteem, and depression, as these outcomes were not subsequently predicted by any body image constructs. These findings are especially concerning given the link between symptoms such as depression and purging and long-term negative outcomes, including premature mortality (Crow et al., 2009; Franko et al., 2018). It remains unclear if these symptoms are maintained by different body image constructs or mechanisms entirely separate from body image disturbance. However, the relatively underinvestigated body image construct of preoccupation was found to be a significant predictor of overall eating disorder symptoms and the specific symptom of fasting, suggesting that preoccupation may provide a meaningful indicator of overall symptom trajectory. Although overvaluation with weight and shape significantly predicted subsequent binge eating, the findings generally suggested that overvaluation and body dissatisfaction in isolate may not provide adequate information about long-term outcomes.

Preoccupation with weight and shape was a slightly more reliable predictor of disordered eating symptoms than both overvaluation and dissatisfaction despite having the lowest endorsement rate through the duration of the study, which calls into question the clinical validity of strict body image cutoffs in the assessment and diagnosis of eating pathology. This discussion is especially important considering the relative normalcy of clinically significant body image disturbance, particularly body dissatisfaction and overvaluation, in the general population (Ackard et al., 2007; Rodin et al., 1984; Tantleff-Dunn et al., 2011). If body image disturbances are to be relied upon as diagnostic criteria for eating disorders, this study suggests it may be useful for these criteria to include a more diverse range of body image constructs. This point is especially relevant when considering the diagnosis of BN, which requires overvaluation for diagnosis (APA, 2013), despite the results of this and prior research (Goldfein et al., 2000; Hadigan & Walsh, 1991), which suggest that this may not be a sensitive indicator. Further research is needed to determine whether preoccupation with weight and shape may be a more effective construct to include in determining eating disorder presence or severity.

Although these findings mirror prior research (Goldfein et al., 2000; Hadigan & Walsh, 1991; Lydecker et al., 2017; Mitchison et al., 2017; Sharpe et al., 2018), conflicting operationalizations in the literature of body image constructs make it difficult to compare across studies. It remains unclear whether null findings in this or other studies result from error in the measurement of facets of body image or the underlying constructs themselves. Unfortunately, the data available in this study did not permit assessments of body image disturbances by measures other than the EDE. Future research should focus on identifying the most effective ways to conceptualize and measure body image disturbances using a wider array of assessments. If different body image measures continue to yield conflicting findings, standardization of body image questioning used across instruments may be beneficial to consistently characterize eating disorder pathology regardless of the method of assessment. In lieu of such standardization, careful consideration is needed when choosing methods of assessment for body image disturbance for varying purposes.

There are additional explanations of study findings that warrant examination. The pattern of results yielded by this study could result from body image constructs coexisting on a severity or time-based continuum, with, for instance, body dissatisfaction at one end overlapping with cultural normality, preoccupation as a key risk or maintaining factor in eating disorders, and overvaluation as a consequence of the disorder. Indeed, body image concerns are more likely to exist on a spectrum from health to illness similarly to other psychiatric disorders (Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009) than categorically as is designated in current diagnostic models. An alternative explanation is that different aspects of body image disturbance could be more state-based (e.g., body dissatisfaction may fluctuate over time), increasing noise and reducing the potential for strong prospective predictive validity. It is also possible that the predictive validity of body image constructs may vary between or within diagnostic categories. It would be especially important to further investigate the predictive validity of body image measures in BN, a diagnostic category that was relatively under-represented in the longitudinal sample in this study. More research is needed to interpret the reciprocal relationship between body image constructs and eating disorder symptoms.

