

Exploring the Construct Validity of the Eating Disorder Continuum

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Although many counseling psychologists conceptualize eating disturbances along a continuum of degree, there appears to be a dearth of research exploring the construct validity of this eating disorder continuum hypothesis (L. B. Mintz et al., 1997). Specific psychological, behavioral, and cognitive characteristics known to be related to clinical eating disorders (C. Fairburn, 1995; D. M. Garner, 1991) were examined in 2 studies undertaken to explore whether these characteristics vary by eating disorder continuum placement. In Study 1, Neuroticism, as measured by the NEO-Five Factor Inventory (FFI), was found to vary by continuum placement in a sample of 169 women. In Study 2, 8 out of 9 Eating Disorder Inventory-2 (EDI-2) subscales and dieting locus of control varied significantly by continuum placement for a sample of 135 women. Scores on Neuroticism and many EDI-2 subscales (i.e., on which higher scores are more indicative of disordered eating) increased in a linear fashion, and women adopted a more internal dieting locus of control as the severity of disturbed eating increased, supporting the construct validity of the eating disorder continuum.

Because a majority of women indicate that they engage in unhealthy eating behaviors and experience different levels of psychological and physical consequences as a result of these behaviors (Dykens & Gerrard, 1986; Fairburn, 1995; Rosen & Gross, 1987), many counseling psychologists have suggested that the spectrum of eating disturbances should be conceptualized along a continuum of degree (Mintz & Betz, 1988; Ousley, 1986; Scarano & Kalodner-Martin, 1994). A theoretical framework for conceptualizing disturbed eating along a continuum was first proposed by Nylander (1971) and has become popular among counseling psychologists, as evidenced by its expansion by Mintz and Betz. Moreover, a recent publication by Mintz, O'Halloran, Mulholland, and Schneider (1997) in the *Journal of Counseling Psychology* offered a systematic procedure for classifying women with eating disturbances, the Questionnaire for Eating Disorder Diagnosis (Q-EDD), and preliminary evidence for its utility in operationally defining the eating disorder continuum. Counseling psychologists have argued that assessing and addressing different levels of severity of disturbed eating behaviors may be useful in investigating the etiology, development, and treatment of clinical eating disorders as well as subclinical eating behaviors that affect individuals' well-being (Scarano & Kalodner-Martin, 1994).

The eating disorder continuum identified by Mintz et al. (1997) placed unrestrained eating at one end of the continuum (i.e., asymptomatic group), clinical eating disorders at the other end of the continuum (i.e., eating disordered

group), and milder forms of disturbed eating at an intermediate point (i.e., symptomatic group). These three groups are consistent with typical operational definitions of the eating disorder continuum hypothesis as they represent increasing levels of disturbed eating behaviors that are proposed to occur along common behavioral and psychological dimensions, so that group differences are a matter of degree and not kind (Mintz & Betz, 1988; Scarano, 1993; Scarano & Kalodner-Martin, 1994). Other authors have suggested, however, that some qualitative differences may occur between subclinical and clinical eating disorders, proposing that characteristics of the asymptomatic and symptomatic groups are similar to each other but different from an eating disorder group (Bruch, 1973; Garner, Olmsted, & Garfinkel, 1983). This challenges the continuity perspective that disordered eating behaviors or symptomatology increase across the continuum and echoes the debate in the personality literature as to whether personality can be placed on a continuum from normal to abnormal (e.g., Gangestad & Snyder, 1985; Meehl, 1995). Despite such challenges, however, it appears that many counseling psychologists support the conceptual model of the eating disorder continuum because its focus on the effects of disturbed eating behaviors that do not meet clinical criteria is consistent with the profession's attention to the full spectrum of human behavior (Scarano & Kalodner-Martin, 1994).

There remains, however, a lack of systematic validity research on the eating disorder continuum hypothesis. Such research is imperative if the continuity perspective is to be upheld. The little available research on the construct validity of the eating disorder continuum generally has supported its conceptualization in that characteristics of clinical eating disorders such as body dissatisfaction, food and weight preoccupation, feeling fat, and the fear of becoming fat increase and self-esteem decreases as the severity of an individual's eating pathology increases (Dykens & Gerrard, 1986; Mintz & Betz, 1988; Scarano & Kalodner-Martin, 1994). Also, quantitative differences have been reported in

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interoceptive awareness (Garfinkel & Garner, 1982), feelings of ineffectiveness (Lehman & Rodin, 1989), and difficulties with interpersonal relationships (Dykens & Gerard, 1986) between clinical, subclinical, and unrestrained eaters. Moreover, bulimic women reported feeling more negativity about their body image than did unrestrained eaters and binge eaters (Katzman & Wolchik, 1984). Thus, this initial research suggests that women with various eating disturbances share similar behavioral and psychological characteristics differing only in their severity (Scarano & Kalodner-Martin, 1994).

