March, 2003

Do eating disorders co-occur with personality disorders? Comparison groups matter.

Carlos M. Grilo
Charles A. Sanislow
Andrew E. Skodol
John G. Gunderson
Robert L. Stout, et al.

Do Eating Disorders Co-Occur with Personality Disorders? Comparison Groups Matter

Carlos M. Grilo,[1]* Charles A. Sanislow,[1] Andrew E. Skodol,[2] John G. Gunderson,[3] Robert L. Stout,[4] M. Tracie Shea,[4] Mary C. Zanarini,[3] Donna S. Bender,[2] Leslie C. Morey,[5] Ingrid R. Dyck,[4] and Thomas H. McGlashan[1]

[1] Department of Psychiatry, Yale University School of Medicine, New Haven, Connecticut
[2] New York State Psychiatric Institute, Columbia University College of Physicians and Surgeons, New York, New York
[3] McLean Hospital, Harvard Medical School, Boston, Massachusetts
[4] Department of Psychiatry and Human Behavior, Brown University Medical School, Providence, Rhode Island
[5] Department of Psychology, Texas A&M University, College Station, Texas

Accepted 19 February 2002

Abstract: **Objective:** *To assess and compare lifetime rates of occurrence of eating disorders (ED) with four Axis II personality disorders (PD) and with major depressive disorder (MDD) without PD. The eating disorders met criteria outlined in the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV).* **Method:** *Six hundred sixty-eight patients recruited for the Collaborative Longitudinal Personality Disorders Study (CLPS) were reliably assessed with the Structured Clinical Interview for DSM-IV Axis I Disorders and the Diagnostic Interview for DSM-IV Personality Disorders. The distribution of ED diagnoses was compared among four PD study groups (schizotypal, borderline, avoidant, obsessive-compulsive) and a fifth study group with MDD without any PD.* **Results:** *The distribution of lifetime diagnoses of anorexia nervosa (N = 40), bulimia nervosa (N = 56), and eating disorder not otherwise specified (N = 118) did not differ significantly across the five study groups, between the MDD group versus all PD groups, and among the four PD study groups.* **Conclusions:** *ED diagnoses did not differentially co-occur significantly across common Axis I and II disorders. The pattern of ED lifetime co-occurrence rates demonstrates the powerful influence of base rates and highlights that declarations of comorbidity demand significant variations from base-rate patterns. © 2003 by Wiley Periodicals, Inc.* Int J Eat Disord 33: 155–164, 2003.

Key words: *eating disorders; personality disorders; comorbidity*

Correspondence to: Dr. Carlos M. Grilo, Yale Psychiatric Research at Congress Place, Yale University School of Medicine, P.O. Box 208098, 301 Cedar Street (2nd floor), New Haven, CT 06519. E-mail: carlos.grilo@yale.edu
Grant Sponsor: NIMH; Grant numbers: R10 MH 50837, 50838, 50839, 50840, 50850, K05 MH 01645.
Published online in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/eat.10123

INTRODUCTION

The study of diagnostic comorbidity has considerable relevance for clinical management and treatment formulation (Kendall & Clarkin, 1992) and for informing our developing models of the underlying pathophysiology or etiology of disorders. Grilo, Devlin, Cachelin, and Yanovski (1997) highlighted the need to examine diagnostic co-occurrence. Available research has generally reported high rates of diagnostic co-occurrence between eating disorders (ED) and personality disorders (PD), although the marked inconsistency across studies is striking. Previous reviews (Skodol et al., 1993; Vitousek & Manke, 1994) have noted that overall estimates of any PD diagnoses in mixed samples of ED patients have ranged from 27% to 93%. Similar variability characterizes reports of PD co-occurrence across the specific ED diagnoses of anorexia nervosa (AN) and bulimia nervosa (BN; Vitousek & Manke, 1994), as well as reports of specific PD diagnoses in EDs (Skodol et al., 1993). For example, Skodol et al. (1993) and Vitousek and Manke (1994) have noted that the frequency of borderline PD (BPD) in patients with BN have ranged from 2% to 50%.

