

Restraint, Dieting, and the Continuum Model of Bulimia Nervosa

Michael R. Lowe

Allegheny University of the Health Sciences

David H. Gleaves

Texas A & M University

Rosalie T. DiSimone-Weiss, Cornelius Furgueson,
Christine A. Gayda, Pam A. Kolsky,
Tracy Neal-Walden, and Lori A. Nelsen
Allegheny University of the Health Sciences

Shortie McKinney
Drexel University

The authors evaluated the continuity model of bulimia nervosa, which suggests that bulimia results from extreme weight concern and dieting practices. Individuals with bulimia, current dieters, restrained nondieters, and unrestrained nondieters were compared on measures of general psychopathology, eating-disorder-specific psychopathology, and overeating. Multiple methods, including questionnaires, clinical interviews, and food records, were used to collect data. The continuity and discontinuity models were tested with trend and regression analyses. The results of most analyses were consistent with the continuity perspective. However, binge eating behavior exhibited a clear nonlinear trend, which occurred because binge eating was common in bulimic individuals but virtually nonexistent in the other 3 groups. Current dieters scored higher than restrained nondieters on restraint/weight concern, but not on psychopathology or binge eating. Overall, the results suggest that “normal” dieting is associated with psychological, but not consummatory, symptoms of bulimia.

Eating disorders experts generally agree that dieting is a contributing factor to the development of bulimia nervosa (Fairburn, Marcus, & Wilson, 1993; Hsu, 1990; Polivy & Herman, 1985). Beyond this general point of agreement, there are two perspectives on the relationship between dieting and the development of bulimia. The continuity model (Hsu, 1990; Polivy & Herman, 1987) suggests that bulimia develops when a person shows the more extreme manifestations (e.g., starve/binge cycles, self-induced vomiting) of the same weight and dieting concerns that plague many women in American society. The discontinuity model (Bruch, 1973) acknowledges the causal role that dieting usually plays in the development of bulimia, but also suggests that dieting develops into bulimia only among in-

dividuals with other predisposing characteristics (depression, impulse control problems, etc.).

In prior research, models of continuity or discontinuity have been tested by comparing unrestrained eaters, restrained eaters, and individuals with bulimia. If bulimic risk factors or symptoms increase as one moves from unrestrained eaters to restrained eaters to those with bulimia, then the continuity perspective is supported. If, on the other hand, such a trend is not observed and restrained eaters appear generally similar to unrestrained eaters, with both types of individuals differing significantly from bulimic individuals, then the discontinuity perspective is supported.

Past research has found evidence of both continuity and discontinuity between bulimic individuals, restrained eaters, and unrestrained eaters. Laessle, Tuschl, Waadt, and Pirke (1989) and Rossiter, Wilson, and Goldstein (1989) both found evidence of continuity on measures of dietary and weight concern, but evidence of discontinuity on measures of general psychopathology. Ruderman and Besbeas (1992) found evidence of both continuity and discontinuity on various personality and psychopathology measures, although the preponderance of their results favored the discontinuity perspective.

The present study was designed to build on past investigations of continuity/discontinuity in three ways. First, past studies did not differentiate between restrained eating and dieting to lose weight. The need to do so was documented in a review of the restraint literature (Lowe, 1993), which concluded that (a) disinhibition in restrained eaters stems from their dieting/overeating history, not from their current level of dietary or cognitive restraint; (b) only about 40% of restrained eaters identified by the Restraint Scale (Herman & Polivy, 1980) are dieting to lose weight at a given point in time; and (c) current dieters

Michael R. Lowe, Department of Clinical and Health Psychology, Allegheny University of the Health Sciences; David H. Gleaves, Department of Psychology, Texas A & M University; Rosalie T. DiSimone-Weiss, Cornelius Furgueson, Christine A. Gayda, Pam A. Kolsky, Tracy Neal-Walden, and Lori A. Nelsen, Department of Clinical and Health Psychology, Allegheny University of the Health Sciences; Shortie McKinney, Department of Nutrition and Food Science, Drexel University.

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Correspondence concerning this article should be addressed to Michael R. Lowe, Department of Clinical and Health Psychology, Mail Stop 626, Allegheny University of the Health Sciences, Philadelphia, Pennsylvania 19102. Electronic mail may be sent via Internet to lowem@hal.allegheny.edu.

respond to disinhibitory influences differently than restrained eaters who are not currently dieting.

According to Lowe (1993), frequency of past dieting and overeating is the critical construct that explains why restrained eaters are vulnerable to counterregulatory and emotional eating. Because bulimic individuals have an extensive history of dieting and overeating, comparing them with low and high scorers on the Restraint Scale appears to be an appropriate method for evaluating the continuity/discontinuity models described above. However, people with bulimia not only have an extensive history of dieting and overeating, but most are presumably on a weight loss diet at any given time. Indeed, because purging is viewed as a means of compensating for food consumed during binges (American Psychiatric Association, 1994)—not as a means of producing weight loss—calorie-restricted dieting is presumably the primary means by which people with bulimia attempt to lower their body weight. Therefore, because most restrained eaters are not on weight loss diets (Lowe, 1993), it appears that a complete evaluation of the continuity model should include as comparison groups both nondieting restrained eaters and active weight-loss dieters.¹

A second purpose of the study was to directly compare current dieters and restrained nondieters on bulimic symptoms and risk factors. Current dieters are trying to lose weight and also have an extensive history of dieting. Thus, current dieters share two potential risk factors for bulimic symptomatology (past and current dieting), whereas restrained nondieters share only one (past dieting). Therefore, the continuity model would predict that current dieters should evidence more general pathology and pathology related to eating disorders than would be found in restrained nondieters. The only possible exception to this prediction would be in the area of eating behavior. Laboratory studies have found marked differences in the response of these two groups to preloads and emotional distress (Eldredge, 1993; Lowe, 1995; Lowe, Whitlow, & Bellwoar, 1991). Whereas restrained eaters tend to overeat following a high-calorie preload or when emotionally distressed, current dieters decrease their consumption when preloaded (Lowe, 1995; Lowe et al., 1991) or emotionally distressed (Eldredge, 1993). Nevertheless, current dieters, unlike restrained nondieters, share with bulimic individuals the potentially critical characteristic of weight-loss dieting. Cognitive and/or physiological concomitants of an ongoing diet may make current dieters resemble people with bulimia more closely than restrained nondieters do. Thus if current dieters score higher on those factors that, according to cognitive-behavioral theory, create risk for binge eating (body dissatisfaction; drive for thinness; restrictive eating; and concerns about eating, shape, and weight; Fairburn, Marcus, & Wilson, 1993), then they will presumably also score higher than restrained nondieters on clinical measures of overeating.

