Decisions about the classification of eating disorders have significant scientific and clinical implications. The eating disorder diagnoses in the Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM–IV; American Psychiatric Association, 1994) reflect the collective wisdom of experts in the field but are frequently not supported in empirical studies and do not capture the disorders of eating experienced by most people with an eating disorder. Statistical approaches to classification such as latent class analysis and taxometrics can help to create a classification system with greater scientific validity and clinical utility. The field would benefit from direct empirical comparisons of different classification schemes with various clinical and scientific validators. Such studies would enable the creators of the next DSM eating disorder classification to increase understanding of the advantages and disadvantages associated with choosing various diagnostic criteria sets for the eating disorders.

Keywords: eating disorders, classification, diagnosis, DSM–IV

Clinical psychology, psychiatry, and other mental health disciplines have placed increasing emphasis on the importance of evidence-based treatments for all forms of psychopathology, including eating disorders (Nathan & Gorman, 2002; Wilson, 2005). The need for efficacious interventions is underscored by the considerable social and economic hardship and medical morbidity experienced by patients with eating disorders. Ironically, however, the psychiatric diagnoses that often define the behavioral targets of these evidence-based treatments are based largely on clinical experience. Establishing valid categories is clinically important because the efficacy of any treatment should be significantly impacted by the classification system used to define the disorders being treated. Current diagnostic systems, that is, the Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM–IV; American Psychiatric Association, 1994) and the International Statistical Classification of Diseases and Related Health Problems (10th revision; ICD-10; World Health Organization, 1992), have been informed by careful review of empirical research findings and have generally produced enhanced diagnostic reliability for the disorders. However, there is growing speculation that the validity of many DSM categories is limited (Maj, Gaebele, Lopez-Ibor, & Sartorius, 2002; Rounsaville et al., 2002). The eating disorder diagnoses remain best construed as open and falsifiable diagnostic constructs in need of further scientific study (Skinner, 1986) rather than discrete disease entities that have been discovered in nature in their true form. In this article, we review the existing DSM–IV classifications of the eating disorders and studies that have tested their validity. We describe how the application of different research strategies may help to answer several key classification questions. How many eating disorders are there? Are the eating disorders best viewed as continuous or categorical in nature? How does comorbid psychopathology influence eating disorder classification? Does the validity of the eating disorders vary across cultures, gender, and age groups? Finally, we discuss potential conceptual advances in the classification of eating disorders and offer specific recommendations regarding future attempts to classify the eating disorders.

Current DSM–IV Eating Disorder Classification System

In the DSM–IV, eating disorders may be classified in one of three categories: anorexia nervosa, bulimia nervosa, and eating disorder not otherwise specified, which includes the provisional diagnostic category of binge-eating disorder. Anorexia nervosa comprises four specific criteria: marked

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weight loss, fear of gaining weight, body image distortion, and (in females) amenorrhea. Furthermore, anorexia nervosa is divided into two subcategories: restricting subtype for those who restrict food intake and exercise for weight control and a binge–purge subtype for those who engage in binge eating and/or purging (i.e., vomiting, laxative, or diuretic use). Bulimia nervosa is defined by binge eating and compensatory behaviors (e.g., vomiting, fasting) that occur an average of twice per week for three months and self-concept dominated by shape and weight. These symptoms must occur outside the course of anorexia nervosa. Like anorexia nervosa, bulimia nervosa is divided into two subtypes: a nonpurging subtype characterized by fasting or exercise after binge eating and a purging subtype characterized by the use of self-induced vomiting, laxatives, or diuretics. Finally, eating disorder not otherwise specified is reserved for those individuals deemed to have a clinically significant eating disorder that does not meet criteria for anorexia nervosa or bulimia nervosa. Within this broad, heterogeneous category, binge-eating disorder is defined by significant binge eating and associated distress in the absence of inappropriate compensatory behavior.

**Advantages of the Current DSM–IV System**

The current classification system has some advantages that are worth noting. First, the *DSM–IV* eating disorders can be reliably diagnosed with several semistructured or clinical interviews (Peterson & Miller, 2005). Second, there is some evidence of diagnostic validity. Anorexia nervosa and bulimia nervosa appear to demonstrate different longitudinal patterns with regard to recovery (Herzog et al., 1999) and mortality (Keel et al., 2003). In addition, anorexia nervosa and bulimia nervosa differ with regard to their cross-cultural and cross-historical representations, with bulimia nervosa demonstrating a pattern that is more consistent with a culture-bound syndrome (Keel & Klump, 2003). Finally, anorexia nervosa and bulimia nervosa appear to differ in terms of established evidence-based treatments. Antidepressant medications and cognitive–behavioral therapy have achieved the status of well-established treatments for bulimia nervosa (Shafran et al., in press). As yet, no well-established treatments have been identified for anorexia nervosa (Shafran et al., in press). Although binge-eating disorder is the most recently characterized eating disorder, preliminary studies support the longitudinal stability of bulimia nervosa versus binge-eating disorder diagnoses (Fairburn, Cooper, Doll, Norman, & O’Connor, 2000; Keel et al., 2003). Despite these advantages, several limitations have been identified.