A number of methodologic issues may account for some of the inconsistencies in the reported co-occurrence rates (Grilo et al., 1997; Rosenvinge, Martinussen, & Ostensen, 2000; Skodol et al., 1993; Vitousek & Manke, 1994). Variations in recruitment, diagnostic criteria, and assessment methods account for some of the inconsistencies in results across studies. In general, studies using self-report assessments and those sampling patient groups characterized by greater severity tend to report higher rates of co-occurrences (Rosenvinge et al., 2000). The use of semistructured diagnostic interviews administered reliably by trained and monitored research clinicians is necessary. However, some critical reviews (Vitousek & Manke, 1994) have noted potential interviewer or investigator biases. For example, patterning of diagnoses may occur when evaluators are not blind to the study goals or have certain biases or expectations regarding associations among disorders.

In addition to methodologic issues, the meaning and definitions of comorbidity should be considered. Possible meanings of comorbidity include random co-occurrence of independent disorders, co-occurrence of various disorders sharing a common etiology or pathophysiology, or disorders that have some type of causal relation between them (Kendall & Clarkin, 1992). Comorbidity may simply reflect artifacts of diagnostic classification schemes (Boyd et al., 1984; Francis, Widiger, & Fyer, 1992; Gangestad & Snyder, 1985) or may result from recruitment methods (Allison, 1993; Berkson, 1946; du Fort, Newman, & Bland, 1993). Defining comorbidity as co-occurring diagnoses that statistically depart from base rates or other frequency expectations represents one important clarification (Kraemer, 1995; Rutter, 1994). Allison (1993) emphasized the importance of selecting relevant comparison groups to provide a context for interpreting statistically significant comorbidity.

To evaluate the basic question of whether EDs are more common in patients with PD than expected by chance, one critical control group (Allison, 1993) would be patients without PD as a control for psychiatric disturbance in general (not, for example, a control group of ''normals''). Several studies have employed diagnostic interviews to assess PD and ED diagnoses as outlined in the 3rd Rev. edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R; American Psychiatric Association [APA], 1987). For example, Oldham et al. (1995) and Skodol et al. (1993) utilized patient comparison groups to provide a context. They reported that the overall rate of PD diagnoses was significantly greater in patients with lifetime ED than in patients without ED. More specifically, schizotypal PD (STPD) and BPD were significantly associated with BN and avoidant PD (AVPD) was significantly associated with both AN and BN. Grilo, Levy,

Becker, Edell, and McGlashan (1996) reported that female ED inpatients had significantly higher rates of PD than female inpatients without ED (83.9% vs. 61.0%). BPD was diagnosed in a significantly higher proportion of ED inpatients than in non-ED inpatients (71.0% vs. 48.6%). No other PD diagnoses were differentially distributed. Zanarini et al. (1998) reported that the lifetime rates of AN and BN did not differ significantly between inpatients with BPD and inpatients with ''other PD'' (20.8% vs. 12.8%, 25.6% vs. 16.8%, respectively). However, the frequency of lifetime eating disorder not otherwise specified (EDNOS) was significantly higher among female inpatients with BPD than among female inpatients with other PD (30.4% vs. 10.0%).

Two conclusions can be drawn from these recent controlled studies. First, PD occur more frequently in ED patients than in patient controls without ED (Grilo et al., 1996; Skodol et al., 1993). Second, ED occur more frequently in patients with BPD than in patients with other PD (Zanarini et al., 1998). However, in contrast to prevailing clinical views that BPD is associated with BN and Cluster C (anxious/fearful) PD are associated with AN, empirical evidence is mixed (Skodol et al., 1993). To build on these findings and more specifically to address the question of comorbidity of ED and PD, a study is needed that considers two additional contrasts, a group of patients (with diagnosable psychopathology) without PD and a group of patients with different forms of PD. This study would also need to consider the well-known problem of PD comorbidity (Becker, Grilo, Edell, & McGlashan, 2000; Grilo, McGlashan, & Oldham, 1998; Grilo, McGlashan, & Skodol, 2000; Stuart et al., 1998).