A third purpose of this study was to conduct a more in-depth and fine-grained examination of the eating behavior of those with bulimia and the three control groups. Past studies of continuity/discontinuity (Laessle et al., 1989; Rossiter et al., 1989; Ruderman & Besbeas, 1992) have focused on general psychopathology and on psychopathology specific to eating disorders rather than on eating behavior per se. In the present study, diverse methods (questionnaires, clinical interviews, and food records) were used to compare groups on overeating and binge

eating. To our knowledge there are no studies that have examined the naturalistic eating behavior of bulimic and nonbulimic but weight-conscious individuals. Thus another objective of this study was to determine whether laboratory demonstrations of overeating in restrained eaters (Polivy & Herman, 1985) and dieters (Lowe et al., 1991) actually reflect increased risk of overeating or binge eating in the real world. Because restraint and dieting are thought to produce overeating, emotional eating, and binge eating even in nonclinical subjects (e.g., Heatherton & Baumeister, 1991; Polivy & Herman, 1985), the continuity model would clearly predict that such eating problems should increase as dieting intensity increased.

In terms of sensitivity of measurement, no study of the continuity model of bulimia has used the Eating Disorders Examination (EDE; Fairburn & Cooper, 1993), which is generally viewed as providing the most fine-grained assessment of eating disorder pathology. The sensitivity of the interview-based EDE was illustrated in a study which found that highly restrained eaters and those with bulimia did not differ on most subscales of a widely used eating disorders questionnaire (the Eating Disorders Inventory; Garner, Olmsted, & Polivy, 1983), but they did differ on most subscales of the EDE (Wilson & Smith, 1989).

The continuity and discontinuity models were tested using trend analyses and a regression analysis. Trend analysis is an appropriate data analytic strategy for investigating the shape or form of the functional relationship between different levels of a (quantitative) independent variable and one or more dependent variables (e.g., Hinkle, Wiersma, & Jurs, 1988; Keppel, 1982). If restrained eating and dieting represent intermediate steps between normality and bulimia (the continuity model), we assumed that the data would exhibit a purely linear trend, with the predicted ordering of eating disorder characteristics being individuals with bulimia > current dieters > restrained nondieters > unrestrained nondieters. On the other hand, we assumed that the presence of a quadratic or cubic trend (one or more significant curves in the functional relationship between the independent and dependent variables) would be inconsistent with the continuity model and would support the discontinuity model.

Regression analyses were utilized to determine the degree to which binge eating could be predicted from measures of eating and weight concerns versus psychopathology. Factors measuring these three dimensions have consistently emerged in studies of clinical and nonclinical populations (Gleaves, Williamson, & Barker, 1993; Tobin, Johnson, Steinberg, Staats, & Dennis, 1991; Varnado, Williamson, & Netemeyer, 1995), and multiple measures of all three were included in this study. A key assumption of the discontinuity model is that some form of psychopathology precedes and helps initiate the intense body dissatisfaction and extreme weight control methods that characterize bulimia. Although it is likely that some degree of emotional distress is generated by the extreme eating and weight concerns shown by bulimic individuals, the discontinuity model predicts

¹ This conclusion is also supported by a study which found that past and current dieting emerged as separate dimensions in a factor analysis of diverse measures of bulimic symptomatology (Tobin, Johnson, Steinberg, Staats, & Dennis, 1991).

that psychopathology should be related to binge eating independently of such concerns. We therefore assumed that if we controlled for the effect of eating/weight concerns and psychopathology (or an interaction of psychopathology and eating/weight concerns) still predicted binge eating, such results would support the discontinuity model. On the other hand, if psychopathology was held constant and eating/weight concerns predicted binge eating, such results would support the continuity model.

Method

Participants

The participants in this study were 73 women from the Philadelphia area. Individuals in the normal weight range were sought. The selected participants ranged in weight from 23.8% below to 22.1% over their desirable weights, and their mean weight was 4.7% below their desirable weights based on the Metropolitan Height and Weight Table (Metropolitan Life Insurance Company, 1983). Participants were mostly in their 20s, with a mean age of 25 years. Eighty-one percent of the nonbulimic participants, assigned to the control groups, were single, compared with 86% of the participants with bulimia. Sixty-five percent of individuals in the control groups and 58% of those in the bulimia group had at least a college education.

Bulimic participants were solicited through an advertisement in a local newspaper. They were screened over the telephone for current experience of symptoms associated with bulimia nervosa and weight within the normal range. Only normal weight individuals were selected to enhance generalization of the results to bulimic individuals (most of whom are normal weight). The bulimic women's binge frequency (based on objective bulimic episodes as defined by the EDE) was 4.6 per week. Their average frequency of self-induced vomiting was 7 times per week; 16 of the 21 bulimic women purged by vomiting. The great majority of the bulimia group (86%) had received psychological treatment for their eating problem.

All other participants were selected from graduate and undergraduate classes at Medical College of Pennsylvania and Hahnemann University. Students interested in participating in the study were asked to complete a screening form that solicited information about their height, current weight, and current dieting status, as well as the method by which they could be contacted if they were selected to participate. This form also contained several questions from the Restraint Scale (Herman & Polivy, 1980) that helped us estimate restrained eating classification. These estimated scores were used near the end of participant solicitation to locate a sufficient number of restrained nondieting participants. Only those whose self-reported weights put them in the normal weight range were considered for participation.

Procedure

Eligible participants were called and scheduled for individual 1-hr appointments. During the appointment, the experimenter administered version 11.5D of the EDE (Cooper & Fairburn, 1987) and provided the participant with a packet of questionnaires to complete during the following week. This packet included the Eating Behavior Study Questionnaire, which contained the revised Restraint Scale (Herman & Polivy, 1980) and items about weight and dieting history; the Eating Disorders Inventory-2 (Garner, 1991); the Derogatis Symptom Inventory (Derogatis, 1988); a food preference inventory²; and a food intake recording booklet. The experimenter also measured, on a balance-beam scale, the height and weight of participants at this first visit. Second appointments were scheduled for the following week so participants

could return completed materials and receive compensation for their participation.

The experimenters were four clinical psychology doctoral degree students and one doctoral level clinical psychologist. The research was presented to all potential participants as a study examining "the interrelationship of eating patterns, dieting practices, and psychological functioning." All participants were paid for their participation. Student participants received \$20 and bulimic participants received \$50. (Bulimic participants received a larger sum because they also completed the Minnesota Multiphasic Personality Inventory and a measure of object relations as part of an unrelated study). A total of 76 women participated in the study, but 3 were eliminated from consideration because of extensive missing data.