**Limitations of the Current DSM–IV System**

Empirical studies of the current *DSM–IV* classification have raised concerns at three levels: (a) individual diagnostic criteria for the eating disorders; (b) the validity of the anorexia nervosa and bulimia nervosa subtype distinctions; and (c) questions about the validity of the anorexia nervosa, bulimia nervosa, and eating disorder not otherwise specified diagnoses themselves (Franko, Wonderlich, Little, & Herzog, 2004). Regarding specific diagnostic criteria, there have been numerous concerns about the *DSM–IV* anorexia nervosa criteria set. For example, fear of weight gain as a criterion has been criticized on the grounds that it may not be present in individuals displaying apparent anorexia nervosa in certain cultures (e.g., Hong Kong), although this is debated (Habermas, 1989; Katzman & Lee, 1997). Also, the criterion of the presence of amenorrhea has been questioned because it is an unreliable indicator of weight status and does not provide information in terms of other important clinical features, comorbidity, or outcome (Andersen, Bowers, & Watson, 2001; Garfinkel et al., 1996; Herzog & Delinsky, 2001).

Similarly, the diagnostic criteria for bulimia nervosa have been criticized. For example, the idea that a binge involves the consumption of an amount of food that is definitely larger than what most people would eat has been very difficult to operationalize (Pratt, Niego, & Agras, 1998; Rossiter & Agras, 1990). This requirement relegates to eating disorder not otherwise specified those individuals who purge after binge episodes that are not objectively large (Keel, Cogley, Ghosh, & Lester, 2002). Furthermore, the idea that the binge is time limited is not empirically based, and no evidence suggests that differentiating longer or shorter binge episodes has clinical utility (Franko et al., 2004). Finally, the criterion that the bulimic symptoms must occur twice a week for three months has failed to receive empirical support in a large number of studies (Crow, Agras, Halmi, Mitchell, & Kraemer, 2002; Kendler et al., 1991).

Support for the *DSM*-based subtypes of anorexia nervosa (binge–purge vs. restricting) and bulimia nervosa (purging vs. nonpurging) has also been limited. The anorexia nervosa subtypes were originally differentiated on the basis of early observations that anorexic women with...
bulimic symptoms showed more comorbid psychopathology and distress than did restricting anorexia nervosa subjects (DaCosta & Halmi, 1992; Herzog, Keller, Sachs, Yeh, & Lavori, 1992). However, researchers conducting recent studies, including prospective longitudinal studies, have failed to find significant evidence of differences between the binge–purge and restricting subtypes of anorexia nervosa in comorbid psychopathology, recovery, relapse, or mortality rates (e.g., Herzog et al., 1999; Keel et al., 2003; Keel, Dorer, Franko, Jackson, & Herzog, 2005). Furthermore, it is increasingly clear that most individuals with restricting anorexia nervosa are likely to report some binge–purge behaviors over time (Bulik, Sullivan, Fear, & Pickering, 1997; Eddy et al., 2002). In a recent large-scale prospective study, the majority of participants with restricting anorexia nervosa who remained ill developed binge–purge symptoms (Eddy et al., 2002). These course-related data raise significant questions about the validity of the subtypes for anorexia nervosa. It may be that the anorexia nervosa binge–purge subtype represents a more severe or chronologically advanced form of anorexia nervosa rather than a distinct diagnostic subtype (Eddy et al., 2002). In contrast to numerous studies providing mixed results for the validity of anorexia nervosa subtypes, few studies provide any data to support the validity of the bulimia nervosa subtypes.

Similarly, empirical studies of the full eating disorder diagnoses raise questions about the distinction between anorexia nervosa and bulimia nervosa. Similar to the cross-over seen between anorexia nervosa subtypes, patients with anorexia nervosa have been found to cross over to develop bulimia nervosa (Keel, Dorer, et al., 2005; Keel & Mitchell, 1997). Further, a recent large-scale study found that many patients with the anorexia nervosa binge–purge subtype retrospectively reported histories of bulimia nervosa (Tozzi et al., 2005). However, prospective follow-up studies of bulimia nervosa have found little crossover to anorexia nervosa (Herzog et al., 1999; Keel, Mitchell, Miller, Davis, & Crow, 2000). Family history studies have suggested that there is significant cross-transmission of diagnoses in the family members of both anorexia nervosa and bulimia nervosa probands (Strober, Freeman, Lampert, Diamond, & Kaye, 2000), suggesting that anorexia nervosa and bulimia nervosa do not “breed true.” Finally, genome-wide linkage analyses have required further specification of features for anorexia nervosa and bulimia nervosa than are provided by the DSM–IV to find loci for genetic susceptibility (Bulik et al., 2003; Grice et al., 2002).

Finally, recent data indicate that the majority (i.e., approximately 60%) of those with eating disorders do not meet DSM–IV diagnostic criteria for anorexia nervosa or bulimia nervosa (Fairburn & Bohn, 2005; Wade, Crosby, & Martin, 2006). Instead, most meet criteria for an eating disorder not otherwise specified. Binge-eating disorder accounts for a sizable portion of this category (Wade, Bergin, Tiggemann, Bulik, & Fairburn, 2006), and elevation of binge-eating disorder from a provisional diagnostic category to a full threshold eating disorder would alleviate part of the abundance of eating disorder not otherwise specified diagnoses. However, concerns have been raised regarding the validity of binge-eating disorder as a distinct diagnostic entity (Devlin, Goldfein, & Dobrow, 2003). Moreover, even if binge-eating disorder is elevated to full syndrome status, there remains a large pool of heterogeneous, undifferentiated symptom patterns in the eating disorder not otherwise specified category that are defined simply by not meeting criteria for anorexia nervosa or bulimia nervosa or by presenting subthreshold variants of anorexia nervosa and bulimia nervosa. For example, a patient who meets all criteria for bulimia nervosa except that her binge–purge episodes occurred once weekly for three months would be diagnosed with an eating disorder not otherwise specified. Concerns about the stability and validity of these eating disorder not otherwise specified diagnoses arise from longitudinal studies. One recent study (Milos, Spindler, Schnyder, & Fairburn, 2005) suggested that approximately 70% of eating disorder not otherwise specified subjects move to either anorexia nervosa or bulimia nervosa over a 30-month follow-up. These findings suggest that such variation may have more to do with fluctuating body weight and symptom severity than with actual transitions from one illness to another. In other cases, symptom profiles do not appear to be subthreshold variants of anorexia nervosa or bulimia nervosa but do appear to be dominated by different symptom patterns. For example, a normal-weight patient who purges five times per week but does not have binge episodes would be diagnosed with an eating disorder not otherwise specified, despite evidence that this represents a prevalent (Wade, Bergin, et al., 2006), distinct, and clinically significant type of eating disorder (Binford & le Grange, 2005; Keel, Mayer, & Harnden-Fisher, 2001) that has demonstrated longitudinal stability (Keel, Haedt, & Edler, 2005). Collectively, studies suggest that the diag-
nostic thresholds that have been set to distinguish among eating disorders lack diagnostic validity across numerous validating strategies and highlight the need for a more empirically based classification of eating disorders.