The Collaborative Longitudinal Personality Disorders Study (CLPS) is a descriptive, prospective, longitudinal, repeated measures study of a treatment-seeking sample of four representative PD that meet criteria outlined in the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994): STPD, BPD, AVPD, and obsessive-compulsive (OCPD), with major depressive disorder without any personality disorder (MDD) serving as a comparison group (Gunderson et al., 2000). In the context of this clinical sample, we describe lifetime patterns of occurrence of DSM-IV ED diagnoses. For further reference, a separate report documented the lifetime patterns of all DSM-IV Axis I/II diagnoses (McGlashan et al., 2000). The current study represents a novel contribution to the literature on the association between PD and ED because it specifically considers the problem of Axis II PD co-occurrence. We constructed specific PD and MDD without PD study groups based on a priori algorithms applied to data generated by semistructured diagnostic interviews plus confirmatory assessments.

METHODS

Participants

Our study group comprised 668 patients enrolled in the CLPS, a naturalistic prospective study with four recruitment sites (Brown University, Columbia University, Harvard University, and Yale University). The overall study aims, design, assessment methodology, and the demographic characteristics of the participants have been detailed by Gunderson et al. (2000). Participants were 18–45 years old and met criteria for one of five study groups (described below). Exclusion criteria included schizophrenia and schizoaffective disorders, active psychosis, confusional states due to organic disorders, post-Electro-Convulsive Treatment status, substance intoxication, or acute withdrawal, IQ estimated below 85, or inability to read English. Of the 668 participants, 64% were female and 36% were male. The sample comprised 76% Caucasians, 11% African Americans, 9% Hispanic-Americans, and 4%

other ethnicity. The mean age of the participants was 32.8 ($SD = 8.1$) years. Participants were generally well distributed across the social classes except for the relatively small representation from the lowest socioeconomic class. Forty-five percent were outpatients in a variety of mental health settings, 11% were psychiatric inpatients, 5% were from medical settings, and 39% were self-referred (from postings and advertisements) and were either in or seeking psychiatric treatment. All participants signed written informed consent after the procedures had been fully explained.

Measures and Creation of Five Study Groups

Participants met criteria for one of four PD study groups (STPD, BPD, OCPD, AVPD) determined by the Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV; Zanarini, Frankenburg, Sickel, & Yong, 1996). Diagnostic instruments do not always yield identical results (Oldham et al., 1992). Therefore, DIPD-IV diagnoses had to receive convergent support from at least one of two contrasting assessment methods: (a) the Personality Assessment Form (PAF; Shea, Glass, Pilkonis, Watkins, & Docherty, 1987) completed independently by treating clinicians blind to our diagnostic findings or (b) the Schedule for Nonadaptive and Adaptive Personality (SNAP; Clark, 1993), a self-report instrument of personality dimensions and pathology.

This diagnostic procedure frequently resulted in several PD diagnoses, including more than one of our four PD diagnostic types. Among the patients diagnosed with a PD, a mean of 1.4 ($SD = 1.6$) PD diagnoses was assigned in addition to the primary PD study group assignment. In these cases, allocation to a PD study group followed an algorithm based on severity (Gunderson et al., 2000). STPD and BPD diagnoses generally had hierarchical precedence over AVPD and OCPD based on their presumed greater severity. When subjects had both STPD and BPD diagnoses (or had both AVPD and OCPD diagnoses) based on the DIPD-IV (and confirmed via the PAF and/or SNAP), allocation to a specific study group was determined based on the number and severity of criteria identified by the multiple methods. The highest number of criteria met on the DIPD-IV took precedence. AVPD or OCPD could be assigned study group status when STPD and/or BPD were present by DIPD-IV criteria so long as the latter were not also endorsed by the PAF and/or SNAP. The MDD comparison group required a current MDD diagnosis based on the SCID-I (First, Spitzer, Gibbon, & Williams, 1996) and no PD diagnosis (operationalized as at least two criteria below threshold for any PD according to the DIPD-IV). In addition, fewer than a total of 15 PD criteria (on the DIPD-IV for all PD diagnoses) was required to create this study group without PD pathology. This algorithm for creating study groups was developed a priori and the research interviewers were blind to the current study.