Participants were assigned to one of four groups: those with bulimia, current dieters, restrained nondieters, and unrestrained nondieters. *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., Rev.; *DSM-III-R*) criteria, as operationalized in edition 11.5D of the EDE (Cooper & Fairburn, 1987), were used to assess diagnostic status of participants recruited for the bulimia group ($n = 21$). Of the 21 participants in this group, 8 did not qualify for the formal diagnosis of bulimia nervosa because they did not exhibit a high enough frequency of objective bulimic episodes. To determine whether it was appropriate to include these women in the bulimia group, they were compared with the 13 participants who met *DSM-III-R* criteria on all dependent measures used in this study. Of the 25 dependent measures examined, the only significant difference was on the Overeating subscale of the EDE. Furthermore, evidence indicates that frequency of binge eating among individuals with eating disorders is unrelated to psychopathology or treatment outcome (Wilson & Eldredge, 1991; Wilson & Walsh, 1991). Finally, the 8 women with subclinical bulimia reported 3.9 binges during the 6 days of food self-monitoring (compared with 5.9 for the remaining women with bulimia), which suggests that their bingeing problem was serious. Therefore, the participants with subclinical and clinical bulimia were combined into one bulimia group. A comparison of the EDE scores of this bulimia group with published EDE norms for bulimia (Fairburn & Cooper, 1993) showed that the two sets of scores were similar, suggesting that the severity of symptoms in our bulimia group was comparable to that of bulimic participants in past research.

Student participants, none of whom had a history of treatment for eating disorders, were assigned as follows to one of the three nonbulimic groups. Those who affirmed that they were "currently on a diet to lose weight" ($n = 14$) on an item on the Eating Behavior Study Questionnaire were placed in the current dieting group regardless of restraint score.³ Those who stated that they were not currently on a diet to lose

² This was administered as part of an unrelated study.

³ All participants completed 7-day food intake diaries, in which they indicated, on arising each morning, whether they intended "on dieting today (eating less than needed to maintain your weight?)." If the answer was affirmative, participants then rated their level of commitment to strictly follow the diet. An examination of these data indicated that all "current dieters" said they intended to diet on most or all days during which intake was monitored, thereby supporting the validity of the single-item dieting question. Among the unrestrained and restrained nondieters, 89% indicated that they did not intend on dieting on most or all of the food monitoring days. Four "nondietering" subjects (3 unrestrained and 1 restrained) actually indicated that they were intending to diet on most or all days during the food monitoring period, raising the question of how these participants should be classified. Further examination of their data suggested that these participants may not have been actively dieting to lose weight. On the Eating Behavior Study Questionnaire, 2 of the 4 indicated that they had never been on a diet to lose weight, and another said she had not dieted in the past year. These participants may have been "dieting" to maintain their weights. The 4th subject's ratings of her daily commitment to diet were consistently 2s

weight were classified as either restrained or unrestrained nondieters. Nondietering participants who had a restraint score of 15 or above were assigned to the restrained nondieter group ($n = 15$), and those with a restraint score below 15 were assigned to the unrestrained nondieter group ($n = 23$). A cutoff score of 15 was chosen because prior restraint research has typically used a score at or near 15 to determine restraint classification (Herman & Polivy, 1980; Herman, Polivy, Lank, & Heatherton, 1987).

Measures

Several participants had one missing value on one or more of the subscales shown below. When this occurred, the missing value was replaced by the mean score of the remaining items on that subscale.

Eating Behavior Study Questionnaire (EBSQ). This questionnaire was constructed for this study to obtain information about participants' current dieting and weight status, dieting history, and demographic information. Herman and Polivy's (1980) Restraint Scale was also embedded within the EBSQ. The Restraint Scale has demonstrated good reliability when used with normal weight individuals and has been able to predict eating behavior for this population in a variety of laboratory studies (Lowe, 1993).

Eating Disorders Examination (EDE; Cooper & Fairburn, 1987). This measure is a 62-item semistructured interview that assesses the specific psychopathology associated with eating disorders. The five subscales derived from this measure are Overeating, Restraint, Eating Concern, Shape Concern, and Weight Concern. The EDE has demonstrated excellent interrater reliability (Cooper & Fairburn, 1987; Fairburn & Cooper, 1993) and its subscales show acceptable internal consistency (Cooper, Cooper, & Fairburn, 1989). The EDE and its individual subscales have been shown to discriminate well between bulimic individuals, restrained eaters, and various control groups (Fairburn & Cooper, 1993). All experimenters who conducted this examination were trained in its administration and scoring to facilitate standardization in its implementation.

Eating Disorders Examination-2 (EDI-2; Garner, 1991). The EDI-2 is a 91-item self-report measure of psychological and behavioral characteristics common to bulimia and anorexia nervosa. The EDI-2 assesses the same eight subscales as the original EDI (Garner et al., 1983), plus three new subscales (Asceticism, Impulse Regulation, and Social Ineffectiveness). The original EDI has been used in a number of studies to distinguish between bulimics and various other nonbulimic groups (Garner et al., 1983; Laessle et al., 1989). Because the results of a recent empirical study (Eberenz & Gleaves, 1994) did not support the reliability or validity of the three provisional scales, we used only the eight original scales in the current investigation.

Derogatis Symptom Inventory (DSI; Derogatis, 1988). The DSI is an 89-item inventory that assesses 10 dimensions of psychiatric symptomatology. The DSI represents a refinement and extension of the more familiar Symptom Checklist-90-Revised (SCL-90-R), whose psychometric properties have been supported in numerous studies (Derogatis, 1988; Derogatis, Rickels, & Rock, 1976). The DSI differs from the SCL-90-R in that it excludes the Somatization and Psychoticism subscales of the SCL-90-R but includes three new subscales measuring panic, social alienation, and cognitive dyscontrol.

Food records. Participants received small preprinted booklets in which they recorded all of their food intake for 7 days. On awakening each day, they recorded whether they intended on dieting that day (defined as "eating less than needed to maintain your weight"). Just

prior to eating each meal or snack, all participants recorded the time, meal type, who they ate with, and their mood. After finishing these recordings, they ate their meal. Participants were warned that recording food intake sometimes makes people eat less than normal, and they were advised to eat normally during the recording period.

Participants were instructed to record the types and amounts of all foods eaten immediately after finishing each meal. The importance of complete and accurate food descriptions was emphasized. Participants received a detailed hand-out describing the procedures they should follow in recording their food intake.

After recording their intake, participants indicated whether they considered the preceding food intake to be an instance of "overeating" (defined as eating "more than you think you should have but still feeling in control while eating"), binge eating (eating "more than you think you should have and feeling out of control while eating"), or neither.

All of the food intake data were entered into the Nutritionist IV nutritional database and analysis program (N-Squared Computing, Salem, Oregon). This software program, which contains nutritional information on over 8,000 foods, produces output on total caloric intake and percentages of calories derived from protein, carbohydrate, and fat. Research assistants were trained to use the Nutritionist IV program by a doctoral level research nutritionist experienced in its use.

Food records are potentially subject to various biases (Wolper, Heshka, & Heymsfield, 1995). However, they have been used successfully to identify characteristic food intake patterns of individuals with bulimia (Davis, Freeman, & Garner, 1988; Rosen, Leitenberg, Fisher, & Khazam, 1986), and they produce results consistent with those obtained with other methodologies (de Castro, 1994).