Empirically Based Classification of Eating Disorders

The *DSM–IV* represents one possible way of grouping symptoms and signs into diagnostic entities, but, increasingly, studies are being conducted that propose alternative classification schemes based on sophisticated statistical approaches (e.g., Gleave, Lowe, Green, Corrane, & Williams, 2000; Williamson, Gleave, & Stewart, 2005). Latent class analysis (Lazarsfeld & Henry, 1968) and taxometric analysis (Waller & Meehl, 1998) are particularly relevant to classification issues. Latent class analysis is designed to identify subtypes of related cases (i.e., latent classes) from multivariate categorical data. Although latent class analysis identifies the optimal number and composition of classes, it does not address whether the relationship between classes is truly discontinuous and qualitative (taxonic) versus quantitative and continuous (dimensional). Taxometric analysis is designed precisely to answer this question (Schmidt, Kotov, & Joiner, 2005; Waller & Meehl, 1998). Thus, taxometric analysis can be used to determine if two superficially distinct disorders are actually alternative manifestations of a single underlying condition or if they represent distinct entities (Waldman & Lilienfeld, 2001). The value of taxometric analysis for addressing these types of nosologic questions has been highlighted in a series of studies on posttraumatic stress disorder (A. M. Ruscio, Ruscio, & Keane, 2002), depression (J. Ruscio & Ruscio, 2000), psychopathy (Harris, Rice, & Quinsey, 1994), and, more recently, eating disorders (Williamson et al., 2002). Below we briefly review results from latent class analysis and taxometric analysis studies in eating disorders.

Latent Class Analyses and Eating Disorders

Results from latent class analysis studies suggest that there may be as many as six homogeneous classes of eating disorders. However, the number and composition of classes has varied across studies as a consequence of methodological differences in samples and assessment methods. A latent class resembling bulimia nervosa has been produced in several studies (Bulik, Sullivan, & Kendler, 2000; Keel et al., 2004; Striegel-Moore et al., 2005; Sullivan, Bulik, & Kendler, 1998). Similarly, a latent class resembling binge-eating disorder has emerged in several studies (Bulik et al., 2000; Striegel-Moore et al., 2005; Sullivan et al., 1998). Results of these studies generally support distinguishing between women who binge and purge and those who just binge.

Some studies have produced a latent class resembling anorexia nervosa (Bulik et al., 2000) or separate classes for the restricting and binge–purge subtypes of anorexia nervosa (Keel et al., 2004; Wade, Crosby, & Martin, 2006). Inconsistent results have emerged concerning distinctions between the anorexia nervosa binge–purge subtype and bulimia nervosa, with one study supporting the presence of separate latent classes (Keel et al., 2004) and another finding both conditions in a single latent class (Wade, Crosby, & Martin, 2006). Findings from Keel et al. (2004) further suggested that low weight alone was inadequate for differentiating among women who binge and purge. Instead, the presence of multiple purging methods identified a form of eating disorder associated with particularly high distress and comorbidity that was more likely to include individuals with the anorexia nervosa binge–purge subtype than bulimia nervosa. Thus, latent class analysis studies suggest the distinction between the anorexia nervosa binge–purge subtype and bulimia nervosa is not clear and may reflect both differences in body weight and nature of the psychopathology.

In addition to supporting some of the diagnostic entities presented in the *DSM–IV*, latent class analyses have suggested the presence of other eating disorder classes not currently recognized in the *DSM–IV*. A latent class characterized by purging in the absence of objectively large binge episodes among normal weight women (purging disorder; Keel, Haedt, & Edler, 2005) has been identified in two independent studies (Striegel-Moore et al., 2005; Sullivan et al., 1998). Further, a latent class characterized by subjective binge episodes in the absence of self-induced vomiting (subjective binge-eating disorder; Mond, Hay, Rodgers, & Owen, 2005) has been identified in one study (Sullivan et al., 1998). These findings suggest that some of the subgroups that are classified as eating disorder not otherwise specified in the *DSM–IV* may be syndromes with alternative manifestations of a single underlying condition or if they represent distinct entities.
binged and fasted (but did not vomit) have been included in latent classes that resemble the bulimia nervosa purging subtype (Keel et al., 2004; Striegel-Moore et al., 2005; Wade, Crosby, & Martin, 2006). No empirical support has emerged for symptom frequency criteria used to distinguish bulimia nervosa or binge-eating disorder from their related subclinical eating disorder not otherwise specified variants in any latent class analysis study. Finally, one study (Wade, Crosby, & Martin, 2006) did not produce separate latent classes for the anorexia nervosa binge-purge subtype, the bulimia nervosa purging subtype, and purging disorder.