Interrater and test-retest reliability were described by Zanarini et al. (2000). Briefly, test-retest reliability for the four PD diagnoses of primary focus ranged from kappa = 0.64 (STPD) to kappa = 0.74 (OCPD). Interrater reliability values for the four PD diagnoses were kappa = 0.68 for AVPD and BPD, kappa = 0.71 for OCPD, and kappa = 1.0 for STPD. Interrater reliability for the other DSM-IV PD ranged from kappa = 0.58 to kappa = 1.0. Kappa values for interrater reliability for Axis I disorders ranged from 0.57 to 1.0 and kappa = 0.77 for ED diagnoses.

Statistical Analysis

We report the frequency of lifetime (including current) ED diagnoses overall and in the five study groups. Chi-square tests are employed to determine whether the frequency of

specific ED diagnoses differs significantly across the five study groups ($N = 668$, $df = 4$), whether the frequency differs significantly across the four PD study groups ($N = 573$, $df = 3$), and whether the frequency differs significantly between the PD study groups as a whole and the MDD study group ($N = 668$, $df = 1$). Odds ratios are often the preferred statistic for reporting co-occurrence. However, we did not use them here because rules for assignment to our four PD study groups resulted in a nonnaturalistic sample, which is indicated for use of odds ratios (Kraemer, 1995).

RESULTS

Lifetime Eating Disorder Diagnoses

Table 1 summarizes the distribution of lifetime rates of DSM-IV ED diagnoses in our overall study group. Of the 668 participants, 40 (6.0%), 56 (8.4%), and 118 (17.7%) met lifetime criteria for AN, BN, and EDNOS, respectively. Given that the majority of ED diagnoses occurred in females (consistent with epidemiologic and clinical reports; Grilo et al., 1997), Table 1 also summarizes the distribution of lifetime ED diagnoses separately for the female participants. Of the 423 females, 35 (8.3%), 51 (12.1%), and 94 (22.2%) met lifetime criteria for AN, BN, and EDNOS, respectively.

Lifetime Eating Disorder Diagnoses among the CLPS Study Groups

Table 1 also presents the frequency of specific lifetime DSM-IV ED diagnoses for the five study groups in the overall CLPS group ($N = 668$) and separately for females ($N = 423$). For example, AN had an overall base rate of 6.0% and was diagnosed in 4.7% of the STPD group, 7.4% of the BPD group, 6.3% of the AVPD group, 6.5% of the OCPD group, and 3.2% of the MDD group.

Chi-square analyses that test whether specific ED diagnoses differed in their distribution across the five groups ($df = 4$), across the four PD study groups (df = 3), and between the four PD groups as a whole and the MDD group ($df = 1$) are shown in Table 1. Chi-square analyses conducted separately for AN, BN, and EDNOS revealed no significant differences among the five study groups, among the four PD study groups, or between the MDD group and the four PD groups. This pattern held for all participants ($N = 668$) and separately for all females.

Lifetime ED Diagnoses among Study Groups without Co-Occurring BPD and STPD

Consistent with the research literature that has relied on structured diagnostic assessments (Oldham et al., 1995; Stuart et al., 1998), in addition to the primary PD study group assignment, patients had a mean of 1.4 ($SD = 1.6$) additional diagnosed PD. The STPD group had more PD diagnoses ($M = 2.4$) than the BPD group ($M = 1.9$), which had more PD diagnoses than the AVPD ($M = 1.0$) and OCPD ($M = 0.9$) groups. Whereas about one-half of the AVPD (45%) and OCPD (52%) groups had no additional diagnosed PD, the majority of STPD and BPD patients had at least two additional diagnosed PD. Given these findings, we performed an exploratory series of analyses that considered potential confounding due to overlap between STPD and BPD across the four PD study groups.