Problems with this initial research, however, include using inconsistent definitions of continuum groups (i.e., different group characteristics and numbers of groups), unvalidated methods of assessing continuum placement, and correlational designs in lieu of analysis of variance strategies and trend analyses that may better address the continuity versus discontinuity debate. The advent of the Q-EDD, which itself has shown adequate convergent, criterion, and content validity and classifies individuals into three distinct groups (Mintz et al., 1997), may facilitate and encourage additional and more consistent research on the validity of the continuum hypothesis. If the continuum hypothesis is valid, it would be expected that a variety of psychological and behavioral characteristics of clinical eating disorders (Garner, 1991) would vary as a function of continuum placement and in a linear fashion.

Furthermore, present knowledge of the eating disorder continuum encompasses a limited set of psychological, behavioral, and cognitive characteristics. The fact that cognitions have not yet been examined extensively in relation to the eating disorder continuum is especially surprising as one aspect of cognitive-behavioral therapy is the challenging of irrational cognitions in treatment, and it seems a successful treatment approach for many subtypes of disordered eating (Fairburn, 1995). Knowing so little about the range of characteristics relevant to the eating disorder continuum limits the application of the continuum hypothesis to prevention and treatment. Thus, additional psychological and behavioral characteristics related to disordered eating (i.e., personality variables, subscales of eating disorder inventories) and cognitions thought to be related to clinical eating disorders (e.g., internal dieting locus of control; Stotland & Zuroff, 1990) must be investigated in terms of the eating disorder continuum hypothesis. If these characteristics can be placed in a linear fashion along the eating disorder continuum, additional empirical support may be garnered for the construct validity of the continuum hypothesis and its application to practice will be enhanced.

Thus, in the interest of further investigating the construct validity of the continuum hypothesis, we explored how personality, body dissatisfaction, several psychological characteristics shown to be common among eating disordered individuals, and dieting locus of control relate to the eating disorder continuum in two studies. We extended previous research by examining these characteristics in relation to the eating disorder continuum framework, assigning individuals to the continuum according to decision rules or through a

psychometrically established measure, and using an analysis of variance strategy with trend analyses.

The relation of personality characteristics to eating disorder continuum placement was examined in the first study. Research on clinical eating disorders often has focused on the link between eating disorders and personality; these findings generally support that clinical eating disorders are related to abnormal personality characteristics (i.e., personality disorders and depression; Aronson, Fredman, & Gabriel, 1990; Fornari, Kaplan et al., 1992; Vitousek & Manke, 1994). There is less empirical evidence, however, for relationships between clinical eating disorders and personality characteristics that are not related to abnormality (Brookings & Wilson, 1994). Furthermore, it is unclear how personality may relate to eating behaviors across the eating disorder continuum. Although Brookings and Wilson investigated the relation of normal personality characteristics to disordered eating behaviors, they did not use the framework of the eating disorder continuum to classify eating disturbance. If the continuum hypothesis is valid, there should be a linear relationship between the degree of eating disturbance (i.e., via continuum categories) and personality characteristics shown to be related to clinical eating disorders (Mintz & Betz, 1988; Scarano, 1993; Scarano & Kalodner-Martin, 1994).

The purpose of this first study, then, was to investigate the relationship between the five factors of personality proposed by Costa and McCrae (1992) and the eating disorder continuum. The five-factor model framework offers the advantages of a reliable and valid measure (i.e., the NEO-Five Factor Inventory [NEO-FFI]), and inclusion of a factor (i.e., Neuroticism) that has been shown consistently to be related to abnormal personality characteristics (Costa & McCrae, 1992) relevant to clinical eating disorders, and inclusion of other factors (i.e., Extraversion, Openness to Experience, Agreeableness, Conscientiousness) that allow a test of the discriminant validity of the continuum model. On the basis of evidence of Skodol et al. (1993) that individuals with clinical eating disorders are characterized by low levels of functioning compared with individuals without eating disorders and of Brookings and Wilson (1994) that Neuroticism is related to some indices of disturbed eating, we expected that women with a higher placement on the eating disorder continuum have higher Neuroticism scores than do women lower on the continuum. Furthermore, because Extraversion has shown no clear relationship with disordered eating and Openness to Experience, Agreeableness, and Conscientiousness have shown no evidence of being related to disturbed eating (Brookings & Wilson, 1994), these factors were not expected to be related to the eating disorder continuum.

In the second study, we examined the relationship of the eating disorder continuum with other psychological, behavioral, and cognitive characteristics to further explore its construct validity. Many psychological and behavioral variables have been found to be related to clinical eating disorders (Garner, 1991). These variables include body dissatisfaction (Thompson, 1990), ineffectiveness and inadequacy (Garner & Bemis, 1985), beliefs that only the highest