In summary, results from studies using latent class analysis suggest that there may be as many as six homogeneous classes of eating disorders: bulimia nervosa; binge-eating disorder; restricting anorexia nervosa; anorexia nervosa, binge-purge type; purging disorder; and subjective binge-eating disorder. Preliminary validation analyses have supported differences in psychological and demographic features among classes. Further, some studies have found familial aggregation of latent class membership (Bulik et al., 2000; Keel et al., 2004; Sullivan et al., 1998), suggesting that the empirically derived eating disorders may breed true. However, results from these latent class analysis studies do not allow us to determine whether classes represent categorically distinct disorders or variants along a dimension of severity for a single condition or a small number of underlying conditions. Taxometric analyses, which can test the categorical–dimensional question, are reviewed next.

**Taxometric Analyses of Eating Disorders**

Taxometric studies of eating-disordered participants indicate that bulimia nervosa represents a categorically distinct class—distinct both from other eating disorders and from normality. Gleaves, Lowe, Green, et al. (2000) evaluated whether anorexia nervosa and bulimia nervosa are qualitatively distinct classes using taxometric procedures on women with various eating disorder presentations, as well as nonclinical controls (N = 959). Bulimia nervosa (purging and nonpurging subtypes) was found to be qualitatively distinct from normality. Similar to their earlier study, Gleaves, Lowe, Snow, Green, and Murphy-Eberenz (2000) found evidence of a latent taxon for bulimia nervosa in a mixed sample of undergraduates and participants recruited from an eating disorder clinic. In analyses on a clinical group with diagnosed eating disorders (bulimia nervosa, anorexia nervosa, binge-eating disorder, and eating disorder not otherwise specified), nonclinical undergraduates, and obese participants, Williamson et al. (2002) also found that bulimia nervosa is best represented as a discrete entity that is qualitatively distinct from other eating disorders and normality. The only dissenting study was reported by Tylka and Subich (2003), who found that the latent structure of bulimia-related symptoms is dimensional rather than taxonic in a large sample of college-age women. Limitations to their study include sole use of self-report measures and the exclusion of any behavioral indicators (such as bingeing or purging).

Other potentially taxonic distinctions have received far less attention. With respect to the restricting subtype of anorexia nervosa, Williamson et al. (2002) reported that it may occur on a continuum with normality, implying it represents an extreme variation of normal processes. Regarding anorexia nervosa and bulimia nervosa subtypes, Gleaves, Lowe, Green, et al. (2000) and Williamson et al. (2002) found that the restricting subtype of anorexia nervosa was qualitatively different from the binge–purge subtype of anorexia nervosa, with some indication that the latter syndrome showed continuity with bulimia nervosa, which parallels latent class analysis studies that have placed bulimia nervosa and the anorexia nervosa binge–purge subtype in the same class (e.g., Wade, Crosby, & Martin, 2006). Williamson et al. obtained results consistent with this view as well. Binge-eating disorder has been examined in one study (Williamson et al., 2002), which indicated that it may compose a distinct taxon.

In sum, three of four taxometric studies (Gleaves, Lowe, Green, et al., 2000; Gleaves, Lowe, Snow, et al., 2000; Williamson et al., 2002) suggest that bulimia nervosa is taxonic in nature. Some findings indicate that the anorexia nervosa binge–purge subtype might be more appropriately grouped with bulimia nervosa than with the anorexia nervosa restricting subtype in future editions of the *DSM*. Initial evidence suggests that the anorexia nervosa restricting subtype may not be taxonic but resides on a continuum with normality (Williamson et al., 2002), although this finding requires replication. Finally, binge-eating disorder appears to be a discrete entity, separate in kind from both normal weight and obese non-binge-eating participants (Williamson et al., 2002).
Alternative Models for the Classification of Eating Disorders

Williamson et al.’s (2005) Three-Dimensional Model

On the basis of the increasing number of studies questioning the validity of the DSM–IV eating disorder diagnoses, new models of classification are emerging. Williamson et al. (2005) conceptualized eating disorders in terms of a three-dimensional model. One dimension, binge eating, is viewed as qualitative (taxonic) in nature, whereas the other two dimensions, fear of fatness–compensatory behaviors and extreme drive for thinness, are viewed as continuous. This model is based on a series of taxometric studies conducted by Williamson et al. (2002) and Gleaves et al. (Gleaves, Lowe, Green, et al., 2000; Gleaves, Lowe, Snow, et al., 2000). Williamson et al. (2002) have demonstrated how the current DSM–IV eating disorder diagnoses would fit in the space of this three-dimensional model (see Figure 1). For example, anorexia nervosa, restricting subtype; obese; and normal groups are positioned along the two continua, whereas disorders involving binge eating (i.e., anorexia nervosa, binge–purge subtype; bulimia nervosa; and binge-eating disorder) are viewed as discontinuous with anorexia nervosa, restricting subtype; obese; and normal groups. This model (Williamson et al., 2005) conceptualizes the current anorexia nervosa restricting subtype as the only variant of anorexia nervosa. Bulimia nervosa is conceptualized as varying in terms of individuals’ body weight, which encompasses the current bulimia nervosa purging subtype and the anorexia nervosa binge–purge subtype. The three-dimensional model also has implications for cases that are currently captured by the eating disorder not otherwise specified category. For example, a new category, binge-eating syndrome, is viewed as varying in terms of individuals’ fear of fatness, with the current binge-eating disorder conceptualized as binge-eating syndrome with low to moderate body concerns.