We recreated the four PD study groups with no overlap between BPD and STPD (by excluding subjects). This procedure resulted in 499 patients with PD assigned to the STPD without BPD ($N = 61$), BPD without STPD ($N = 166$), AVPD without BPD and STPD ($N = 132$), and OCPD without BPD and STPD ($N = 140$) groups. We then repeated

Table 1. Frequency and percentage of co-occurrence of current and lifetime DSM-IV eating disorders in the five study groups ($N = 668$)

Current/Lifetime Eating Disorders	N	Total (%)	STPD ($N = 86$) n	(%)	BPD ($N = 175$) n	(%)	AVPD ($N = 158$) n	(%)	OCPD ($N = 154$) n	(%)	MDD ($N = 95$) n	(%)	Chi-Square 5 Groups (4PD + MDD) ($N = 668$) ($df = 4$)	p	Chi-Square 4 PD Groups ($N = 573$) ($df = 3$)	p	Chi-Square All PD vs. MDD ($N = 668$) ($df = 1$)	p
All patients (N = 668)																		
Anorexia nervosa	40	(6.0)	4	(4.7)	13	(7.4)	10	(6.3)	10	(6.5)	3	(3.2)	2.37	.67	0.74	.86	1.58	.21
Bulimia nervosa	56	(8.4)	4	(4.7)	23	(13.1)	13	(8.2)	12	(7.8)	4	(4.2)	9.00	.07	5.99	.11	2.51	.11
EDNOS	118	(17.7)	9	(10.5)	38	(21.7)	29	(18.4)	27	(17.5)	15	(15.8)	5.32	.26	4.99	.17	0.27	.60
Female patients (N = 423)			($N = 39$)		($N = 131$)		($N = 104$)		($N = 92$)		($N = 57$)		($N = 423$)		($N = 366$)		($N = 423$)	
Anorexia nervosa	35	(8.3)	3	(7.7)	12	(9.2)	9	(8.7)	8	(8.7)	3	(5.3)	0.88	.93	0.08	.99	0.79	.38
Bulimia nervosa	51	(12.1)	3	(7.7)	22	(16.8)	12	(11.5)	11	(12.0)	3	(5.3)	5.98	.20	2.89	.41	2.87	.09
EDNOS	94	(22.2)	5	(12.8)	32	(24.4)	25	(24.0)	19	(20.7)	13	(22.8)	2.70	.61	2.70	.44	0.01	.91

Note: DSM-IV = 4th edition of the Diagnostic and Statistical Manual of Mental Disorders; STPD = schizotypal personality disorder; BPD = borderline personality disorder; AVPD = avoidant personality disorder; OCPD = obsessive-compulsive personality disorder; MDD = major depressive disorder without any personality disorder; EDNOS = eating disorder not otherwise specified.

all the chi-square analyses separately for the three ED categories (AN, BN, and EDNOS). Consistent with our main analyses reported above, we did not observe any significant differences among the five study groups, among the four PD study groups, or between the MDD group versus the four PD groups. This nonsignificant pattern held for all participants and separately for females only.

DISCUSSION

The current report represents a novel contribution to the literature on the association between PD and ED. First, to provide a context for interpreting the rates of ED in PD, the rates of ED in patients with MDD without PD were utilized. Second, to provide a context for interpreting the rates of ED in PD, several PD diagnoses were considered (including the most frequently studied, i.e., BPD). Third, to control partly for the problem of PD co-occurrence, the rates of ED were compared among four PD groups constructed based on a priori algorithms. Fourth, the creation of the study groups was based on data generated by semistructured diagnostic interviews plus confirmatory assessments. Fifth, the study was designed blind to the aims of the analyses reported here and the interviewers were unaware of the goals of this study.

Our major finding was that the lifetime rates of occurrence of AN, BN, and EDNOS diagnoses among the five study groups (STPD, BPD, AVPD, OCPD, and MDD) varied according to the base rates of the respective diagnoses in the overall study group. AN was present at a base rate of 6.0% and all study group co-occurrences ranged from 3.2% to 7.4%. BN was present at a base rate of 8.4% and all study group co-occurrences ranged from 4.2% to 13.1%. EDNOS was present at a base rate of 17.7% and all study group co-occurrences ranged from 10.5% to 21.7%. These patterns of co-occurrence, that is, patterns that vary with base rate and vary more or less uniformly across groups, are unlikely to represent meaningful comorbidity. The distribution of ED did not differ significantly across study groups. These findings are generally consistent with those reported by Zanarini et al. (1998) who found that among a large inpatient group, patients with BPD did not have significantly higher rates of AN or BN than patients with other PD. However, these findings are at odds with those reported by Skodol et al. (1993) in a smaller study using a different diagnostic instrument.