standards of personal performance are acceptable (Slade, 1982), alienation and reluctance to form close relationships (Selvini-Palazzoli, 1974), confusion and mistrust related to affective and bodily functioning (Garner & Bemis, 1985), fears of maturation (Crisp, 1980), belief in the virtue of oral self-restraint (Garner & Bemis, 1985), poor impulse regulation (Casper, 1990), and beliefs that social relationships are insecure and disappointing (Strober, 1981). All of the above characteristics that have been found to be related to clinical eating disorders are identified as subscales of the Eating Disorder Inventory-2 (i.e., EDI-2), a clinically popular and valid measure. Because the eating disorder continuum hypothesis posits that differences among these variables should be a matter of degree, we hypothesized that women's scores on subscales of the EDI-2 increase with higher placement on the eating disorder continuum. We also hypothesized that the cognitive variable of dieting locus of control varies as a function of women's placement on the continuum of eating disorders. Dieting locus of control is defined as the perception that a person can affect or control, at least in part, her or his own weight (Stotland & Zuroff, 1990); an internal dieting locus of control is indicative of the belief that one is in control of behaviors or attributes that determine one's weight. Although described as a multidimensional construct (Stotland & Zuroff, 1990), the variable of dieting locus of control taps into a primarily cognitive aspect of disturbed eating, an individual's cognitive beliefs about dieting practices and expectations for weight control practices. Because individuals who engage in dieting strategies perceive themselves to be more in control of their weight and believe that these strategies ultimately will lead to weight loss (Fairburn, 1995), internality of dieting locus of control was expected to increase as a function of higher continuum placement.

Study 1

Method

Participants

A sample of 169 college women from a large Midwestern university completed a demographic form, a survey of their eating habits, and a measure of their personality. This sample size exceeded the 60 cases needed for a power of .80 when alpha is set at .05 and a medium effect is expected ($R^2_{xy} = .25$). Only women were studied because eating disturbances are more common in women (Hesse-Biber, 1989). The mean age of the sample was 21.94 years, with a range of 18 years to 46 years. Caucasian women constituted the largest category of participants (81.7%), followed by African American women (11.8%) and Asian American women (6.5%). All of the participants were college students at a state university enrolled in psychology classes or campus sororities; freshmen composed 52.4% of the sample, sophomores 24.7%, juniors 9.4%, and seniors 13.5%.

Instruments

NEO-FFI (Costa & McCrae, 1992). The NEO-FFI, the short version of the NEO-Personality Inventory-Revised (NEO-PI-R; Costa & McCrae, 1985) was used to obtain scores for the five

domains of personality (i.e., neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness). Each domain is assessed by a subscale consisting of 12 questions; raw scores for the subscales were hand-calculated and were transformed into *T* scores using the normative tables provided with the inventory (Costa & McCrae, 1992).

The subscales of the original NEO-PI-R show evidence of having good construct validity, content validity, criterion group validity, internal consistency reliability, test-retest reliability, convergent validity, and discriminant validity (Costa & McCrae, 1992). The NEO-FFI subscales correlate highly with the domain scales of the NEO-PI-R, thus providing a shorter, yet still comprehensive, valid, and reliable measure of the five factors of personality (Costa & McCrae, 1992). In this study, four of the five factors showed adequate internal consistency reliability (i.e., alphas at or above .85), but the Extraversion subscale was less internally consistent (i.e., $\alpha = .68$).

Operational definition of the eating disorder continuum. Because the data for this study were collected prior to the publication of the Q-EDD (Mintz et al., 1997), responses to an updated version of the Weight Management, Eating, and Exercise Habits Questionnaire (WMQ; Ousley, 1986) formed the foundation for categorization of participants into the three continuum groups: asymptomatic, symptomatic, and eating disordered. The original WMQ included three sections to assess four of the five *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition (*DSM-III*; American Psychiatric Association, 1980) criteria for bulimia nervosa (i.e., binge eating, loss of control, prevention of weight gain, and binge frequency). In the first section, 11 questions regarding past and current weight and frequency of eating behaviors were posed, asking how often and for how long an individual used several weight control techniques (.73 test-retest reliability; O'Halloran, 1989); the second section contained 6 questions related to exercise, dieting, and other methods used to reduce or control weight (i.e., "How often and for how long do you jog?"; .90 test-retest reliability; O'Halloran, 1989); and in the third section were 3 questions specific to attitudes and behaviors associated with binge eating to which the individual responded on a Likert scale ranging from *never* to *always* (i.e., "I feel out of control when I binge."; .82 test-retest reliability; O'Halloran, 1989). We updated this measure to account for *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (*DSM-IV*; American Psychiatric Association, 1994) characteristics of eating disorders by including 28 new items to assess characteristics of anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified (EDNOS).

These additional items were necessary because the original version of the WMQ assessed subclinical and clinical bulimia, but not anorexia or EDNOS, which also are part of the continuum's eating disorder group. For example, we assessed one *DSM-IV* criterion for anorexia nervosa, the refusal to maintain weight appropriate for height, by asking to what extent the respondent agreed with the statement "If my doctor told me that I must gain 10 pounds to be in good health, I would follow her or his advice." Responses to these new items were obtained on 5-point Likert scales ranging from *strongly disagree* to *strongly agree*. Furthermore, our updated version of the WMQ included new *DSM-IV* criteria for subclinical and clinical bulimia. That is, we assessed negative self-evaluation, a new criterion for bulimia nervosa set forth in the *DSM-IV*, by asking to what extent the respondent agreed with statements such as, "When I gain weight, I feel as if I failed and view the weight gain as a loss in self-control." The internal consistency reliability of these 28 items calculated for the current sample was .93.