Results

Preliminary Analyses

The four groups were compared on age, percentage of desirable weight, and restraint scores using one-way analyses of variance and Newman-Keuls post hoc tests (see Table 1). No group differences were found for age or relative weight. Subjects on average were in their mid 20s (range = 18–40) and slightly underweight. Groups differed on restraint, with bulimics scoring higher than the other three groups, and both dieters and restrained nondieters scoring higher than unrestrained eaters. The mean restraint scores of current dieters and restrained nondieters were similar.

Data Reduction

As an initial data reduction strategy, all measures of general and eating disorder-related psychopathology were first entered into a principal components analysis and factor scores were generated.⁴ The initial measures that were included in the analysis

⁴ Regarding our initial principal components analysis, we should briefly address the issue of sample size, the number of variables, and the stability of the component patterns. Contrary to accepted rules of thumb based on ratios of sample size to number of variables, Guadagnoli and Velicer (1988) found absolute sample size and component saturation to be the most critical variables in determining the stability of component patterns. They found that when factors are defined by four or more variables with loadings of .60 or greater, then the structure can be interpreted with samples as small as 50. Given that this condition was met in the current data, the obtained factor structure appeared stable and the sample size adequate. The obtained factor structure was also quite similar to that obtained in previous factor analytic studies of bulimic and nonbulimic samples (Gleaves, Williamson, & Barker, 1993; Tobin, Johnson, Steinberg, Staats, & Dennis, 1991; Varnado, Williamson, & Netemeyer, 1995).

(on a 10-point scale where 1 = *very slightly committed* and 10 = *extremely committed*). Based on this information, these 4 participants were retained as "nondieters" in the analyses.

Table 1
Means and F Tests Comparing Groups on Age, Restraint, and Percentage of Desirable Weight

Variable	Group				F(3, 69)
	Bulimia (n = 21)	Current dieters (n = 15)	Restrained nondieters (n = 14)	Unrestrained nondieters (n = 23)	
Age	25.0 _a	24.1 _a	26.1 _a	24.7 _a	0.41
Restraint	24.8 _a	18.8 _b	18.2 _b	10.9 _c	50.00*
Percentage of desirable weight	-4.1 _a	-1.9 _a	-3.4 _a	-7.9 _a	1.55

Note. Means with the same subscript are not significantly different.

* $p < .001$.

were the original eight scales from the EDI-2; the 10 dimensions from the DSI; the five subscales from the EDE; a measure of weight suppression (defined as [highest past weight - current weight]/desirable weight; see Lowe & Kleifield, 1988) and frequency of bingeing, frequency of overeating, total calories consumed, and variability in caloric intake across all 6 days (calculated independently for each participant) from the self-monitoring data.⁵

To first determine if the data were suitable for a principal components analysis, we examined Kaiser's measure of sampling adequacy (MSA; Kaiser, 1974). The initial overall MSA was .87, which Kaiser characterized as "meritorious." However, the individual MSAs for a few variables were judged to be problematically low. These were the Maturity Fears scale from the EDI (MSA = .59), total calories consumed (MSA = .63), the measure of variability (MSA = .61), and the weight suppression variable (MSA = .24). These four variables were eliminated from further analyses; the resulting overall MSA increased to .90, and all individual MSAs were greater than .70, suggesting that the data were clearly appropriate for further analysis.

Based on a plot of the eigen values, we extracted a three-factor solution that accounted for 71% of the total variance.⁶ The extracted components were then subjected to an oblique rotation. This rotation strategy was chosen to allow for correlated factors because the factors in question were conceptually assumed to be correlated in the real world. The resulting factor structure is presented in Table 2. The factor correlation matrix is presented in Table 3. Variables with factor loadings of greater than .60 were used to determine the item composition of the factors and to derive factor names. The first factor comprised all of the scales from the DSI and the general psychopathology scales from the EDI-2 (although the perfection scale had a loading of less than .60). This component appeared to measure General Psychopathology. The second factor, which comprised two scales from the EDI-2, four from the EDE, and one from the food records, was named Restraint/Weight Concerns. The EDI Bulimia scale, the EDE Eating Concern and Overeating scales, and self-monitored binge frequency loaded on the third factor, which was called Binge Eating. Factor scores were then generated from this analysis (using the regression method) to be used in subsequent analyses.

Trend Analyses

To specifically test the continuity versus discontinuity hypotheses, the data were subjected to trend analyses with the three

factor scores from the principal-components analysis as the dependent variables and group membership as the independent variable. Based on the a priori predictions made by the continuity model, the levels of the group variable were ordered as follows: 1 = unrestrained nondieters; 2 = restrained nondieters; 3 = current dieters; and 4 = bulimic individuals. The data were examined for the presence of significant linear, quadratic, and cubic trends.

The trend for the General Psychopathology factor is depicted in the top panel of Figure 1. The test for the linear trend was significant, $F(1, 68) = 12.86, p < .0001$. The tests for the quadratic and cubic trends were both nonsignificant, $F(1, 68) = 0.03, p > .05$, and $F(1, 68) = 2.65, p > .05$, respectively. The trend for the Restraint/Weight Concerns factor is presented in the middle panel of Figure 1. As with the first factor, the test for the linear trend was significant, $F(1, 68) = 109.74, p < .0001$, and both the quadratic and cubic trends were nonsignificant, $F(1, 68) = 3.31, p > .05$, and $F(1, 68) = 0.05, p > .05$, respectively. The trend for the Binge Eating factor is depicted in the bottom panel of Figure 1. For this factor, the tests for all three types of trend were statistically significant, $F(1, 68) = 72.87, p < .0001$, for the linear trend; $F(1, 68) = 34.89, p < .0001$, for the quadratic trend; and $F(1, 68) = 7.68, p < .008$, for the cubic trend.

Regression analyses

To further test the continuity versus discontinuity models, we performed a multiple-regression analysis using Restraint/Weight Concerns and Psychopathology to predict binge eating. In the continuity model, body disparegement and extreme dieting are viewed as directly responsible for producing binge eating. Thus in a regression analysis, where each predictor variable is tested after controlling for other predictor variables, the model would suggest that Restraint/Weight Concerns, but not General Psychopathology, would predict binge eating. According to the discontinuity model, body disparegement/extreme

⁵ Because of errors in scheduling, a number of participants made their second visit 7 days after their first and therefore had only 6 complete days of food records. Therefore, the 7th day of food records was excluded for all participants.

⁶ There was a fourth factor that had an eigenvalue of greater than 1.0 (1.07). However, the eigen plot suggested a clearer drop off after the third factor, leading to the choice of the three factor solution.

dieting and preexisting psychopathology are both required to produce disordered eating of clinical proportions. Thus, the discontinuity model would predict that after we controlled for Restraint/Weight Concerns, binge eating could be predicted from the Psychopathology and the interaction of Psychopathology and Restraint/Weight Concerns.