When interpreting the lack of statistically significant association between variables (i.e., our study groups), the statistical power of the test must be taken into account. In this study, despite the relatively low base rates for some of the disorders of interest, we have adequate power to detect most associations that would be of clinical significance. Using Cohen's effect size categories (Cohen, 1988), our power to detect an association between a pair of disorders ranges from 88% for small effects to 99% for medium or larger effects, with a two-tailed test and alpha level of .05.

Our findings are based on a large study group of treatment-seeking adults recruited for a longitudinal study of PD and MDD without PD. Although our findings may have broad generalizability for clinical populations in terms of the study group's demography and its composition of common Axis I psychiatric and Axis II PD diagnoses (McGlashan et al., 2000), our analyses target the distribution of ED diagnoses in these study groups. Our findings extend those previously reported by Zanarini et al. (1998) who found that lifetime rates of AN and BN did not differ significantly between inpatients with BPD and inpatients with other PD. Unlike Zanarini et al. (1998), we failed to observe a significant difference in the frequency of lifetime EDNOS between BPD and other PD. However,

a comparison to complementary designs that have assessed PD in ED study groups (Rosenvinge et al., 2000) is complex. Clinical populations have a number of potential selection biases and confounds (du Fort et al., 1993). In addition, studies have found differences between clinical samples and community cases of ED (Fairburn, Welch, Norman, O'Connor, & Doll, 1996). For example, Fairburn et al. (1996) found greater psychosocial impairment among BN clinical patients suggestive of personality psychopathology than among community (nontreatment seeking) cases of BN.

Our findings regarding EDNOS also merit brief discussion. EDNOS is the most prevalent category of ED but is also the most infrequently studied (Andersen, Bowers, & Watson, 2001; Grilo et al., 1997). Many patients with significant ED features (with associated distress and impairment) do not meet diagnostic criteria (Andersen et al., 2001; Bunnell, Shenker, Nussman, Jacobson, & Cooper, 1990). However, the failure to meet all criteria for the formal ED categories does not necessarily reflect a lack of clinical significance. For example, research has suggested that failing to meet the amenorrhea criterion for AN (Andersen et al., 2001) or the frequency stipulation of binge eating for binge eating disorder (a specific example of EDNOS; Striegel-Moore et al., 2000) does not result in clinically meaningful demarcations of ''caseness.'' In our study group, EDNOS was the most frequently assigned ED diagnosis (17.7% of entire group and 22.2% of females). These rates are comparable to those previously reported by Zanarini et al. (1998) and suggest the importance for future studies to assess EDNOS.

We reported observed rates of co-occurrence between PD and ED diagnoses as currently defined in the DSM-IV. Our findings allow us to tentatively conclude that although ED are not uncommon in PD, they do not differentially co-occur across certain common disorders. Allison (1993) cogently argued, and demonstrated using data simulation methods, the necessity of appropriate patient control groups for comorbidity research. Our analyses show that patients with PD do not have significantly more ED than patients with MDD but without PD. In addition, patients with specific forms of PD do not differ in their frequencies of ED. This consistent pattern of nonsignificant co-occurrence is unlikely to represent meaningful comorbidity.

These findings have implications for clinicians and researchers. For clinicians, the co-occurrence rates between ED and PD are sufficiently high to warrant careful consideration during routine assessment and treatment planning stages. For researchers, these findings do not support the likelihood of a common mechanism or shared pathophysiology. However, our data do not agree with the literature regarding personality traits and dimensions (e.g., perfectionism; Fairburn, Cooper, Doll, & Welch, 1999; Lilenfeld et al., 2000). Longitudinal tests of both dimensional and categorical models of PD and their relation to ED (at different stages of illness and recovery) will ultimately provide more definitive answers (Grilo et al., 2000).

REFERENCES

Allison, D.B. (1993). A note on the selection of control groups and control variables in comorbidity research. Comprehensive Psychiatry, 34, 336–339.