The Drive for Thinness subscale of the EDI-2 (Garner, 1991) was used to assess the last criterion for bulimia and anorexia (i.e.,

weight preoccupation). This subscale of the EDI-2 has seven items that assess excessive concern with dieting, preoccupation with weight, and fear of gaining weight. It is scored by converting raw scores into percentile scores that range from 25 to 99, with higher scores indicative of a greater probability of having an eating disorder. It shows high internal consistency reliability (Garner & Olmsted, 1984), test-retest reliability, content validity, criterion validity, and construct validity (Garner, 1991). Crowther, Lilly, Crawford, and Shepard (1992) assessed the stability of the original EDI Drive for Thinness subscale over a 1-year period in a female, nonclinical population and reported considerable stability ($r = .72$). The internal consistency reliability of the Drive for Thinness subscale for the current sample was .91.

The updated version of the WMQ used in this research (used in conjunction with the EDI-2 Drive for Thinness subscale) is comparable with the Q-EDD (Mintz et al., 1997) and was scored similarly. For instance, both our updated version and the Q-EDD used the original WMQ as its base. Moreover, our updated version of the WMQ, like the Q-EDD, was scored according to a decision rule method. For example, if a participant taking the updated WMQ responded to the items in such a way that was consistent with all the *DSM-IV* criteria of anorexia nervosa (i.e., having a body weight below 85% of that expected for her height, reporting that they were very much or severely afraid of becoming fat or gaining weight, etc.), consistent with all criteria for bulimia nervosa (i.e., reporting binge eating episodes where they felt they had no control over the binges at least twice a week for 6 months or more, reporting compensatory behaviors such as vomiting or taking laxatives for twice a week for at least 3 months, etc.), or consistent with EDNOS (i.e., reporting that they engaged in binge eating but not purging behaviors, bingeing and purging at a frequency of less than twice a week and/or a duration of less than 3 months, etc.), then she was classified into the eating disorder continuum group. A participant was placed into the asymptomatic continuum group if her body weight was more than 85% of that expected for her height (i.e., a body mass index at or above 17.6) and she indicated that she did not engage in binge eating, strict dieting, appetite suppressants, fasting, or any purgatory behaviors (i.e., vomiting after eating). A participant was placed into the symptomatic continuum group if she did not meet the criteria for any of the eating disorder or asymptomatic groups, but indicated behaviors such as strict dieting or using appetite suppressants, or met all criteria for anorexia except that she has a body mass index of 17.6 or higher. Moreover, in order for a participant to be placed into the eating disorder or the symptomatic group, she had to have obtained a raw score of at least 5.1 on the Drive for Thinness subscale of the EDI-2 (as suggested by Scarano, 1993). Otherwise, she was placed into the asymptomatic group. For this study, there was 100% agreement between two independent raters for classifying women into the three eating disorder continuum groups. The authors of this study served as the independent raters.

Procedure

Non-sorority participants were recruited in psychology classes and through posted flyers. Of those who were recruited in psychology classes, 100% participated after receiving a description on the purpose of the study. Approximately 70% of the women who had expressed interest in participating on the flyer attended the experiment. Of these women, 100% participated after the description of the study was given. Sorority participants were recruited through posted flyers. Of nine sororities contacted, two participated. All of the members of the two sororities participated in the experiment. Participants were tested in small groups in classrooms or in their sorority house and then were weighed privately with an

accurate bathroom scale in order to obtain the body mass information needed to determine the severely underweight criterion of anorexia nervosa. Psychology students received course credit, and sorority members received community service hours for their participation.

Results

Data for each participant (e.g., WMQ; Drive for Thinness subscale of the EDI-2) were summarized to facilitate the individual's classification into one of the three eating disorder continuum categories to test the hypothesis that neuroticism varies as a function of an individual's placement on the eating disorder continuum. The eating disorder continuum categories (asymptomatic, symptomatic, and eating disordered) served as the independent variables and NEO-FFI subscales served as the dependent variables in a multivariate analysis of variance (MANOVA). Continuum group placement could be differentiated in terms of the NEO-FFI subscales, $F(10, 324) = 5.50, p < .001$, Wilks's $\Lambda = .73$. Univariate tests with the NEO-FFI subscales indicated that only Neuroticism, $F(2, 166) = 25.20, p < .001$, varied as a function of eating disorder continuum placement; Extraversion, $F(2, 166) = .25, p > .05$; Openness to Experience, $F(2, 166) = .08, p > .05$; Agreeableness, $F(2, 166) = .68, p > .05$; and Conscientiousness, $F(2, 166) = 1.01, p > .05$, did not vary as a function of continuum placement. Post hoc and trend analyses were used to see if the continuum groups differed from each other on Neuroticism scores and if Neuroticism scores increased in the hypothesized linear fashion across the continuum from asymptomatic to symptomatic to eating disordered. Because of the number of comparisons, the conservative Scheffé test was used (Tabachnick & Fidell, 1996). The asymptomatic group differed from the symptomatic group ($p < .001$) and from the eating disordered group ($p < .001$), and the symptomatic group differed from the eating disordered group ($p < .001$) in terms of Neuroticism scores. Results from the trend analyses indicated that all three continuum groups differed from each other on Neuroticism in a linear fashion, $F(1, 167) = 50.68, p < .001$. Because the three continuum groups are proposed to be along an ordinal and not an interval scale (i.e., showing equidistance between groups), a quadratic or cubic trend analysis was not undertaken. Table 1 presents the personality factor means and standard deviations along the continuum groups.