The model of Williamson et al. (2005) may have significant implications for research on etiology, assessment, and treatment of eating disorders. For example, taxometric findings have been viewed as indirect evidence for a possible genetic basis for the identified taxon (e.g., binge eating; Meehl, 1992). Similarly, the assessment of eating disorders will be influenced by the conceptualization of symptoms. If drive for thinness is a dimension, the psychometric goal will be to assess all aspects of the construct and discriminate all regions of the dimension (Meehl, 1992; J. Ruscio & Ruscio, 2002). If binge eating is a category, the goal is to sort diagnostic criteria at a best cut so as to minimize misclassifications (Meehl, 1992). Finally, the model may have implications for treatment, including the observation that treatments for bulimia nervosa and binge-eating disorder are generally less intense and more efficacious than treatments for anorexia nervosa (Hay & Bacaltchuk, 2002; Treasure & Schmidt, 2002). If restricting anorexia nervosa is nontaxonic and continuous with...
normality, treatment responsiveness may be similar to that for other disturbances thought to be continuous with normality (e.g., personality disorders). Conversely, bulimia nervosa and binge-eating disorder, which are viewed as part of the discrete binge-eating taxon, may respond to psychological and pharmacological interventions for specific underlying mechanisms that give rise to the taxonic nature of the conditions. Although such an interpretation is interesting, it hinges on continued taxometric support with a broad array of indicators and carefully selected samples. Further, this logic does not explain the limited efficacy of treatment for the anorexia nervosa binge–purge subtype. Finally, this model remains mute on symptom clusters not currently represented in the DSM–IV, such as purging disorder. The transdiagnostic approach (reviewed next) seeks to improve the inclusiveness of the eating disorder classification.

The Transdiagnostic Approach

Fairburn and colleagues (Fairburn & Bohn, 2005; Fairburn, Cooper, & Shafran, 2003) have proposed a single unitary diagnostic category, “eating disorder,” which would subsume the current diagnoses of anorexia nervosa and bulimia nervosa and their subtypes and eating disorder not otherwise specified (Fairburn & Bohn, 2005). The transdiagnostic model is founded on the belief that common characteristic features between the various forms of eating disorders serve to unite more than separate them. First, it is argued that anorexia nervosa, bulimia nervosa, and eating disorder not otherwise specified essentially share the same core psychopathology, namely, the overevaluation of control over shape, weight, and eating. In support of this contention, patients with eating disorder not otherwise specified are reported to be similar to patients with anorexia nervosa and bulimia nervosa in terms of weight and shape concerns (Turner & Bryant-Waugh, 2004). Second, Fairburn and colleagues argued that eating disorder diagnoses share many of the same distinctive clinical features. These communalities, shared by at least some subgroups from each eating disorder diagnosis, include the restriction of food intake, purging behaviors, overexercise, body checking, and binge eating. Finally, Fairburn pointed to the fluctuating longitudinal course of eating disorder patients such that patients often migrate from one diagnostic category to another over time.

Communalities in core psychopathology, clinical features, and longitudinal course may indicate common mechanisms in the maintenance of bulimia nervosa, anorexia nervosa, and atypical eating disorders (e.g., Fairburn et al., 2003), such as the overevaluation of shape and weight and low core self-esteem. On the basis of these purported common mechanisms, Fairburn and colleagues (Fairburn et al., 2003) proposed a transdiagnostic treatment based on cognitive–behavioral theory. According to Fairburn, the patient’s specific eating disorder diagnosis is not relevant to the treatment. Rather, the particular pathological features displayed and the specific processes that appear to be maintaining symptoms should direct how cognitive–behavioral therapy is used. The transdiagnostic model of eating disorder classification is clearly a substantial departure from the DSM approach, which has highlighted differences among possible eating disorder groups rather than similarities.

Examining the Validity of Eating Disorder Classification Models

Presently, there are few data to determine which of the three models of eating disorder classification (i.e., DSM–IV, three dimensional, transdiagnostic) is most valid. Certainly, these models do not represent the full array of possible models. Direct examinations of the DSM–IV eating disorder diagnoses on various validity indicators (e.g., diagnostic stability, etiological factors) have often failed to support the idea that these are distinct diagnostic entities that are stable over time and show a unique psychopathology, pathophysiology, or course. Taxometric and latent class studies have tended to support the validity of some DSM–IV categories (bulimia nervosa, binge-eating disorder) but not others (e.g., eating disorder not otherwise specified).

The three-dimensional and transdiagnostic models both address some of the problems in the DSM–IV model but are largely untested in terms of diagnostic validity. The three-dimensional model is based on empirical classification studies and in that regard is empirically based. However, taxometric studies have generally tested the nature of existing DSM–IV categories, which may limit the model’s generalizability to eating disorder syndromes not currently in the DSM–IV. However, it is worth noting that the model’s specification of binge eating (especially bulimia nervosa) as a taxon has been supported in all studies that rigorously tested this idea. Nonetheless, there has not yet been an empirical test of the full model with one well-defined sample and rigorous measurement. Furthermore, the proposed categories in this model have not been tested in terms of meaningful differences on validity indicators such as family history, premorbid personality, demographics, precipitating factors, psychological or biological tests, diagnostic stability, or response to treatment (Kendler, 1980).