To test these models, the Restraint/Weight Concerns factor, the General Psychopathology factor, and the interaction of these two factors were entered into a multiple-regression analysis with scores on the Binge Eating factor as the criterion variable.⁷ Although the zero-order correlations between Binge Eating and both Restraint/Weight Concerns and General Psychopathology (which can be seen in Table 3) were both statistically significant, the test of the unique effect of each term was significant only for the Restraint/Weight Concerns factor, $F(1, 68) = 8.70$, $p < .005$. The effects for General Psychopathology, $F(1, 68) = 1.27$, $p > .05$, and the interaction of General Psychopathology and Restraint/Weight Concerns, $F(1, 68) = .19$, $p > .05$, were both nonsignificant.

Comparing Restrained Nondieters and Current Dieters

Because one purpose of the study was to directly compare current dieters and nondieting restrained eaters, we specifically contrasted these groups on each of the three factor scores used in the trend analyses. The mean values for these contrasts are

Table 2
Rotated Factor Structure

Variable	1	2	3
Eating Disorders Inventory			
Drive for Thinness	.54	.89	.49
Bulimia	.39	.53	.89
Body Dissatisfaction	.47	.73	.28
Ineffectiveness	.79	.45	.41
Perfectionism	.54	.20	.29
Interpersonal Distress	.74	.30	.34
Interceptive Awareness	.78	.47	.56
Derogatis Symptom Inventory			
Panic	.70	.31	.38
Cognitive Dyscontrol	.81	.31	.10
Interpersonal Sensitivity	.94	.48	.29
Depression	.93	.44	.41
Anxiety	.91	.32	.31
Hostility	.70	.30	.15
Phobic Anxiety	.81	.33	.14
Paranoid Ideation	.87	.38	.17
Obsessive-Compulsive	.89	.38	.14
Social Alienation	.90	.37	.28
Eating Disorders Examination			
Restraint	.44	.82	.37
Eating Concern	.49	.79	.72
Overeating	.40	.51	.77
Weight Concern	.44	.90	.31
Shape Concern	.50	.91	.54
Food records			
Binges	.21	.32	.86
Overeats	.05	.63	.25

Note. Factor loadings in bold show the measures which comprised each factor. 1 = General Psychopathology; 2 = Restraint/Weight Concern; 3 = Binge Eating.

Table 3
Factor Correlation Matrix

Factor	1	2	3
1. General Psychopathology	—	.40	.30
2. Restraint/Weight Concerns		—	.40
3. Binge Eating			—

also depicted in Figure 1. Only the contrast on the Restraint/Weight Concerns factor was significant, $F(1, 68) = 6.62$, $p < .02$, with the current dieters scoring significantly higher than the restrained nondieters. The contrast on the psychopathology variable was nonsignificant, $F(1, 68) = 0.001$, $p > .05$, as was the contrast on the binge eating variable, $F(1, 68) = 1.26$, $p > .05$.

Discussion

The primary purpose of this study was to reexamine the continuity and discontinuity models of bulimia. In this study we built on past investigations of the continuum model of bulimia by (a) discriminating between restrained eating and current dieting; (b) using diverse methods to collect data on naturally occurring binge eating; and (c) using the Eating Disorders Examination, which is the most sensitive indicator available of bulimic symptomatology (Fairburn & Cooper, 1993).

Despite the diverse methods used to collect data, the component subscales of our measures of psychopathology and bulimic symptomatology coalesced into three interpretable factors: General Psychopathology, Restraint/Weight Concerns, and Binge Eating. Similar factors have been found in past studies (Gleaves et al., 1993; Varnado et al., 1995; Tobin et al., 1991). The results of the trend analyses for the first two factors were consistent with the continuity model of bulimia. Scores on the General Psychopathology and Restraint/Weight Concerns factors increased in a graduated, linear fashion across the four groups studied. In particular, the absence of significant nonlinear trends for the General Psychopathology factor is inconsistent with the discontinuity perspective, which assumes that pre-morbid psychopathology is a necessary precondition for developing the severe body disparagement, extreme weight control methods, and chaotic eating patterns of people with bulimia. If this perspective were accurate, then a sharp (i.e., discontinuous) increase in psychopathology should have been observed as one moved from the two weight-concerned groups to the bulimia group. The observed results are more consistent with the continuity model's assumption that substantial negative affect (if not frank psychopathology) may be generated as a result of weight preoccupation and episodic dieting, even in nonclinical populations.

⁷ Although there were no group differences in body mass, we correlated percentage of desirable weight with binge eating to see if relative body weight was related to bingeing. However, relative weight was found to be uncorrelated with binge eating and was excluded from subsequent analyses.

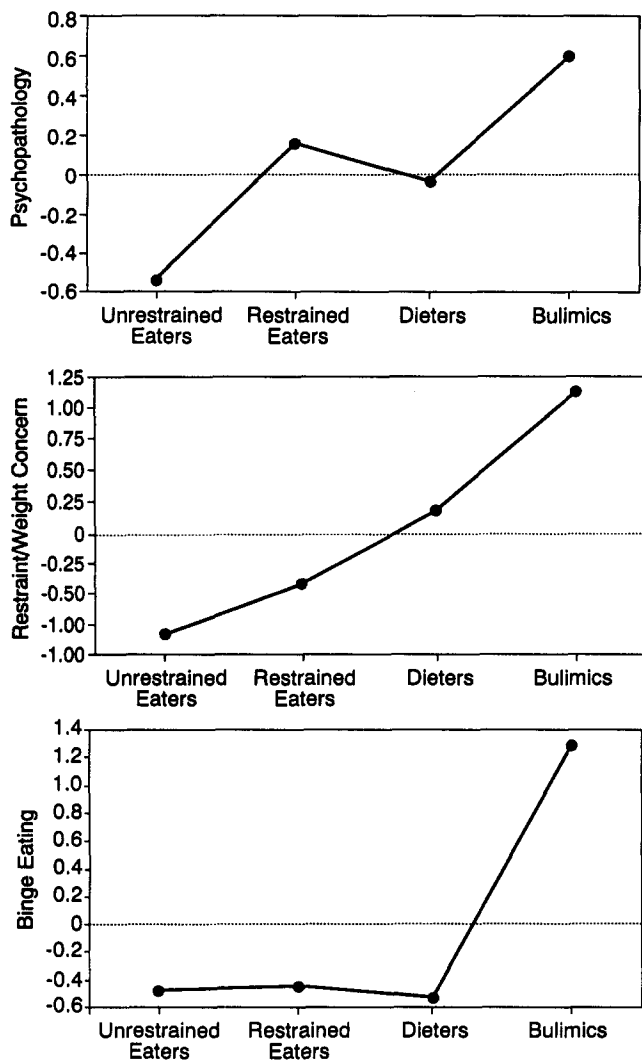


Figure 1. Results of trend analyses, showing mean factor scores on General Psychopathology (top), Restraint/Weight Concerns (middle), and Binge Eating (bottom).