Study 2

Method

Participants

A total of 135 public high school and college women from campus sororities and psychology classes were surveyed. This sample size exceeded the 76 cases needed for power of .80 when alpha is set at .05 and a medium effect is expected ($R_y^2 = .25$). The mean age of the sample was 22.42 ($SD = 7.34$) years with a range of 16 to 49 years. Participants were predominantly Caucasian (92.7%), with African American women composing 6.6% of the sample and Asian American women composing .7% of the sample.

Table 1
NEO-FFI Domain Scale Means, Standard Deviations, and Number of Women in Each Continuum Group for Study 1 (N = 169)

	EDC	N	E	O	A	C	n	%
Asymptomatic								
<i>M</i>		49.00	53.37	52.18	43.56	47.95	57	34
<i>SD</i>		8.95	8.39	10.14	10.35	10.42		
Symptomatic								
<i>M</i>		56.04	53.97	51.89	42.83	46.04	76	45
<i>SD</i>		9.45	10.77	8.46	10.47	9.58		
Eating disordered								
<i>M</i>		62.67	54.92	52.64	45.39	44.92	36	21
<i>SD</i>		8.97	11.50	8.47	12.42	12.50		

Note. FFI = Five Factor Inventory; EDC = eating disorder continuum group; N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness; % = percentage of women in a continuum group.

Instruments

Q-EDD (Mintz et al., 1997). The Q-EDD was used to classify individuals into the asymptomatic, symptomatic, and eating disordered categories of the eating disorder continuum. The Q-EDD operationally defines the *DSM-IV* criteria for bulimia nervosa and anorexia nervosa and is used to differentiate between individuals with eating disorders (a group including anorexic, bulimic, and EDNOS individuals), symptomatic individuals (those who have some symptoms of disturbed eating but do not meet *DSM-IV* criteria for anorexia, bulimia, or EDNOS), and asymptomatic individuals (i.e., those who do not report behaviors consistent with disturbed eating). Scoring was based on decision rules specified in the Q-EDD scoring manual (Mintz et al., 1997), which differentiate the categories of disturbed eating behaviors.

The Q-EDD uses Ousley's (1986) WMQ as its base and is described in detail in Mintz et al. (1997). Mintz et al. examined the psychometric properties of the Q-EDD and found evidence of convergent validity (i.e., Q-EDD scores correspond with those from the Eating Attitudes Test and the Bulimia Test-Revised [BULIT-R]), incremental validity (i.e., Q-EDD was found to be superior to the BULIT-R when differentiating bulimic from nonbulimic individuals), and criterion validity (i.e., the Q-EDD has a 98% accuracy rate for differentiating between eating disordered and non-eating-disordered individuals and has a high correspondence with clinician diagnoses). Moreover, test-retest reliability ranged from a kappa of .64 (for eating disordered and non-eating-disordered groups) to .85 (for asymptomatic and symptomatic categories) for a 2-week period. There also was a 100% agreement between two raters for differentiating between eating disordered and non-eating-disordered groups and between eating disordered, symptomatic, and asymptomatic groups (Mintz et al., 1997). For this study, there was a 96.3% agreement rate between two independent judges (both authors of this study). The judges met and discussed the questionnaires on which they disagreed until a 100% agreement level was achieved.

EDI-2 (Garner, 1991). The EDI-2, a 91-item self-report measure, instructs participants to rate each item according to a 6-point Likert scale that ranges from *always true* to *never true*. The EDI-2 contains 11 subscales that assess psychological and behavioral traits common in anorexia nervosa and bulimia nervosa. Three subscales assess attitudes and behaviors concerning eating, weight, and shape (Drive for Thinness, Bulimia, and Body Dissatisfaction), 5 subscales tap psychological traits or general organizing constructs relevant to clinical eating disorders (Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, and Matu-

rity Fears), and 3 subscales are provisional (Asceticism, Impulse Regulation, and Social Inhibition; for a full review of the EDI-2 subscales, see Garner, 1991). Because the Drive for Thinness and Bulimia subscales of the EDI-2 are behavioral scales often used in the diagnosis of eating disorders, it was decided not to use these subscales in the analyses investigating if EDI-2 scores vary by continuum placement. For the remaining 9 subscales, raw scores are converted into percentile ranks, with higher scores indicative of a greater probability of having a clinical eating disorder (Garner, 1991). A diagnosis is not generated by the EDI-2, but this measure provides standardized measurement of severity of symptomatology along clinically relevant subscale dimensions (Garner, 1991).