Similarly, the transdiagnostic model is a substantial revision of the DSM–IV scheme and overcomes numerous problems associated with the heterogeneity in the existing DSM–IV eating disorder diagnoses and their relative instability over time. Furthermore, it is consistent with a model specifying clear clinical and treatment implications. However, any existing or future evidence that identifies meaningful distinctions among scientifically or clinically defined eating disorder groups must be considered contradictory to the transdiagnostic model. For example, taxometric analysis and latent class analysis studies, which have already identified distinctions between individuals who simply restrict food intake versus those who binge and purge, do not support the transdiagnostic model. Furthermore, some of the reported differences between the diagnoses of anorexia nervosa and bulimia nervosa (e.g., cross-cultural representation; treatment response; chronicity; and, most notably, mortality) and results from genomewide linkage analyses...
are inconsistent with the transdiagnostic model. The transdiagnostic model is based largely on treatment outcome and would not predict clear treatment-related differences on the basis of eating disorder diagnoses. However, treatment response represents only one of several validators of clinical categories (Kendall, 1989). Etiologic, pathophysiologic, and psychopathological validators also need to be evaluated rigorously to test a classification model (Kendler, 1990). The risk of basing a classification of eating disorders primarily on treatment response or any other single validator is that a more fundamental factor or process may be missed, which theoretically overrides the apparent similarities. For example, Ustun, Chatterji, and Andrews (2002) noted that given external characteristics (e.g., lives in water, has fins, and is longer than it is wide), a dolphin and a shark may both be intuitively classified as fish, which would miss a more fundamental distinction that dolphins are mammals and sharks are not. Thus, the validity of any model depends on the examination of multiple validators to ensure that no significant distinguishing feature is overlooked.

**The Problem of Comorbid Psychopathology for Eating Disorder Classification**

The high degree of comorbid psychopathology seen in both anorexia nervosa (Halmi et al., 1991) and bulimia nervosa (Powers, Coovert, Brightwell, & Stevens, 1988; Wonderlich & Mitchell, 1997) poses theoretical and empirical problems for eating disorder classification. In a theoretical sense, such comorbidity raises interesting issues about the nature of the relationship between eating disorders and other forms of psychopathology. Specifically, the evidence of shared symptomatology with anxiety disorders, mood disorders, and substance use disorders has raised questions about whether eating disorders actually represent atypical variants of these other conditions. For example, in addition to the co-occurrence of symptoms, some eating disorders, anxiety disorders, and mood disorders all show some degree of treatment response to psychotropic medications, such as fluoxetine, implying similarity in treatment responsivity. However, there are also substantial differences between eating disorders and these other psychopathologies on other indicators. For instance, eating disorders are more likely to show a longer and more protracted clinical course than will anxiety or mood disorders (Hsu, Kaye, & Welzlin, 1993; Strober & Kaiz, 1987). Additionally, researchers in family history studies have failed to find evidence suggestive of a shared etiology between eating disorders and mood disorders, anxiety disorders, or substance use disorders (see Lilienfeld, 2004, for a review).

Thus, it appears that the eating disorders and other forms of psychopathology are best viewed as independent entities that may share risk factors but that eating disorders cannot be simply construed as entities in a larger spectrum of more fundamental problems. Nonetheless, diagnosis and treatment of eating disorders may be complicated by such comorbidity. It has been suggested that such comorbid psychopathology may prove a better predictor of clinical variables (i.e., response to treatment, clinical course) than the eating disorder diagnoses themselves (Westen & Harnden-Fischer, 2001). One clinically relevant strategy for conceptualizing such comorbidity is to search for patterns of comorbidity within eating disorder diagnoses, which is reviewed below.

**Personality-Based Patterns of Comorbidity Within Eating Disorder Diagnoses**

There has been speculation for some time about personality-based subgroups of eating disordered individuals that cut across both anorexia nervosa and bulimia nervosa diagnostic categories (e.g., Johnson & Connor, 1987; Westen & Harnden-Fischer, 2001; Wonderlich & Mitchell, 1992). Early efforts to understand the nature and implications of such patterned comorbidity within eating disorder diagnostic categories relied on the application of impulsivity-related constructs, such as borderline personality disorder (e.g., Steiger & Stotland, 1996; Wonderlich & Swift, 1990) or multi-impulsive bulimia nervosa (e.g., Fichter, Quadflieg, & Rief, 1994; Lacey, 1993). However, more recent approaches have relied on latent profile analyses or cluster analyses to identify subgroups of eating disordered individuals based on a more comprehensive set of personality traits. Such statistical approaches have consistently identified three to four clusters of eating disordered individuals on the basis of personality traits, largely independent of eating disorder diagnosis: emotionally dysregulated or impulsive, emotionally constricted or compulsive, and normative. The clusters differ on etiologic variables (e.g., family history, child abuse), eating disorder and comorbid psychopathology symptoms, overall level of functioning, treatment history, and momentary mood and behavior ratings (e.g., Espelage, Mazzeo, Sherman, & Thompson, 2002; Goldner, Srikanth, Schroeder, Livesley, & Birmingham, 1999; Holliday, Landou, Collier, & Treasure, 2006; Strober, 1983; Westen & Harnden-Fischer, 2001; Wonderlich et al., 2005; Wonderlich et al., in press). Thus, even within eating disorder diagnostic categories, there may be varying patterns of psychopathology that have meaningful scientific and clinical implications.

**Clinical Implications**

These varied patterns of psychopathology within the eating disorders diagnoses pose dilemmas for scientists and clinicians. First, it is possible that these subtypes differ in etiologic processes. For example, as noted above, studies to date have suggested that within-diagnostic category personality clusters differ in both family history variables (Holliday et al., 2006) and childhood trauma variables (Westen & Harnden-Fischer, 2001), which may have significant implications for the conceptualization, classification, and treatment of these disorders. Second, these clusters appear to differ significantly in the longitudinal course of the disorder, with the impulsive and emotionally dysregulated cluster likely to display a more protracted and negative course. This is consistent with past research that has shown that among bulimic individuals, impulsivity...
serves as a negative prognostic indicator (Keel & Mitchell, 1997). Third, it is also possible that such personality-based features may have significant implications for evidence-based treatments for eating disorders. For example, there is some indication that highly impulsive personality traits predict a poor outcome from individual or group therapy as well as cognitive–behavioral therapy (Herzog, Keller, Lavoni, & Sacks, 1991; Rossiter, Agras, Telch, & Schneider, 1993), which is considered by most to be the most empirically supported treatment for bulimia nervosa.