The results of the regression analyses also supported the continuity over the discontinuity viewpoint. The Restraint/Weight Concerns factor predicted Binge Eating severity when General Psychopathology was controlled, but General Psychopathology did not predict Binge Eating when Restraint/Weight Concerns was controlled. Also, the interaction of Restraint/Weight Concerns and General Psychopathology did not predict Binge Eating. These results support the continuum model because in this model increased psychopathology in chronic dieters and individuals with bulimia is due to the affective consequences of weight consciousness itself (e.g., anxiety about body shape, shame about overeating). The fact that the linear trend in psychopathology observed in the trend analysis was no longer found when restraint/weight concerns were controlled in the regression analysis is consistent with the continuum model's assumption that increased psychopathology is secondary to increased eating and weight problems in weight-conscious individuals.

It is important to note, however, that other studies have found that bulimic individuals exhibit more psychopathology than both unrestrained and restrained eaters, who typically do not differ (Laessle et al., 1989; Ruderman & Besbeas, 1992; Rossiter et al., 1989). These latter results are more consistent with the discontinuity model. The difference in results between this study and prior studies might be partially accounted for by the fact that the Laessle et al. and Rossiter et al. studies, unlike this study, used bulimic participants who were seeking treatment. Also, the difference in psychopathology between the two diet-concerned groups and the unrestrained nondieters in the present study was greater than that found in the previous studies. This difference in outcome might be related to the fact that the control group participants in the present study were several years older than those in the Laessle et al. and Rossiter et al. studies. Thus the longer duration of dieting by participants in our study may have intensified the adverse psychological effects associated with it.

The results involving the General Psychopathology and Restraint/Weight Concerns factors were partially overshadowed, however, by the surprising results for the Binge Eating factor. A marked discontinuity was found between the very low binge eating scores observed in all three control groups and the much higher level of binge eating scores found in the bulimia group. In a sense, the entire question of continuity in bulimic symptomatology is predicated on the assumption that dieting produces measurable increases in binge eating, the quintessential symptom of bulimia. The fact that neither type of dieting behavior was associated with increased binge eating suggests that the overeating exhibited by restrained eaters (Ruderman, 1986) and current dieters (Lowe, 1995; Lowe et al., 1991) in laboratory contexts does not reflect binge eating in the real world (cf. Charnock, 1989; Laessle et al., 1989; Rand & Kuldau, 1991). Rather, the present results suggest that there is a discordance between the psychological and consummatory correlates of "normal" dieting. Restrained eating and current dieting were associated with elevations in psychological symptoms of bulimia (psychopathology, concerns about weight and dieting) but not with binge eating itself.

On the other hand, there is substantial evidence that a period of strict dieting and weight loss usually precedes the development of bulimia by individuals with eating disorders (Polivy & Herman, 1985). The absence of a dieting-binge eating relationship in the present study could be reconciled with the presence of a dieting-binge eating relationship in studies of bulimic etiology (Polivy & Herman, 1985) if one assumes that the caloric restriction and weight loss exhibited during the premorbid stage of bulimia far outstrip that shown by restrained nondieters or current dieters in the present study. The fact that imposed or voluntary caloric restriction (and weight loss) has been shown to produce binge eating in psychiatrically normal individuals (Keys, Brozek, Henschel, Mickelsen, & Taylor, 1950; Polivy, Zeitlin, Herman, & Beal, 1994; Telch & Agras, 1993) supports this conclusion. Overall, then, the results of this study suggest that "normative" body dissatisfaction and dieting practices have negative consequences (e.g., emotional distress, lowered self-esteem) but that those consequences are unlikely to include binge eating unless substantial food restriction and weight loss occurs.

However, although weight-loss dieting appears to contribute to the development of bulimia (Polivy & Herman, 1985), this does not mean that intensive dieting alone can explain the discontinuity in binge eating between the bulimia group and the three nonbulimic groups. Women in the bulimia group scored higher than restrained nondieters and current dieters on the Restraint/Weight Concerns factor, but Figure 1 suggests that their elevated scores on this factor are insufficient to explain the dramatic discontinuity in binge eating between the bulimia group and the other two weight-conscious groups. An additional influence is likely contributing to the sharply elevated binge eating scores of the bulimia group. This influence may be purging behavior. According to this viewpoint, the significance of the high scores of individuals with bulimia on the Restraint/Weight Concerns factor goes beyond the intensified dieting behavior these scores reflect. Their elevated eating and weight concerns may also push them beyond the threshold of reasonable weight control methods (e.g., exercise, eating small meals) into the realm of extreme methods (e.g., self-induced vomiting). Once purging is initiated and develops as a routine response to bingeing, it may play at least as great a role as dieting in perpetuating binge eating. This may occur because purging both minimizes the caloric penalty for binge eating and contributes to an energy deficit that fuels subsequent binges. As much as restrained nondieters and current dieters wish to be thinner, their unwillingness to engage in purging behavior may substantially account for why any incipient binge eating in these individuals rarely develops into a clinically significant problem.

All discussion of overeating has so far focused on binge eating, but a final issue to consider is the relation between dieting behavior and overeating that does not reach binge proportions. There is, after all, a large gap between the gorgelike intakes that comprise bulimic binges and the moderate intakes that constitute normal meals and snacks. Although it seems clear that the dieting practices of restrained nondieters and current dieters do not induce binge eating, a relationship may exist between normative dieting and more moderate levels of overeating. Indeed, an examination of the composition of the Restraint/Weight Concerns factor shows that although eating and body concern measures loaded most highly on this factor, the loadings for measures of overeating and binge eating were also relatively high. In particular, it is noteworthy that the overeating measure from the food records loaded on Factor 2 (Restraint/Weight Concerns) rather than on Factor 3 (Binge Eating). These results, in conjunction with the discontinuous dieting-binge eating relationship shown in Figure 1, may indicate that forms of overeating less dramatic than binge eating are positively associated with dieting intensity. Although milder levels of overeating may not be as distressing as binge eating, such overeating could still produce weight gain and provoke renewed dieting. Alternatively, the moderate loadings of overeating and binge eating items on Factor 2 might reflect a tendency for weight-concerned individuals to perceive, in certain circumstances, the consumption of normal amounts of food as overeating. This type of cognitive distortion has been documented in past research (cf. Gleaves, Williamson, & Barker, 1993).

A secondary purpose of this study was to better understand why current dieters and restrained nondieters have shown differing eating patterns in past research (Lowe, 1993). In line

with past work by Rogers and Green (1993), current dieters scored significantly higher than restrained nondieters on the Restraint/Weight Concerns factor. However, although most theories of restrained eating would predict that such heightened dieting and weight concerns would induce at least moderate levels of binge eating, this did not occur. These results, combined with those reviewed above, suggest that an ongoing effort to restrict caloric intake and lose weight will not necessarily be associated with bouts of binge eating. Indeed, there is evidence that dietary restriction that is implemented in a moderate and flexible manner may enhance eating control (Laessle et al., 1989; Lawson et al., 1995; Westenhoefer, 1991)—at least in the short run.