Internal consistency reliability estimates for the first 8 EDI-2 subscales range from .80 to .92, and the test-retest reliabilities for these subscales range from .41 to .75 (Garner, 1991). Alphas and test-retest reliabilities are not reported for the provisional subscales. For this sample, the internal consistency reliability estimates for the first 8 subscales ranged from .73 (Maturity Fears) to .93 (Body Dissatisfaction) and ranged from .56 (Asceticism) to .82 (Impulse Regulation) for the provisional subscales. In terms of validity, Garner stated that the EDI-2 demonstrates content validity, as the 11 subscales are derived from the writings of prominent theorists specializing in eating disorders. Moreover, criterion validity is established by the ability of items to discriminate between persons with eating disorders and nonpatient samples (Garner, 1991). Finally, construct validity is shown by the relationship that the EDI-2 has with other measures of eating disorders (i.e., the Eating Attitudes Test; Garner, 1991).

Dieting Beliefs Scale (DBS; Stotland & Zuroff, 1990). The DBS is a 16-item self-report measure that assesses women's dieting locus of control. Respondents used a 6-point Likert scale that ranged from 1 (*not at all descriptive of their beliefs*) to 6 (*very descriptive of their beliefs*). Items include equal numbers of internal and external items in order to control for acquiescence bias. Examples of items include "By restricting what one eats, one can lose weight" and "Losing weight is simply a matter of wanting to do it and applying yourself" (Stotland & Zuroff, 1990). A more internal weight locus of control is indicated by higher scores on the measure.

The authors of the DBS (Stotland & Zuroff, 1990) reported that test-retest reliability for total scores on the DBS over approximately 6 weeks was .81. Internal consistency reliability for a sample of undergraduate women for the total score was .68; the alpha for this sample of women was .65. The total score has demonstrated acceptable validity; Stotland and Zuroff reported that it was related to characteristics of eating disturbances such as an

individual's perception of having a weight problem, currently being on a diet, use of dieting restraint, weight fluctuation, and binge eating.

Balanced Inventory of Desirable Responding Version 6 (BIDR-6; Paulhus, 1994). The BIDR-6 is a 40-item measure of the tendency to give socially desirable responses on self-reports. It contains two relatively independent subscales: Self-Deceptive Enhancement (SDE), which assesses the tendency to give honest but inflated descriptions of oneself, and Impression Management (IM), which assesses the tendency to give inflated self-descriptions to others or to an audience. Items are rated on 7-point Likert scales, and subscale scores are based on means for the subscale items. Internal consistency reliability (i.e., ranging from .70 to .82 for SDE and .80 to .86 for IM) and test-retest reliability over a 5-week interval (i.e., .69 for SDE and .77 for IM) are adequate (Paulhus, 1994). The internal consistency reliability for this study was .73 for SDE and .84 for IM. Validity of the BIDR-6 is supported by strong associations with other measures of desirable responding (e.g., Edwards SD scale; Paulhus, 1994).

Procedure

Non-sorority college women were recruited in psychology classes and through posted flyers. All of the women recruited in psychology classes and through posted flyers participated after receiving a description of the research. Of the eight sorority groups contacted through flyers, three participated. High school students were tested in health classes (100% participated) and did not receive credit for their participation. Psychology students were tested in small groups at the university and received course credit for their participation. Sorority women were tested in small groups in a private room at their sorority house and received community service hours for their participation. Women filled out measures of their eating habits (i.e., Q-EDD, EDI-2) and dieting beliefs (i.e., DBS). An instrument to assess socially desirable response tendencies (i.e., BIDR-6) also was included, as responses to the aforementioned instruments were deemed susceptible to biased responding. Because in Study 1 women's actual weights were correlated with their self-ratings of weight as measured by an accurate bathroom scale ($r = .98$), it was decided to assess only self-ratings of weight. For participants unsure of their weight, however, an accurate bathroom scale was provided.

Results

First, because age was found to be unrelated to continuum placement ($r = .11$, $p > .05$), high school and college women were not separated in the analyses. To test the hypothesis that EDI-2 subscale scores vary with continuum placement, a MANCOVA (i.e., controlling for social desirability) was calculated using subscale scores of the EDI-2 (except Drive for Thinness and Bulimia) as dependent variables and women's placement on the eating disorder continuum as the independent variable. Results indicated EDI-2 subscale scores varied as a function of continuum placement, $F(18, 248) = 5.94$, $p < .001$, Wilks's $\Lambda = .49$.