The current study has several strengths, including the large sample collected across three independent sites, the two-year longitudinal span, the inclusion of both full-criteria and sub-threshold AN, BN, and BED diagnoses, and the use of well-validated assessments to measure study variables. To the best of our knowledge, this is the first study to examine the predictive ability of these body image constructs in a heterogeneous transdiagnostic sample. However, several study limitations should be considered. First, the sample collected in this study may have been skewed or biased. Scores for all eating disorder predictors and outcomes from the EDE were relatively low for a clinical sample, with only overvaluation reaching clinical cutoff guidelines at baseline (e.g., rating of 4 or above out of 6; Luce, Crowther, & Pole, 2008), though dissatisfaction scores were also close to this clinical cutoff. As with any longitudinal investigation, this study experienced attrition. Analysis of individuals who did not complete follow-up assessment suggests that individuals with greater severity, including participants with BN, were less likely to provide longitudinal information, potentially impacting the study findings. Finally, it should be noted that participants in this study were not barred from receiving eating disorderspecific treatment

throughout the course of the study; thus, some of the reduced severity could relate to positive effects of treatment. For these reasons, the results of this study should be replicated in a sample with higher clinical severity.

Related, the diversity of the sample was limited as the sample consisted only of women ages 14–50 in the United States, of whom 91.1% were Caucasian. It remains unclear if these findings would translate to individuals in other age ranges. Inclusion of non-Caucasian and non-Western individuals would provide necessary insight into the cross-cultural generalizability of these findings. Indeed, prior research has suggested that the centrality given to weight and shape concerns may be culturally specific, as these symptoms are not as common in non-Western individuals, and there exists a positive correlation between the Westernization of a society and weight and shape concerns present among eating disorder cases (Keel & Klump, 2003; Palmer, 1993). Thus, continued research replicated across cultural contexts is needed. Additionally, although the exclusion of nonfemale participants was common practice at the time of data collection, more research in this area that includes male-identified, trans-identified, and nonbinary individuals is necessary. In samples of individuals without history of disordered eating, preoccupation has only shown significant association with symptom severity for female-identified individuals (Forrest et al., 2018; Mitchison et al., 2017; Sharpe et al., 2018), thus work is needed to investigate association with gender within clinical samples.

Another limitation of the study is the temporal relevance of the data, which completed collection nearly 20 years ago. As the relative prevalence of body image disturbance may have increased since the time of data collection (Santana et al., 2019), the relationship between these constructs and eating disorder outcomes+ may have shifted. Additionally, diagnoses were made using DSM-IV criteria, and some individuals may fall into disparate diagnostic categories using criteria from the DSM-5, especially those who were classified with a sub-threshold eating disorder. Therefore, replication within a more recently collected data set is needed.

In conclusion, despite its limitations, this study provides intriguing evidence that body image constructs used in assessments for eating pathology are not completely equal in their ability to predict eating disorder symptom severity concurrently and over time. In particular, preoccupation with weight and shape may provide marginally improved prediction over other constructs. These results suggest that using consistent definitions of body image constructs in assessment of eating disorders may be beneficial. Furthermore, given the relative strengths and weaknesses of different body image constructs to predict symptom profiles, it is possible that diagnostic criteria would benefit from accounting for a wider range of body image concerns to capture the heterogeneous presentations of body image disturbance in eating disorders.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

ACKNOWLEDGMENTS

This work was supported in part by the McKnight Foundation, National Institute of Mental Health of the National Institutes of Health (Award numbers: K23MH112867 and T32MH082761), Klarman Family Foundation, Hilda and Preston Davis Foundation, and Minnesota Obesity Center. These funding agencies did not influence the design of the study, collection, analysis, and interpretation of data, or writing of the manuscript. The investigators express gratitude to the McKnight Longitudinal Study research staff at the University of Minnesota, Cornell University, and Stanford University for their contributions to this investigation, and to Dr. Ross Crosby for his consultation regarding the statistical analyses for this article.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

REFERENCES

Abraham SF, von Lojewski A, Anderson G, Clarke S, & Russell J (2009). Feelings: What questions best discriminate women with and without eating disorders? Eating and Weight Disorders, 14(1), e6–e10. 10.1007/BF03354621 [PubMed: 19367134]

Ackard DM, Fulkerson JA, & Neumark-Sztainer D (2007). Prevalence and utility of DSM-IV eating disorder diagnostic criteria among youth. International Journal of Eating Disorders, 40(5), 409–417. 10.1002/eat.20389 [PubMed: 17506079]

Agras WS, Crow S, Mitchell JE, Halmi KA, & Bryson S (2009). A 4-year prospective study of eating disorder NOS compared with full eating disorder syndromes. International Journal of Eating Disorders, 42, 565–570. 10.1002/eat.20708 [PubMed: 19544557]

American Psychiatric Association. (1980). Diagnostic and statistical manual of mental disorders (3rd ed.). Washington, DC: American Psychiatric Publishing.