American Psychiatric Association. (1987). Diagnostic and statistical manual of mental disorders (3rd Rev. ed.). Washington, DC: Author.

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

Andersen, A.E., Bowers, W.A., & Watson, T. (2001). A slimming program for eating disorders not otherwise specified. Reconceptualizing a confusing, residual diagnostic category. Psychiatric Clinics of North America, 24, 271–280.

Becker, D.F., Grilo, C.M., Edell, W.S., & McGlashan, T.H. (2000). Comorbidity of borderline personality disorder with other personality disorders in hospitalized adolescents and adults. American Journal of Psychiatry, 157, 2011–2016.
Berkson, J. (1946). Limitations of the application of the four-fold table analysis to hospital data. Biometrics Bulletin, 2, 47–53.
Boyd, J.H., Burke, J.K., Gruenberg, E., Holzer, C.E., Rae, D.S., George, L.K., Karno, M., Stoltzman, R., McEvoy, L., & Nestadt, G. (1984). Exclusion criteria of DSM-III: A study of co-occurrence of hierarchy-free syndromes. Archives of General Psychiatry, 41, 983–989.
Bunnell, D.W., Shenker, I.R., Nussman, M.P., Jacobson, M.S., & Cooper, P. (1990). Subclinical versus formal eating disorders: Differentiating psychological features. International Journal of Eating Disorders, 9, 357–362.
Clark, L.A. (1993). Schedule for Nonadaptive and Adaptive Personality (SNAP). Minneapolis:University of Minnesota Press.
Cohen, J. (1988). Statistical power analysis for the behavioral sciences. New York:Academic Press.
du Fort, G.G., Newman, S.C., & Bland, R.C. (1993). Psychiatric comorbidity and treatment seeking: Sources of selection bias in the study of clinical populations. Journal of Nervous and Mental Disease, 181, 467–474.
Fairburn, C.G., Cooper, Z., Doll, H.A., & Welch, S.L. (1999). Risk factors for anorexia nervosa: Three integrated case-control comparisons. Archives of General Psychiatry, 56, 468–476.
Fairburn, C.G., Welch, S.L., Norman, P., O'Connor, M., & Doll, H.A. (1996). Bias and bulimia nervosa: How typical are clinic cases? American Journal of Psychiatry, 153, 386–391.
First, M.B., Spitzer, R.L., Gibbon, M., & Williams, J.B.W. (1996). Structured Clinical Interview for DSM-IV Axis I disorders (SCID-I). New York: New York State Psychiatric Institute.
Frances, A., Widiger, T., & Fyer, M.R. (1992). The influence of classification methods on comorbidity. In J.D. Maser & C.R. Cloninger (Eds.), Comorbidity of mood and anxiety disorders (pp. 41–59). Washington, DC: American Psychiatric Association.
Gangestad, S., & Snyder, M. (1985). To carve nature at its joints: On the existence of discrete classes in personality. Psychological Bulletin, 92, 317–349.
Grilo, C.M., Devlin, M.J., Cachelin, F.M., & Yanovski, S.Z. (1997). Report of the National Institutes of Health Workshop on the development of research priorities in eating disorders. Psychopharmacology Bulletin, 33, 321–333.
Grilo, C.M., Levy, K.N., Becker, D.F., Edell, W.S., & McGlashan, T.H. (1996). DSM-III-R axis I and II disorders in inpatients with eating disorders. Psychiatric Services, 47, 426–429.
Grilo, C.M., McGlashan, T.H., & Oldham, J.M. (1998). Course and stability of personality disorders. Journal of Practical Psychiatry and Behavioral Health, 4, 61–75.
Grilo, C.M., McGlashan, T.H., & Skodol, A.E. (2000). Course and stability and course of personality disorders: The need to consider comorbidities and continuities between axis I psychiatric disorders and axis II personality disorders. Psychiatric Quarterly, 71, 291–307.