On a practical level, clinicians must deal with such eating disorder–related comorbidity on a regular basis. For example, clinicians offering cognitive–behavioral therapy for bulimia nervosa may encounter patients who reflect extremes of specific personality clusters (i.e., emotionally dysregulated or impulsive, emotionally constricted or compulsive) as well as other variations in comorbid psychopathology (e.g., posttraumatic stress disorder, treatment-resistant mood or anxiety disorders). Thus, in one case, a clinician may attempt to deliver cognitive–behavioral therapy to an individual with bulimia nervosa who regularly abuses substances, engages in suicidal gestures or parasuicidal behavior, and is sexually promiscuous, but in another case delivers the same treatment to another individual with bulimia nervosa who displays very different comorbidity characterized by extreme perfectionism, symptoms of obsessive–compulsive disorder, refusal to drink alcohol because it has calories and promotes disinhibition, and an absence of sexual experience of any type. Although the cognitive–behavioral therapy may address these two patients’ shared symptomatology of dieting, bingeing, and purging, the clinician may encounter difficulties associated with the wide range of personality and comorbidity features across these two cases. Consequently, newer developments in the treatment of bulimia nervosa have emphasized some degree of flexibility in the application of either specific treatment modules (Fairburn et al., 2003) or interventions based on individual differences in key constructs (e.g., Wonderlich, Mitchell, Peterson, & Crow, 2001), which may better address comorbidity-related treatment effects. In spite of such developments, however, comorbid psychopathology continues to complicate assessment, diagnosis, and treatment of eating disorders.

**Generalizability of Eating Disorder Classifications**

The vast majority of research on classification is based on Caucasian adolescent and young adult women from Western, industrialized nations. However, eating disorders are not restricted to this demographic group. The populations included in studies likely influence the description, definition, and classification of eating disorders. These effects may limit the generalizability and utility of eating disorder classifications used to characterize eating disorders in people from non-Western cultures, ethnic or racial minority groups, men, and children.

**Cross-Cultural Differences**

Attempts to examine evidence of anorexia nervosa across cultures have been marked by debates concerning the definition of the illness. Although there is universal agreement that anorexia nervosa represents a disorder marked by starvation, some experts (Habermas, 1989) have argued that weight phobia is a necessary motivating force behind food refusal, whereas others (Katzman & Lee, 1997; Lee, 1995) have argued that it is not a core feature of anorexia nervosa. Cases of anorexia nervosa–like syndromes have been described in South Africa, Nigeria, Zimbabwe, Egypt, the United Arab Emirates, Iran, China, Japan, Korea, Russia, India, Pakistan, and Malaysia (Keel & Klump, 2003). Although food refusal and emaciation are reported for all cases and are predominantly found in adolescent and young adult women, the presence of weight phobia as a motivating factor is not universal. In comparison to anorexia nervosa, detecting bulimia nervosa outside of a Western context has proven challenging (Keel & Klump, 2003).

Unfortunately, cross-cultural research has focused on the disorders as they have been defined within the *DSM–IV*. Thus, it is not possible to comment on the possible presence of other disorders (e.g., purging disorder, binge-eating disorder, or subjective binge-eating disorder) outside of Western culture. Because binge episodes require large stores of readily edible food, binge-eating disorder, like bulimia nervosa, may be limited to places where food is abundant and easily obtained. In contrast, both purging disorder and subjective binge-eating disorder may be relatively more common in non-Western regions because, like anorexia nervosa, neither requires large quantities of food.

**Differences Among Subgroups Within Cultures**

Eating disorders in racial and ethnic minorities. Research supports important differences among different racial and ethnic minority groups in relation to eating disorders. Black women appear to be less likely to experience body dissatisfaction, disordered eating, and diagnosable eating disorders compared with White American women (Abrams, Allen, & Gray, 1993; Rhea, 1999; Striegel-Moore et al., 2003). In particular, Black women appear to be protected more from anorexia nervosa and bulimia nervosa than from binge-eating disorder (D. E. Smith, Marcus, Lewis, Fitzgibbon, & Schreiner, 1998; Striegel-Moore et al., 2003), suggesting that Black women may not be protected from eating disorders per se but from those disorders in which body image disturbance is a defining feature. In contrast, no specific protection from the development of body image disturbance or disordered eating has been observed in Hispanic (Fitzgibbon et al., 1998; Lester & Petrie, 1998; le Grange, Stone, & Brownell, 1998; Robinson et al., 1996), Asian (Barnett, Keel, & Conoscenti, 2001; Robinson et al., 1996), or Native American samples (Rosen et al., 1988; J. E. Smith & Krejci, 1991; Story et al., 1994). A strong traditional cultural identity appears to protect Black and Hispanic women from disordered eating attitudes and behaviors (Chamorrow & Flores-Ortiz, 2000;
Gowen, Hayward, Killen, Robinson, & Taylor, 1999; Lester & Petrie, 1995; Pumariega, Gustavson, Gustavson, & Motes, 1994). In contrast, in several studies, researchers have failed to find a significant association between acculturation to Western values and disordered eating among Asian women (Gowen et al., 1999; Haudeck, Rorty, & Henker, 1999; Jackson, Keel, & Lee, 2006). Instead, results suggest that cultural factors that contribute to eating disorders may be native to some Asian cultures (Jackson et al., 2006). For example, the virtue of fasting to the point of emaciation is included in the Daoist text Sándong Zhunang (Rieger, Touyz, Swain, & Beumont, 2001). Thus, Asian women may be more likely to be diagnosed with eating disorder not otherwise specified characterized by fasting and very low weight in the absence of weight phobia. Native American groups appear to be at increased risk for obesity, and increased body mass index and feelings of being overweight have been associated with purging among Chipewa and Native Alaskan females (Rosen et al., 1988; Story et al., 1994). Thus, anorexia nervosa may be underrepresented among Native American girls and women, whereas purging disorder may be more common. The failure of a diagnostic system to adequately capture disorders of eating that are experienced by members of ethnic and racial minority groups may have particularly deleterious effects for these individuals. Indeed, women from ethnic and racial minority groups are more likely to have undiagnosed and untreated eating disorders compared with White women (Cachelin, Rebeck, Veisel, & Striegel-Moore, 2001; Cachelin & Striegel-Moore, 2006).