American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders (4th ed.). Washington, DC: American Psychiatric Publishing.

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Washington, DC: American Psychiatric Publishing.

Beck AT, Steer RA, & Garbin MG (1988). Psychometric properties of the Beck depression inventory: Twenty-five years of evaluation. Clinical Psychology Review, 8, 77–100. 10.1016/02727358(88)90050-5

Beck AT, Ward CH, Mendelson M, Mock J, & Erbaugh J (1961). An inventory for measuring depression. Archives of General Psychiatry, 4, 561–571. 10.1001/archpsyc.1961.01710120031004 [PubMed: 13688369]

Benjamini Y, & Hochberg Y (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. Journal of the Royal Statistical Society. Series B (Methodological), 57(1), 289–300.

Berg KC, Peterson CB, Frazier P, & Crow SJ (2012). Psychometric evaluation of the eating disorder examination and eating disorder examination-questionnaire: A systematic review of the literature. International Journal of Eating Disorders, 45(3), 428–38. 10.1002/eat.20931 [PubMed: 21744375]

Coffino JA, Udo T, & Grilo CM (2019). The significance of overvaluation of shape or weight in binge-eating disorder: Results from a National Sample of U.S. adults. Obesity, 27(8), 1367–1371. 10.1002/oby.22539 [PubMed: 31265763]

Crow SJ, Agras W, Halmi K, Mitchell JE, & Kraemer HC (2002). Full syndromal versus subthreshold anorexia nervosa, bulimia nervosa, and binge eating disorder: A multicenter study. International Journal of Eating Disorders, 32(3), 309–318. 10.1002/eat.10088 [PubMed: 12210645]

Crow SJ, Peterson CB, Swanson SA, Raymond NC, Specker S, Eckert ED, & Mitchell JE (2009). Increased mortality in bulimia nervosa and other eating disorders. American Journal of Psychiatry, 166, 1342–1346. 10.1176/appi.ajp.2009.09020247 [PubMed: 19833789]

Fairburn CG (2008). Cognitive behavior therapy and eating disorders. New York, NY: Guilford Press.

Fairburn CG, & Cooper Z (1993). The eating disorder examination. In Fairburn CG & Wilson Binge GT(Eds.), Binge eating: Nature, assessment, and treatment (12th ed., pp. 317–360). Guilford Press: New York, NY.

Fairburn CG, Cooper Z, & O'Connor ME (2014). Eating Disorder Examination (Edition 17.0D). Oxford, England: University of Oxford. Retrieved from https://www.credo-oxford.com/pdfs/EDE_17.0D.pdf

Fairburn CG, Peveler RC, Jones R, Hope RA, & Doll HA (1993). Predictors of 12-month outcome in bulimia nervosa and the influence of attitudes to shape and weight. Journal of Consulting and Clinical Psychology, 61(4), 696–698. 10.1037/0022-006x.61.4.696 [PubMed: 8370866]

Forrest LN, Jones PJ, Ortiz SN, & Smith AR (2018). Core psychopathology in anorexia nervosa and bulimia nervosa: A network analysis. International Journal of Eating Disorders, 51(7), 668–679. 10.1002/eat.22871 [PubMed: 29693747]

Franko DL, Tabri N, Keshaviah A, Murray HB, Herzog DB, Thomas JJ, … Eddy KT (2018). Predictors of long-term recovery in anorexia nervosa and bulimia nervosa: Data from a 22-year longitudinal study. Journal of Psychiatric Research, 96, 183–188. 10.1016/j.jpsychires.2017.10.008 [PubMed: 29078155]