Gunderson, J.G., Shea, M.T., Skodol, A.E., McGlashan, T.H., Morey, L.C., Stout, R.L., Zanarini, M.C., Grilo, C.M., Oldham, J.M., & Keller, M.B. (2000). The Collaborative Longitudinal Personality Disorders Study: Development, aims, designs and sample characteristics. Journal of Personality Disorders, 14, 300–315.
Kendall, P.C., & Clarkin, J.F. (1992). Introduction to special section: Comorbidity and treatment implications. Journal of Consulting and Clinical Psychology, 60, 833–834.
Kraemer, H. (1995). Statistical issues in assessing co-morbidity. Statistics in Medicine, 14, 721–733.
Lilenfeld, L.R., Stein, D., Bulik, C.M., Strober, M., Plotnicov, K., Pollice, C., Rao, R., Merikangis, K.R., Nagy, K.R., & Kaye, W.H. (2000). Personality traits among currently eating disordered, recovered and never-ill first-degree relatives of bulimic and control women. Psychological Medicine, 30, 1399–1410.
McGlashan, T.H., Grilo, C.M., Skodol, A.E., Gunderson, J.G., Shea, M.T., Morey, L.C., Zanarini, M.C., & Stout, R.L. (2000). The collaborative longitudinal personality disorders study: Baseline axis I/II and axis II/II co-occurrence. Acta Psychiatrica Scandinavica, 102, 256–264.
Oldham, J.M., Skodol, A.E., Kellman, D.H., Hyler, S.E., Doidge, N., Rosnick, L., & Gallaher, P.E. (1995). Comorbidity of axis I and axis II disorders. American Journal of Psychiatry, 152, 571–578.
Oldham, J.M., Skodol, A.E., Kellman, H.D., Hyler, S.T., Rosnick, L., & Davies, M. (1992). Diagnosis of DSM IIIR personality disorders by two structured interviews: Patterns of comorbidity. American Journal of Psychiatry, 149, 213–220.
Rosenvinge, J.H., Martinussen, M., & Ostensen, E. (2000). The comorbidity of eating disorders and personality disorders: A meta-analytic review of studies published between 1983 and 1998. Eating and Weight Disorders, 5, 52–61.
Rutter, M. (1994). Comorbidity: Meanings and mechanisms. Clinical Psychology: Science and Practice, 1, 100–104.
Shea, M.T., Glass, D.R., Pilkonis, P.A., Watkins, J., & Docherty, J.P. (1987). Frequency and implications of personality disorders in a sample of depressed inpatients. Journal of Personality Disorders, 1, 27–42.
Skodol, A.E., Oldham, J.M., Hyler, S.E., Kellman, H.D., Doidge, N., & Davies, M. (1993). Comorbidity of DSM-III-R eating disorders and personality disorders. International Journal of Eating Disorders, 14, 403–416.
Striegel-Moore, R.H., Dohm, F.A., Solomon, E.E., Fairburn, C.G., Pike, K.M., & Wilfley, D.E. (2000). Subthreshold binge eating disorder. International Journal of Eating Disorders, 27, 270–278.
Stuart, S., Pfohl, B., Battaglia, M., Bellodi, L., Grove, W., & Cadoret, R. (1998). The co-occurrence of DSM-III—R personality disorders. Journal of Personality Disorders, 12, 302–315.

Vitousek, K., & Manke, F. (1994). Personality variables and disorders in anorexia nervosa and bulimia nervosa. Journal of Abnormal Psychology, 103, 137–147.
Zanarini, M.C., Frankenburg, F.R., Dubo, E.D., Sickel, A.E., Trikha, A., Levin, A., & Reynolds, V. (1998). Axis I comorbidity of borderline personality disorder. American Journal of Psychiatry, 155, 1733–1739.
Zanarini, M.C., Frankenburg, F.R., Sickel, A.E., & Yong, L. (1996). The Diagnostic Interview for DSM-IV Personality Disorders. Belmont, MA: McLean Hospital and Harvard Medical School.
Zanarini, M.C., Skodol, A.E., Bender, D., Dolan, R., Sanislow, C., Schaeffer, E., Morey, L.C., Grilo, C.M., Shea, M.T., McGlashan, T.H., & Gundersen, J.G. (2000). The Collaborative Longitudinal Personality Disorders Study: Reliability of axis I and II diagnoses. Journal of Personality Disorders, 14, 291–299.