The present results have implications for understanding the relationship between restrained eating and eating disorders. Specifically, the results suggest that restrained eaters and dieters may not always be appropriate analogue populations for studying bulimia nervosa. Although restrained eaters show disturbances on psychological (e.g., Heatherton & Baumeister, 1991) and appetitive (e.g., Klajner, Herman, Polivy, & Chhabra, 1981) measures that resemble those found in bulimics, the same is apparently not true of their naturalistic food intake. As in past studies (Kirkley, Burge, & Ammerman, 1988; Laessle et al., 1989), the daily caloric intake of our restrained eaters (1,673) did not differ from that of unrestrained nondieters (1,630); indeed even current dieters (1,516) did not differ from these two groups in their naturalistic intake.⁸ Thus, in order to approximate the psychobiological pressures affecting the eating behavior of bulimic individuals, it may be necessary to subject analogue populations to caloric restrictions that more closely mirror those experienced by bulimic individuals (cf. Kauffman, Herman, & Polivy, 1995; Laessle, Platte, Schweiger, & Pirke, 1996).

In a similar vein, the apparent lack of both strict caloric restriction (see also Kirkley et al., 1988, and Laessle et al., 1989) and binge eating among restrained eaters and dieters suggests that the elevations in emotional distress often found in weight-conscious individuals (Heatherton & Baumeister, 1991; McCarthy, 1990) stem more from the chronic discordance between their desired and actual body shapes (Brownell, 1991) than it does from a chaotic eating style. Significant negative affect could be generated in restrained eaters and dieters because their self-esteem is unduly influenced by a body shape that is difficult or impossible to change.

Finally, it is important to note four potential limitations of the current study. First, 8 women in the bulimia group did not receive *DSM-III-R* diagnoses of bulimia nervosa because they did not meet the binge frequency criterion. The issue therefore arises as to whether the results would be different if they had all met full diagnostic criteria. In this case, the bulimia group may have scored slightly higher on the General Psychopathology and Restraint/Weight Concerns factors and definitely would have scored higher on the Binge Eating factor. However, these changes would not alter the linear trend observed for the first two factors

⁸ Because most people underreport their true level of food intake (Schoeller, 1990), these values probably underestimate actual daily intake by several hundred calories.

and would have only increased the curvilinear trend observed for the third factor.

Second, the study was cross-sectional, making it impossible to draw causal conclusions about the relationship between dieting and bulimic symptomatology. For instance, the fact that current dieters scored higher than restrained nondieters on the Restraint/Weight Concerns factor could be due to a third variable such as predisposition toward weight gain. Prospective studies of restrained eaters who do and do not begin weight loss diets over time would provide a methodologically superior method for studying the relationship between dieting and the development of bulimic symptoms (cf. Patton, Johnson-Sabine, Wood, Mann, & Wakeling, 1990).

Third, both the bulimic participants and those in the control group in this study volunteered to participate in it. Therefore, it is possible that individuals who agreed to participate in this study may have differed in important ways from those who chose not to. Caution in generalizing the present results to other populations is therefore warranted.

Fourth, our design used preselected groups to examine the issue of continuity in bulimic symptomatology. This approach may have generated results different from those that would be obtained in a large, unselected population of individuals prone to weight and dieting concerns. Therefore future research might examine the issue of continuity in such a population (e.g., college students) using statistical techniques (e.g., MAXCOV analysis; see Korfine & Lenzenweger, 1995, and Meehl, 1995) best suited to evaluating the issue of continuity versus discontinuity in psychopathology.

References

- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Brownell, K. D. (1991). Dieting and the search for the perfect body: Where physiology and culture collide. *Behavior Therapy*, 22, 1-12.
- Bruch, H. (1973). *Eating disorders*. New York: Basic Books.
- Charnock, D. (1989). A comment on the role of dietary restraint in the development of bulimia nervosa. *British Journal of Clinical Psychology*, 28, 329-340.
- Cooper, Z., Cooper, P. J., & Fairburn, C. G. (1989). The validity of the Eating Disorder Examination and its subscales. *British Journal of Psychiatry*, 154, 807-812.
- Cooper, Z., & Fairburn, C. G. (1987). The Eating Disorder Examination: A semi-structured interview for the assessment of the specific pathology of eating disorders. *International Journal of Eating Disorders*, 6, 1-8.
- Davis, R., Freeman, R. J., & Garner, D. M. (1988). A naturalistic investigation of eating behavior in bulimia nervosa. *Journal of Consulting and Clinical Psychology*, 56, 273-279.
- de Castro, J. M. (1994). Methodology, correlational analysis, and interpretation of diet diary records of the food and fluid intake of free-living humans. *Appetite*, 23, 179-192.
- Derogatis, L. R. (1988). *The Derogatis Symptom Inventory*. Towson, MD: Clinical Psychometric Research.
- Derogatis, L. R., Rickels, K., & Rock, A. F. (1976). The SCL-90-R and the MMPI: A step in the validation of a new self-report scale. *British Journal of Psychiatry*, 128, 280-289.
- Eberenz, K. P., & Gleaves, D. H. (1994). An examination of the internal consistency and factor structure of the Eating Disorder Inventory-2 in a clinical sample. *International Journal of Eating Disorders*, 16, 371-179.
- Eldredge, K. L. (1993). An investigation of the influence of dieting and self-esteem on dietary inhibition. *International Journal of Eating Disorders*, 13, 57-67.
- Fairbrun, C. G., & Cooper, Z. (1993). The Eating Disorder Examination (12th ed.). In C. G. Fairburn & G. T. Wilson (Eds.), *Binge eating: Nature, assessment and treatment* (pp. 317-360). New York: Guilford Press.
- Fairburn, C. G., Marcus, M. D., & Wilson, G. T. (1993). Cognitive-behavioral therapy for binge eating and bulimia nervosa: A comprehensive treatment manual. In C. G. Fairburn & G. T. Wilson (Eds.), *Binge eating: Nature, assessment and treatment* (pp. 361-404). New York: Guilford Press.
- Garner, D. M. (1991). *The Eating Disorders Inventory-2*. Odessa, FL: Psychological Assessment Resources.
- Garner, D. M., Olmsted, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, 2, 15-34.
- Gleaves, D. H., Williamson, D. A., & Barker, S. E. (1993). Confirmatory factor analysis of a multidimensional model of bulimia nervosa. *Journal of Abnormal Psychology*, 102, 173-176.
- Guadagnoli, E., & Velicer, W. F. (1988). Relation of sample size to component patterns. *Psychological Bulletin*, 103, 265-275.
- Heatherton, T. F., & Baumeister, R. F. (1991). Binge-eating as an escape from self-awareness. *Psychological Bulletin*, 110, 86-108.
- Herman, C. P., & Polivy, J. (1980). Restrained eating. In A. J. Stunkard (Ed.), *Obesity* (pp. 208-225). Philadelphia: W. B. Saunders.
- Herman, C. P., Polivy, J., Lank, C. N., & Heatherton, T. F. (1987). Anxiety, hunger, and eating behavior. *Journal of Abnormal Psychology*, 96, 264-269.
- Hinkle, D. E., Wiersma, W., & Jurs, S. J. (1988). *Applied statistics for the behavioral sciences* (2nd ed). Boston: Houghton Mifflin.
- Hsu, L. K. G. (1990). *Eating disorders*. New York: Guilford Press.
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39, 31-36.
- Kauffman, N. A., Herman, C. P., & Polivy, J. (1995). Hunger-induced finickiness in humans. *Appetite*, 24, 203-218.
- Keys, A., Brozek, K., Henschel, A., Mickelsen, O., & Taylor, H. L. (1950). *The biology of human starvation*. Minneapolis: University of Minnesota Press.
- Keppel, G. (1982). *Design and analysis: A researcher's handbook* (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Kirkley, B. G., Burge, J. C., & Ammerman, A. (1988). Dietary restraint, binge eating, and dietary behavior patterns. *International Journal of Eating Disorders*, 7, 771-778.
- Klajner, F., Herman, C. P., Polivy, J., & Chhabra, R. (1981). Human obesity, dieting and the anticipatory salivation to food. *Physiology and Behavior*, 27, 195-198.
- Korfine, L., & Lenzenweger, M. F. (1995). The taxonicity of schizotypy: A replication. *Journal of Abnormal Psychology*, 104, 26-31.
- Laessle, R. G., Platte, P., Schweiger, U., & Pirke, K. M. (1996). Biological and psychological correlates of intermittent dieting behavior in young women. A model for bulimia nervosa. *Physiology and Behavior*, 60, 1-5.
- Laessle, R. G., Tuschl, R. J., Kotthaus, B. C., & Pirke, K. M. (1989). A comparison of the validity of three scales for the assessment of dietary restraint. *Journal of Abnormal Psychology*, 98, 504-507.
- Laessle, R. G., Tuschl, R. J., Waadt, S., & Pirke, K. M. (1989). The specific psychopathology of bulimia nervosa: A comparison with restrained and unrestrained (normal) eaters. *Journal of Consulting and Clinical Psychology*, 57, 772-775.
- Lawson, O. J., Williamson, D. A., Champagne, C. M., DeLany, J. P., Brooks, E. R., Howat, P. M., Wozniak, P. J., Bray, G. A., & Ryan,