Goldfein JA, Walsh BT, & Midlarsky E (2000). Influence of shape and weight on self-evaluation in bulimia nervosa. International Journal of Eating Disorders, 27(4), 435–445. 10.1002/(SICI)1098108X(200005)27:4<435::AID-EAT8>3.0.CO;2-2 [PubMed: 10744850]

Hadigan CM, & Walsh TB (1991). Body shape concerns in bulimia nervosa. International Journal of Eating Disorders, 10(3), 323–331. 10.1002/1098-108X(199105)10:3<323::AIDEAT2260100308>3.0.CO;2-V

Hay P (1998). The epidemiology of eating disorder behaviors: An Australian community-based survey. International Journal of Eating Disorders, 23(4), 371–382. 10.1002/(sici)1098-108x(199805)23:4<371::aid-eat4>3.0.co;2-f [PubMed: 9561427]

Hsu LKG, & Sobkiewicz TA (1991). Body image disturbance: Time to abandon the concept for eating disorders? International Journal of Eating Disorders, 10(1), 15–30. 10.1002/1098-108x(199101)10:1<15::aid-eat2260100103>3.0.co;2-i

Keel PK, & Klump KL (2003). Are eating disorders culture-bound syndromes? Implications for conceptualizing their etiology. Psychological Bulletin, 129(5), 747–769. 10.1037/0033-2909.129.5.747 [PubMed: 12956542]

Luce KH, Crowther JH, & Pole M (2008). Eating disorder examination questionnaire (EDE-Q): Norms for undergraduate women. International Journal of Eating Disorders, 41(3), 273–276. 10.1002/eat.20504 [PubMed: 18213686]

Lydecker JA, White MA, & Grilo CM (2017). Form and formulation: Examining the distinctiveness of body image constructs in treatmentseeking patients with binge-eating disorder. Journal of Consulting and Clinical Psychology, 85(11), 1095–1103. 10.1037/ccp0000258 [PubMed: 29083224]

Mitchison D, Hay P, Griffiths S, Murray SB, Bentley C, Gratwick-Sarll K, … Mond J (2017). Disentangling body image: The relative associations of overvaluation, dissatisfaction, and preoccupation with psychological distress and eating disorder behaviors in male and female adolescents. International Journal of Eating Disorders, 50(2), 118–126. 10.1002/eat.22592 [PubMed: 27539911]

Os JV, Linscott RJ, Myin-Germeys I, Delespaul P, & Krabbendam L (2009). A systematic review and meta-analysis of the psychosis continuum: Evidence for a psychosis proneness–persistence–impairment model of psychotic disorder. Psychological Medicine, 39(2), 179–195. 10.1017/s0033291708003814 [PubMed: 18606047]

Palmer RL (1993). Weight concern should not be a necessary criterion for the eating disorders: A polemic. International Journal of Eating Disorders, 14(4), 459–465. 10.1002/1098-108X(199312)14:4<459::AID-EAT2260140409>3.0.CO;2-V [PubMed: 8293028]

Peterson CB, Crow SJ, Swanson SA, Crosby RD, Wonderlich SA, Mitchell JE, … Halmi KA (2011). Examining the stability of DSM–IV and empirically derived eating disorder classification: Implications for DSM–5. Journal of Consulting and Clinical Psychology, 79(6), 777–783. 10.1037/a0025941 [PubMed: 22040286]

Rodin J, Silberstein L, & Striegel-Moore R (1984). Women and weight: A normative discontent. Nebraska Symposium on Motivation, 32, 267–307. [PubMed: 6398857]

Rosenberg M (1965). Society and the adolescent self-image. Princeton, NJ: Princeton University Press.