**Eating disorders in men.** Most research suggests that eating disorders in men closely resemble eating disorders in women (Keel, Klump, Leon, & Fulkerson, 1998; Leon, Fulkerson, Perry, Keel, & Klump, 1999). Factors that appear to be more relevant for men, such as involvement in sports that require low weight (Hausenblas & Carron, 1999) and homosexuality (Carlat, Camargo, & Herzog, 1997; Mangweth et al., 1997; Russell & Keel, 2002), may increase the salience of weight control in a group that is otherwise less concerned about being thin. However, there has been speculation that men may be at risk for “reverse anorexia” (Pope, Katz, & Hudson, 1993). Instead of viewing the body as much larger than it really is, men with reverse anorexia nervosa are characterized by viewing their bodies as puny despite their efforts and success at bodybuilding (Pope et al., 1993). This distorted perception contributes to more extreme efforts (excessive exercise, high-protein diets, anabolic steroid use) to increase lean muscle mass and overall body size. Because this condition involves altered eating patterns, the use of extreme weight-control behaviors, and body image disturbance, many of have argued that it represents an eating disorder (Andersen, 1984; McCabe & Ricciardelli, 2001; Pope et al., 1993), albeit one rarely seen in women and not included in current diagnostic classifications.

**Eating or feeding disorders in children.** In the previous Diagnostic and Statistical Manual of Mental Disorders (3rd ed., rev.; American Psychiatric Association, 1987), eating disorders were included within the section on disorders usually first evident in infancy, childhood, or adolescence. However, current eating disorder definitions in the DSM–IV and ICD-10 fail to capture the majority of eating disorders that occur in children (Bryant-Waugh & Lask, 1995; Nicholls, Chater, & Lask, 2000). Some of this is due to criteria that are inappropriate for prepubescent children, such as secondary amenorrhea, or are difficult to assess in children, such as the undue influence of weight or shape on self-evaluation. Similar to problems in the identification of eating disorders in men, much of this is due to the restriction of eating disorder types to those that occur predominantly in late adolescent and young adult women. Nicholls et al. (2000) recommended expanding the classification to include syndromes that may be unique to children. These conditions include food avoidance emotional disorder, selective eating, functional dysphagia, and pervasive refusal syndrome. However, it is unclear where the line should be drawn between feeding disorders and eating disorders in children.

**Summary of generalizability of eating disorders.** The extent to which most individuals with eating disorders receive a diagnosis of eating disorder not otherwise specified represents a problem in the definition and classification of these problems. This problem becomes dramatically worse when the current classification system is applied to individuals from other cultures, individuals from ethnic and racial minority groups, men, or children. The inclusion of binge-eating disorder as a diagnostic category lessens the discrepancy—particularly for Black women and men who may be less likely to experience concerns about weighing too much. However, expansion of current diagnostic criteria and exploration of other types of eating disorders are needed to capture problems that are experienced by most people with clinically significant disorders of eating and to produce a classification system that can be generalized beyond late adolescent and young adult White women from Western cultures.

**Summary**

Future models of eating disorder classification will have a significant impact on empirical research and treatment development for these serious forms of psychopathology. Consequently, it is important to derive a system that maximizes jointly scientific validity and clinical utility. Although the DSM–IV was a significant advance over its predecessors, continued problems with the specific diagnostic criteria and eating disorder diagnoses limit its effectiveness. We agree with other clinicians and scientists (e.g., Barlow, 2005; Hunsley & Mash, 2005; Joiner, Walker, Pettit, Perez, & Cukrowicz, 2005) who argued that evidence-based assessment and classification should be the standard for the development of diagnostic models, in the same way that evidence-based treatment approaches represent standards in the area of interventions. Taxonomic studies of eating disorders, although preliminary, reveal several possible changes in the current DSM–IV eating disorder classification system, including the separation of restricting forms of eating disorders from binge–purge forms and the removal of subclinical forms of anorexia.
nervosa and bulimia nervosa from the eating disorder not otherwise specified category and their inclusion in full syndrome categories. Additionally, there may be several types of eating disorder psychopathology that are not fully recognized in the current DSM-IV system (e.g., binge-eating disorder, purging disorder), which deserve further attention. Also, as with many other psychiatric disorders, comorbid psychopathology complicates diagnosis and classification. It is important to note, however, that before a particular classification scheme is selected, it should be compared with other classification models across a variety of variables to assess diagnostic validity and utility. Finally, eating disorder researchers and clinicians should pay careful attention to the variations in eating disorder psychopathology across sex, ethnic groups, and age groups, which may significantly limit the generalizability of classification models based on demographically limited samples.

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