As in Study 1, post hoc univariate comparisons were used to determine which EDI-2 subscales varied according to eating disorder continuum placement, and trend analyses were used to observe if the mean scores across the continuum groups increased in a linear fashion for each of the nine subscales. Eight out of the nine EDI-2 subscales varied according to eating disorder continuum placement, Body

Dissatisfaction, $F(4, 130) = 29.66$, $p < .001$; Ineffectiveness, $F(4, 130) = 16.51$, $p < .001$; Interpersonal Distrust, $F(4, 130) = 3.38$, $p < .05$; Interoceptive Awareness, $F(4, 130) = 19.15$, $p < .001$; Maturity Fears, $F(4, 130) = 5.42$, $p < .01$; Asceticism, $F(4, 130) = 4.72$, $p < .01$; Impulse Regulation, $F(4, 130) = 13.38$, $p < .001$; and Social Inhibition, $F(4, 130) = 8.04$, $p < .001$; only Perfectionism, $F(4, 130) = .49$, $p > .05$, did not differentiate continuum placement. Post hoc analyses, with Scheffé tests to counteract inflation of Type 1 error rate (Tabachnick & Fidell, 1996), were used to determine if the continuum groups differed from one another for each EDI-2 subscale. Results indicated that all three continuum groups differed from each other in the expected manner for the following EDI-2 subscales: Interoceptive Awareness (asymptomatic and symptomatic difference, $p < .001$; asymptomatic and eating disordered group difference, $p < .001$; and symptomatic and eating disordered group difference, $p < .05$) and Impulse Regulation (asymptomatic and symptomatic difference, $p < .05$; asymptomatic and eating disordered group difference, $p < .001$; and symptomatic and eating disordered group difference, $p < .01$). The asymptomatic continuum group differed from both the symptomatic group and the eating disorder group in the expected manner, although the symptomatic group did not differ from the eating disorder group for Body Dissatisfaction (asymptomatic and symptomatic difference, $p < .001$, and asymptomatic and eating disordered group difference, $p < .001$), Ineffectiveness (asymptomatic and symptomatic difference, $p < .001$, and asymptomatic and eating disordered group difference, $p < .001$), Maturity Fears (asymptomatic and symptomatic difference, $p < .05$, and asymptomatic and eating disordered group difference, $p < .05$), and Social Inhibition (asymptomatic and symptomatic difference, $p < .05$, and asymptomatic and eating disordered group difference, $p < .01$). No differences between any continuum groups were found for Perfectionism (all group differences, $p > .05$) and Interpersonal Distrust (all group differences, $p > .05$). There were no EDI-2 subscales in which the symptomatic group was similar to the asymptomatic group but significantly different from the eating disorder group.

Trend analyses indicated that the following subscales had mean scores that increased linearly with respect to continuum placement: Body Dissatisfaction, $F(1, 133) = 33.89$, $p < .001$; Ineffectiveness, $F(1, 133) = 25.88$, $p < .001$; Interpersonal Distrust, $F(1, 133) = 6.75$, $p < .01$; Interoceptive Awareness, $F(1, 133) = 37.08$, $p < .001$; Maturity Fears, $F(1, 133) = 9.29$, $p < .01$; Asceticism, $F(1, 133) = 6.72$, $p < .05$; Impulse Regulation, $F(1, 133) = 26.93$, $p < .001$; and Social Inhibition, $F(1, 133) = 15.96$, $p < .001$. Only Perfectionism did not show a linear trend for continuum placement, $F(1, 133) = .77$, $p > .05$.

An analysis of covariance (ANCOVA) was used to observe if dieting locus of control would vary with placement on the eating disorder continuum. Eating disorder continuum placement served as the independent variable, the total score on the DBS served as the dependent variable, and the two social desirability scales on the BIDR-6 served as the covariates. The total score of the DBS varied

significantly with continuum placement, $F(4, 130) = 7.02$, $p < .001$. Post hoc analyses indicated that the asymptomatic group differed from the symptomatic group ($p < .01$), the asymptomatic group differed from the eating disorder group ($p < .001$), and the symptomatic group differed from the eating disorder group ($p < .05$) for the total score of the DBS. Moreover, trend analyses indicated that the DBS total score followed a linear trend, $F(1, 133) = 25.88$, $p < .001$. Table 2 displays the EDI-2 subscale score and DBS total score means and standard deviations along the continuum groups.

General Discussion

The results of these two studies support the construct validity of the eating disorder continuum in that several variables that are significant characteristics of clinical eating disorders vary meaningfully as a function of women's placements along the eating disorder continuum. Specifically, the reported analyses indicated that the Neuroticism personality domain score as measured by the NEO-FFI, eight out of nine EDI-2 subscales, and internal dieting locus of control as measured by the DBS varied as a function of eating disorder continuum placement. Overall, analyses indicated that these variables showed the expected linear relationship to eating disorder continuum placement, thereby supporting the construct validity of the eating disorder continuum hypothesis for women. These results also extend prior work that showed a variety of psychological, behavioral, and cognitive characteristics related to clinical eating disorders (Brookings & Wilson, 1994; Fairburn, 1995; Garner, 1991; Skodol et al., 1993; Stotland & Zuroff, 1990) to be related as expected to women's continuum placement. Moreover, consistent with the limited empirical research that does not show a clear relationship between eating disturbances and certain psychological and behavioral characteristics (Brookings & Wilson, 1994), eating disorder continuum placement was not differentiated by Extraversion, Openness to Experience, Agreeableness, and Conscientiousness.