Santana DD, Mitchison D, Griffiths S, Appolinario JC, Veiga GV, Touyz S, & Hay P (2019). Ten-year time trends in mental and physical health correlates of weight/shape overvaluation. European Eating Disorders Review, 27(5), 531–540. 10.1002/erv.2672 [PubMed: 30895707]

Sharpe H, Griffiths S, Choo T, Eisenberg ME, Mitchison D, Wall M, & Neumark-Sztainer D (2018). The relative importance of dissatisfaction, overvaluation and preoccupation with weight and shape for predicting onset of disordered eating behaviors and depressive symptoms over 15 years. International Journal of Eating Disorders, 51(10), 1168–1175. 10.1002/eat.22936 [PubMed: 30194690]

Sinclair SJ, Blais MA, Gansler DA, Sandberg E, Bistis K, & LoCicero A (2010). Psychometric properties of the Rosenberg self-esteem scale: Overall and across demographic groups living within the United States. Evaluation & the Health Professions, 33(1), 56–80. 10.1177/0163278709356187 [PubMed: 20164106]

Tantleff-Dunn S, Barnes RD, & Larose JG (2011). It's not just a "woman thing:" The current state of normative discontent. Eating Disorders, 19(5), 392–402. 10.1080/10640266.2011.609088 [PubMed: 21932970]

Vall E, & Wade TD (2015). Predictors of treatment outcome in individuals with eating disorders: A systematic review and meta-analysis. International Journal of Eating Disorders, 48(7), 946–971. 10.1002/eat.22411 [PubMed: 26171853]

Wade TD, Zhu G, & Martin NG (2011). Undue influence of weight and shape: Is it distinct from body dissatisfaction and concern about weight and shape? Psychological Medicine, 41(4), 819–828 10.017/S0033291710001066. [PubMed: 20507670]

Wilfley DE, Schwartz MB, Spurrell EB, & Fairburn CG (2000). Using the eating disorder examination to identify the specific psychopathology of binge eating disorder. International Journal of Eating Disorders, 27(3), 259–269. 10.1002/(sici)1098-108x(200004)27:3<259::aid-eat2>3.0.co;2-g [PubMed: 10694711]

TABLE 1

Baseline sample characteristics and comparison of demographic and clinical characteristics between participants who completed or did not complete 12- and 24-month follow-up assessments

		12-month follow-up				24-month follow-up			
Variable	**Baseline Full sample (*n* = 448) *M* (*SD*) or % (*n*)**	**Complete (*n* = 350) *M* (*SD*) or % (*n*)**	**Missing (*n* = 98) *M* (*SD*) or % (*n*)**	***t*/χ^2**	***P***	**Complete (*n* = 312) *M* (*SD*) or % (*n*)**	**Missing (*n* = 136) *M* (*SD*) or % (*n*)**	***t*/χ^2**	***P***
Age	32.27 (8.94)	32.72 (9.27)	30.67 (7.50)	−2.01	.05	33.08 (9.17)	30.41 (8.13)	−2.94	.003[a]
Race (% White)	91.1 (*n* = 408)	91.9	87.5	5.2	.27	91.9	88.9	3.42	.49
BMI	27.89 (10.51)	28.34 (10.86)	26.38 (9.01)	−1.64	.1	28.62 (11.07)	26.29 (8.91)	−2.17	.03
Diagnosis	–	–	–	–	–	–	–	–	–
Anorexia nervosa (AN)	11.4 (*n* = 51)	12.0 (*n* = 42)	9.2 (*n* = 9)	0.6	.59	12.8 (*n* = 40)	8.1 (*n* = 11)	2.1	.2
Subthreshold AN	11.4 (*n* = 51)	11.4 (*n* = 40)	11.2 (*n* = 11)	0	1	12.5 (*n* = 39)	3.9 (*n* = 12)	1.27	.33
Bulimia nervosa (BN)	22.1 (*n* = 99)	20.9 (*n* = 73)	26.5 (*n* = 26)	1.43	.27	18.0 (*n* = 56)	31.6 (*n* = 43)	10.3	.002[a]
Subthreshold BN	14.7 (*n* = 66)	15.4 (*n* = 54)	12.3 (*n* = 12)	0.62	.52	14.7 (*n* = 46)	14.7 (*n* = 20)	0	1
Binge-eating disorder (BED)	25.9 (*n* = 116)	28.6 (*n* = 100)	16.3 (*n* = 16)	5.98	.013[a]	29.8 (*n* = 93)	16.9 (*n* = 23)	8.21	.005[a]
Subthreshold BED	10.3 (*n* = 46)	11.1 (*n* = 39)	7.1 (*n* = 7)	1.33	.35	11.9 (*n* = 37)	6.6 (*n* = 9)	2.82	.13
Preoccupation score	1.80 (2.30)	1.68 (2.28)	2.40 (2.49)	2.49	.013[a]	1.69 (2.28)	2.17 (2.43)	1.93	.06
Overvaluation score	4.31 (1.42)	4.25 (1.46)	4.52 (1.25)	1.69	.09	4.24 (1.47)	4.47 (1.31)	1.59	.11
Dissatisfaction score	3.94 (1.79)	3.91 (1.83)	4.07 (1.63)	0.77	.44	3.90 (1.82)	4.05 (1.70)	0.85	.4
EDE global score	2.90 (1.28)	2.78 (1.26)	3.46 (1.20)	4.32	<.001[a]	2.77 (1.27)	3.27 (1.30)	3.65	<.001[a]
Binge-eating episodes	12.98 (17.68)	12.11 (15.66)	16.07 (23.35)	1.97	.05	11.73 (15.67)	15.85 (21.38)	2.28	.02
Purging episodes	14.75 (42.98)	13.72 (45.41)	18.42 (32.79)	0.96	.34	11.67 (44.52)	21.82 (38.44)	2.31	.02
Fasting score	0.83 (1.40)	0.72 (1.37)	1.25 (1.63)	2.96	.003[a]	0.73 (1.37)	1.07 (1.59)	2.16	.03
RSES score	24.59 (6.43)	24.55 (6.47)	24.72 (6.32)	0.23	.82	24.56 (6.48)	24.66 (6.34)	0.15	.88
BDI score	16.39 (10.77)	16.17 (10.50)	17.14(11.69)	0.79	.43	16.00 (10.51)	17.28 (11.32)	1.16	.25

