Determining if Borderline Personality Disorder and Bipolar Disorder Are Alternative Expressions of the Same Disorder: Results From the National Epidemiologic Survey on Alcohol and Related Conditions

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ABSTRACT

Objective: To examine whether bipolar disorder and borderline personality disorder represent 2 different disorders or alternative manifestations of the same disorder.

Methods: The data were collected between January 1, 2004, and December 31, 2005. The analyses were conducted between December 21 and December 27, 2010. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed on 25 symptoms assessing depression, mania, and borderline personality disorder from the National Epidemiologic Survey on Alcohol and Related Conditions, a large nationally representative sample of the US adult population (N = 34,653). *DSM-IV* criteria were used for diagnosis of bipolar disorder and borderline personality disorder.

Results: A 3-factor solution provided an excellent fit in both the EFA (root mean square error of approximation [RMSEA] = 0.017, comparative fix index [CFI] = 0.997) and the CFA (RMSEA = 0.024, CFI = 0.993). Factor 1 (Borderline Personality Disorder) loaded on all 9 borderline personality disorder symptoms, factor 2 (Depression) loaded on 8 symptoms of depression, and factor 3 (Mania) loaded on 7 symptoms of mania plus the psychomotor agitation item of the depression section. The correlations between the Borderline Personality Disorder and Depression factors ($r = 0.328$) and between the Borderline Personality Disorder and Mania factors ($r = 0.394$) were lower than the correlation between Depression and Mania factors ($r = 0.538$).

Conclusions: A model with 3 positively correlated factors provided an excellent fit for the latent structure of borderline personality disorder and bipolar disorder symptoms. The pattern of pairwise correlations between the 3 factors is consistent with the clinical presentation of 2 syndromes (depression and mania) that can be characterized as a unitary psychiatric entity (bipolar disorder) and a third syndrome (borderline personality disorder) that is often comorbid with bipolar disorder. The findings converge in suggesting that bipolar disorder and borderline personality disorder are overlapping but different pathologies. These findings may serve to inform ongoing efforts to refine the existing psychiatric nosology and to suggest new avenues for etiologic and treatment research.

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Borderline personality disorder and bipolar disorder are 2 chronic, severe psychiatric disorders.[1,2] Because they often co-occur and many of their symptoms (such as emotional instability and impulsivity) overlap, borderline personality disorder and bipolar disorder are often difficult to distinguish in clinical practice. Some previous studies[3,4] in clinical samples have suggested that borderline personality disorder and bipolar disorder may be overlapping or alternative manifestations of a single underlying disorder, ie, the bipolar spectrum hypothesis, whereas other studies,[5–9] based on major differences between both disorders in phenomenology, family history, longitudinal course, and treatment response, have posited that borderline personality disorder and bipolar disorder constitute 2 independent psychiatric entities. An important clinical and nosologic question is whether borderline personality disorder and bipolar disorder represent 2 different disorders or alternative manifestations of the same disorder. Determining whether borderline personality disorder and bipolar disorder are 2 forms of the same disorder or 2 independent entities is important because the answer may help guide future investigation on the etiology and treatment of these clinical syndromes.

One way to examine whether borderline personality disorder and bipolar disorder are the same or 2 different disorders is to investigate their latent structure, ie, whether the way their symptoms cluster is best explained by 1, 2, or possibly more latent variables. To date, no study has jointly examined the latent structure of bipolar disorder and borderline personality disorder in a clinical or epidemiologic sample to test whether they represent the same disorder or alternative manifestations of the same disorder. If borderline personality disorder and bipolar disorder represent alternative manifestations of the same disorder or 2 levels of severity of the same disorder, their symptoms should be manifestations of the same latent variable or variables. If they constitute different constructs, their symptoms should be the manifestation of 2 or more, possibly correlated, latent variables. To address this question, we drew on data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a large, nationally representative sample of the US adult population.

METHODS

Sample

The NESARC, consisting of Wave 1 (2001–2002) and Wave 2 (January 1, 2004, to December 31, 2005), is a nationally

Clinical Points

- The symptoms of bipolar disorder can be grouped along 2 dimensions, 1 representing depression and the other representing mania, whereas the symptoms of borderline personality disorder appear to align along a single dimension.
- These 3 dimensions are correlated, but the correlation of depression and mania is stronger than the correlation between either of them and borderline personality disorder.
- These results suggest that bipolar disorder and borderline personality disorder are overlapping but different psychiatric disorders.

representative sample of the United States conducted by the US Census Bureau under the direction of the National Institute of Alcoholism and Alcohol Abuse (NIAAA). The target population was the civilian non-institutionalized population aged 18 years and older residing in households in the 50 states and the District of Columbia. The sample in Wave 1 included 43,093 respondents drawn from individual households and group quarters (eg, college quarters, group homes, boarding houses, and nontransient hotels).[10] All procedures, including informed consent, received full ethical review and approval from the US Census Bureau and US Office of Management and Budget. Excluding ineligible respondents (eg, deceased), the Wave 2 response rate was 86.7% (N = 34,653).[10] Wave 2 NESARC weights include a component that adjusts for nonresponse, demographic factors, and psychiatric diagnoses to ensure that the Wave 2 sample approximated the target population, that is, the original sample minus attrition between the 2 waves. As described previously,[10] adjustment for nonresponse was successful, as the Wave 2 respondents and the original target population did not differ in age, race/ethnicity, sex, socioeconomic status, or the presence of any substance, mood, anxiety, or personality disorder.[10] To increase the generalizability of results, and be consistent with current dimensional conceptualizations of psychiatric disorders,[11–13] all participants in Wave 2—not only those meeting full *DSM-IV* criteria for bipolar I disorder, bipolar II disorder, or borderline personality disorder—were included in the present study. This approach avoids including only the most severe cases or those above a prespecified severity threshold.