These findings also begin to build a description of members of each continuum group in terms of psychological, behavioral, and cognitive characteristics. That is, it appears the asymptomatic, the symptomatic, and the eating

disorder continuum groups can be differentiated in more ways than by *DSM-IV* criteria. It appears that women within the asymptomatic group have average Neuroticism scores and score around the 50th percentile of the psychological subscales of the EDI-2 (e.g., Ineffectiveness, Interceptive Awareness). Moreover, women within the asymptomatic group appear to score below average (i.e., the 38th percentile) on the Body Dissatisfaction subscales of the EDI-2 and seem to adopt a lower than average internal dieting locus of control (Stotland & Zuroff, 1990). On the other hand, women within the symptomatic group have high-average Neuroticism scores (Costa & McCrae, 1992) and score, on average, around the 70th percentile of the EDI-2 psychological subscales. Furthermore, women within the symptomatic group score at a high percentile (i.e., at the 76th percentile) on the Body Dissatisfaction subscale of the EDI-2 and appear to adopt more of an internal dieting locus of control than the asymptomatic group. Last, women in the eating disorder group have high Neuroticism scores (Costa & McCrae, 1992), score, on average, around the 75th percentile on the psychological subscales of the EDI-2, score at the 76th percentile on the Body Dissatisfaction EDI-2 subscale, and adopt an even higher internal dieting locus of control than women in the symptomatic group.

The generalizability of the present findings is limited, however, because of the restricted diversity of the sample. The samples consisted mostly of Caucasian women and included only a relatively small number of women with clinical eating disorders. More research is needed to discover if these results can be replicated and applied to men in general and women and men of different races and from varied geographical areas. It is also important to note that our sample may not be representative of the female college student population with eating disturbances. We specifically targeted sororities where disturbed eating behaviors are thought to be more prevalent (Schulken, Pinciario, Sawyer, Jensen, & Hoban, 1997) in order to increase the size of our eating disorder continuum group. We would expect that studies with fewer sorority women would have a smaller percentage of women in both the symptomatic and the eating disorder continuum groups.

Despite these limitations, these results are more congruent

Table 2

EDI-2 Subscale Means, Standard Deviations, and Number of Women in Each Continuum Group for Study 2 (N = 135)

EDC	BD	I	P	ID	IA	MF	A	IR	SI	DBST	n	%
Asymptomatic												
M	37.90	54.32	54.81	53.06	50.48	53.90	58.65	53.35	45.90	3.85	31	23
SD	25.0	11.1	30.8	17.5	16.1	25.2	25.8	16.5	26.5	0.59		
Symptomatic												
M	75.90	73.61	55.65	60.55	68.72	69.46	59.48	65.59	60.72	4.23	69	51
SD	21.9	19.3	30.2	21.8	20.8	26.4	27.6	21.1	27.8	0.51		
Eating disordered												
M	76.20	77.63	61.49	66.37	79.77	73.94	74.69	78.86	71.49	4.53	35	26
SD	27.5	19.7	35.4	21.4	19.0	26.7	21.2	20.8	21.3	0.54		

Note. EDC = Eating disorder continuum group; BD = Body Dissatisfaction; I = Ineffectiveness; P = Perfectionism; ID = Interpersonal Distrust; IA = Interceptive Awareness; MF = Maturity Fears; A = Asceticism; IR = Impulse Regulation; SI = Social Inhibition; DBST = total score of Dieting Belief Scale; % = percentage of women in a continuum group.

with the continuity model than the discontinuity model (Lowe et al., 1996). The discontinuity model states that the asymptomatic and symptomatic continuum groups are similar, with both groups differing from the eating disorder group (Lowe et al., 1996). Yet, post hoc analyses of many EDI-2 subscales (i.e., Body Dissatisfaction, Ineffectiveness, Maturity Fears, and Social Inhibition) indicated differences between the asymptomatic and symptomatic continuum groups, but not between the symptomatic and eating disorder groups. That is, any "discontinuity" in the present data is inconsistent with the discontinuity perspective of eating disorders. This discontinuity, however, also is not totally consistent with the continuity model, which posits that there should be a significant quantitative difference between the symptomatic and eating disorder groups. Further research might be directed toward distinguishing those variables that are continuous across all three continuum groups versus those that best distinguish asymptomatic versus symptomatic groups and symptomatic versus eating disordered groups.

Although the present research provides compelling evidence of the construct validity of the eating disorder continuum hypothesis, many additional characteristics remain to be explored. In particular, an avenue that has not yet been adequately researched is that of the role cognitions play in the prediction of eating disorder continuum placement. The present exploration of the relation of eating disorder continuum placement to the cognition of dieting locus of control is notable as research on cognitive variables and eating disorder continuum placement is very limited.

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