Note: Binge-eating and purging episodes were assessed over the preceding 3 months.

Abbreviations: BDI, Beck Depression Inventory (Beck et al., 1961); EDE, Eating Disorder Examination Questionnaire (Fairburn & Cooper, 1993); RSES, Rosenberg Self-Esteem Scale (Rosenberg, 1965).

[a]Significant after Benjamini–Hochberg corrections.

TABLE 2

Sample clinical characteristics at Baseline, 12-month follow-up, and 24-month follow-up assessments

	Baseline		12-month follow-up		24-month follow-up	
Variable	***M* (*SD*) or %**	**Range**	***M* (*SD*) or %**	**Range**	***M* (*SD*) or %**	**Range**
Preoccupation score	1.80 (2.30)	0.00–6.00	1.02 (1.75)	0.00–6.00	0.77 (1.48)	0.00–6.00
Overvaluation score	4.31(1.42)	0.00–6.00	3.74 (1.43)	0.00–6.00	3.44 (1.45)	0.00–6.00
Body dissatisfaction score	3.94(1.79)	0.00–6.00	3.32 (1.73)	0.00–6.00	3.24 (1.70)	0.00–6.00
EDE global score	2.90 (1.28)	0.00–5.93	2.14 (1.22)	0.00–5.24	1.81 (1.18)	0.00–5.81
Binge-eating episodes	12.98 (17.68)	0.00–150.00	8.41 (14.44)	0.00–112.00	6.36 (12.67)	0.00–123.00
Purging episodes	14.75 (42.98)	0.00–560.00	13.41 (45.05)	0.00–560.00	11.06 (35.36)	0.00–560.00
Fasting score	0.83 (1.40)	0.00–6.00	0.57 (1.18)	0.00–6.00	0.38 (0.99)	0.00–6.00
RSES score	24.59 (6.43)	10.00–40.00	23.36 (6.41)	0.00–40.00	22.93 (6.31)	0.00–40.00
BDI score	16.39 (10.77)	0.00–49.00	13.29 (10.33)	0.00–44.00	12.01 (9.72)	0.00–53.00

Note: Binge-eating and purging episodes were assessed over the preceding 3 months.