- D. H. (1995). The association of body weight, dietary intake, and energy expenditure with dietary restraint and disinhibition. *Obesity Research*, 3, 153-161.
- Lowe, M. R. (1993). The effects of dieting on eating behavior: A three-factor model. *Psychological Bulletin*, 114, 100-121.
- Lowe, M. R. (1995). Restrained eating and dieting: Replication of their divergent effects on eating regulation. *Appetite*, 25, 115-118.
- Lowe, M. R., & Kleifield, E. (1988). Cognitive restraint, weight suppression, and the regulation of eating. *Appetite*, 10, 159-168.
- Lowe, M. R., Whitlow, J. W., & Bellwoar, V. (1991). Eating regulation: The role of restraint, dieting, and weight. *International Journal of Eating Disorders*, 10, 461-471.
- McCarthy, M. (1990). The thin ideal, depression and eating disorders in women. *Behavior Research and Therapy*, 28, 205-215.
- Meehl, P. E. (1995). Bootstraps taxometrics: Solving the classification problem in psychopathology. *American Psychologist*, 50, 266-275.
- Metropolitan Life Insurance Company. (1983). Metropolitan height and weight table. *Statistical Bulletin*, 64, 2-9.
- Patton, C. C., Johnson-Sabine, E., Wood, K., Mann, A. H., & Wakeling, A. (1990). Abnormal eating attitudes in London schoolgirls—A prospective epidemiological study: Outcome at twelve month follow-up. *Psychological Medicine*, 20, 383-394.
- Polivy, J., & Herman, C. P. (1985). Dieting and bingeing: A causal analysis. *American Psychologist*, 40, 193-201.
- Polivy, J., & Herman, C. P. (1987). Diagnosis and treatment of normal eating. *Journal of Consulting and Clinical Psychology*, 55, 635-644.
- Polivy, J., Zeitlin, S. B., Herman, C. P., & Beal, A. L. (1994). Food restriction and binge eating: A study of former prisoners of war. *Journal of Abnormal Psychology*, 103, 409-411.
- Rand, C. S. W., & Kuldau, J. M. (1991). Restrained eating (weight concerns) in the general population and among students. *International Journal of Eating Disorders*, 10, 699-708.
- Rogers, P. J., & Green, M. W. (1993). Dieting, dietary restraint and cognitive performance. *British Journal of Clinical Psychology*, 32, 113-116.
- Rosen, J. C., Leitenberg, H., Fisher, C., & Khazam, C. (1986). Binge eating episodes in bulimia nervosa: The amount and type of food consumed. *International Journal of Eating Disorders*, 5, 255-267.
- Rossiter, E. M., Wilson, G. T., & Goldstein, L. (1989). Bulimia nervosa and dietary restraint. *Behaviour Research and Therapy*, 27, 465-468.
- Ruderman, A. J. (1986). Dietary restraint: A theoretical and empirical review. *Psychological Bulletin*, 99, 247-262.
- Ruderman, A. J., & Besbeas, M. (1992). Psychological characteristics of dieters and bulimics. *Journal of Abnormal Psychology*, 101, 383-390.
- Schoeller, D. (1990). How accurate is self-reported dietary energy intake? *Nutrition Reviews*, 48, 373-379.
- Telch, C. F., & Agras, W. S. (1993). The effects of a very low calorie diet on binge eating. *Behavior Therapy*, 24, 177-193.
- Tobin, D. L., Johnson, C., Steinberg, S., Staats, M., & Dennis, A. B. (1991). Multifactorial assessment of bulimia nervosa. *Journal of Abnormal Psychology*, 100, 14-21.
- Varnado, P. J., Williamson, D. A., & Netemeyer, R. (1995). Confirmatory factor analysis of eating disorder symptoms in college women. *Journal of Psychopathology and Behavioral Assessment*, 17, 69-79.
- Westenhoefer, J. (1991). Dietary restraint and disinhibition: Is restraint a homogeneous construct? *Appetite*, 16, 45-55.
- Wilson, G. T., & Eldredge, K. L. (1991). Frequency of binge eating in bulimic patients: Diagnostic validity. *International Journal of Eating Disorders*, 10, 557-561.
- Wilson, G. T., & Smith, D. (1989). Assessment of bulimia nervosa: An evaluation of the Eating Disorder Examination. *International Journal of Eating Disorders*, 8, 173-179.
- Wilson, G. T., & Walsh, B. T. (1991). Eating disorders in the DSM-IV. *Journal of Abnormal Psychology*, 100, 362-265.
- Wolper, C., Heshka, S., & Heymsfield, S. B. (1995). Measuring food intake: An overview. In D. B. Allison (Ed.), *Handbook of assessment methods for eating behaviors and weight-related problems* (pp. 215-240). Thousand Oaks, CA: Sage.

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