Abbreviations: BDI, Beck Depression Inventory (Beck et al., 1961); EDE, Eating Disorder Examination Questionnaire (Fairburn & Cooper, 1993); RSES, Rosenberg Self-Esteem Scale (Rosenberg, 1965).

TABLE 3

Cross-sectional generalized linear models examining concurrent associations between body image-related related variables and eating disorder and psychological well-being

Dependent variable	Independent variables	*Wald* χ^2	*B*	*SE*	*P*
EDE global score	Preoccupation	370.31	0.24	0.01	<.001[a]
	Overvaluation	118	0.2	0.02	<.001[a]
	Dissatisfaction	442	0.34	0.02	<.001[a]
Binge-eating episodes	Preoccupation	9.28	0.05	0.02	.002[a]
	Overvaluation	3.5	0.05	0.03	.06
	Dissatisfaction	26.7	0.13	0.02	<.001[a]
Purging episodes	Preoccupation	7.98	0.05	0.02	.005[a]
	Overvaluation	10.2	0.08	0.03	.001[a]
	Dissatisfaction	0.76	0.02	0.02	.38
Fasting score	Preoccupation	69.7	0.07	0.01	<.001[a]
	Overvaluation	6.94	0.03	0.01	.008[a]
	Dissatisfaction	30.3	0.06	0.01	<.001[a]
RSES score	Preoccupation	64.40	0.67	0.08	<.001[a]
	Overvaluation	134	1.41	0.12	<.001[a]
	Dissatisfaction	50.1	0.77	0.11	<.001[a]
BDI score	Preoccupation	51.22	0.08	0.01	<.001[a]
	Overvaluation	77.9	0.14	0.02	<.001[a]
	Dissatisfaction	37.9	0.09	0.01	<.001[a]

Note: Binge-eating and purging episodes were assessed over the preceding 3 months.

Abbreviations: EDE, Eating Disorder Examination Questionnaire (Fairburn & Cooper, 1993); BDI, Beck Depression Inventory (Beck et al., 1961); RSES, Rosenberg Self-Esteem Scale (Rosenberg, 1965).

[a]Significant after Benjamini–Hochberg corrections.

TABLE 4

Longitudinal generalized linear models examining predictive associations between body image-related related variables and subsequent eating disorder and psychological well-being

Dependent variable	Independent variables	*Wald* χ^2	*B*	*SE*	*P*
EDE global score	Preoccupation	8.76	0.06	0.02	.003[a]
	Overvaluation	3.64	0.05	0.03	.06
	Dissatisfaction	0.87	0.03	0.03	.35
Binge-eating episodes	Preoccupation	0.64	−0.02	0.02	.423
	Overvaluation	5.99	0.08	0.03	.014[a]
	Dissatisfaction	0.78	0.03	0.03	.38
Purging episodes	Preoccupation	0.21	0.01	0.02	.649
	Overvaluation	3.23	0.05	0.03	.07
	Dissatisfaction	0.02	−0.00	0.03	.89
Fasting score	Preoccupation	31.5	0.04	0.01	<.001[a]
	Overvaluation	0.69	0.01	0.01	.41
	Dissatisfaction	2.43	−0.02	0.01	.12
RSES score	Preoccupation	1.03	0.08	0.08	.309
	Overvaluation	0.08	−0.04	0.13	.78
	Dissatisfaction	0.1	0.01	0.11	.92
BDI score	Preoccupation	0.21	−0.01	0.01	.646
	Overvaluation	3.46	0.04	0.02	.06
	Dissatisfaction	1.29	0.02	0.02	.26

Note: Binge-eating and purging episodes were assessed over the preceding 3 months.

Abbreviations: BDI, Beck Depression Inventory (Beck et al., 1961); EDE, Eating Disorder Examination Questionnaire (Fairburn & Cooper, 1993); RSES, Rosenberg Self-Esteem Scale (Rosenberg, 1965).

[a]Significant after Benjamini–Hochberg corrections.