DSM-IV Diagnostic Interview

All psychiatric assessments were made by trained, nonclinical interviewers according to *DSM-IV* criteria using the Alcohol Use Disorder and Associated Disabilities Interview Schedule–*DSM-IV* Version (AUDADIS-IV), a valid and reliable fully structured diagnostic interview designed for use by professional interviewers. The test-retest reliability and validity of AUDADIS-IV measures of *DSM-IV* disorders have been reported elsewhere.[14,15]

In the AUDADIS, lifetime bipolar disorder is defined as having at least 1 manic, hypomanic, or mixed episode with or without 1 or more major depressive episodes on a lifetime basis. The test-retest reliability for bipolar I disorder and bipolar II disorder are good ($\kappa = 0.59$ and $\kappa = 0.69$).[16] All NESARC respondents were also asked a series of borderline personality disorder symptom questions, mapping the *DSM-IV* criteria[2,17] about how they felt or acted most of the time throughout their lives, regardless of the situation or whom they were with (eg, Have you often become frantic when you thought that someone you really cared about was going to leave you? Have you all of a sudden changed your sense of who you are and where you are headed? Have you often done things impulsively?). They were instructed not to include symptoms occurring only when they were depressed, manic, anxious, drinking heavily, using medications or drugs, experiencing withdrawal symptoms, or physically ill. To receive a diagnosis of borderline personality disorder, respondents had to endorse the requisite number of *DSM-IV* symptom items (5 of 9 items; eg, efforts to avoid real or imagined abandonment, pattern of unstable and intense interpersonal relationships, identity disturbance), at least 1 of which must have caused social or occupational dysfunction. Symptom questions were similar to those appearing in the Structured Clinical Interview for *DSM-IV* Disorders II,[18] the International Personality Disorder Examination, and the Diagnostic Interview for *DSM-IV* Personality Disorders. The test-retest reliability of BPD was $\kappa = 0.71$.[2]

Analytic Strategy

The analyses were conducted between December 21 and December 27, 2010. Because there were no prior results to allow us to firmly hypothesize a priori a specific factor structure, the 25 symptoms (9 symptoms of borderline personality disorder, 9 symptoms of depression, and 7 symptoms of mania) assessed dichotomously were initially submitted to an exploratory factor analysis (EFA) among a weighted random split-half of the sample of the Wave 2 NESARC sample. Factor selection in the EFA was guided by number of items per factor, number of eigenvalues greater than 1, factor loadings greater than 0.4, model interpretability, and goodness of fit indices, including the χ^2 test of model fit, comparative fit index (CFI), and root mean square error of approximation (RMSEA).[19]

In parallel analysis, multiple simulated datasets with the same numbers of observation and variables as the sample to be studied are randomly generated. The mean eigenvalues obtained across those simulated datasets are compared with those from the sample being studied. Factors from the sample being studied with eigenvalues greater than the corresponding eigenvalues from the randomly generated datasets are retained. Thus, the number of factors retained is equal to the number of eigenvalues in the sample being studied that are greater than the mean eigenvalues in the randomly generated datasets.

The factor structure suggested by the EFA was then examined using confirmatory factor analysis (CFA) in the other weighted random split-half sample. All analyses were conducted in Mplus 5.1,[20] which takes into account NESARC sampling weights and design effects when performing

Table 1. Results of the Exploratory Factor Analysis 3-Factor Solution Among the First Split-Half of the NESARC Sample (N = 17,326)[a,b]

	3-Factor Model		
Item	Factor 1 (Borderline Personality Disorder)	Factor 2 (Depression)	Factor 3 (Mania)
Efforts to avoid abandonment	0.721	−0.007	0.038
Unstable interpersonal relationships	0.674	−0.037	0.089
Identity disturbance	0.697	−0.015	0.122
Impulsivity	0.604	−0.004	0.046
Suicidal behavior/self-mutilating behavior	0.676	0.270	−0.015
Affective instability	0.810	0.092	0.015
Feelings of emptiness	0.783	0.154	−0.038
Anger	0.618	−0.008	0.091
Transient paranoid ideation or dissociative symptoms	0.659	0.022	0.147
Depressed mood	−0.002	1.020	−0.065
Diminished interest or pleasure	0.013	0.955	0.009
Weight loss or weight gain	0.001	0.911	0.030
Insomnia or hypersomnia	−0.002	0.958	0.020
Psychomotor agitation or retardation	−0.061	0.457	0.625
Fatigue	−0.020	0.969	−0.010
Worthlessness or excessive guilt	0.102	0.889	0.031
Diminished ability to think	0.014	0.937	0.057
Thoughts of death/suicidal ideation/suicide attempt	0.175	0.829	−0.014
Inflated self-esteem or grandiosity	0.058	−0.054	0.835
Decreased need for sleep	−0.005	0.026	0.895
Increased talkativeness	−0.023	−0.038	0.981
Subjective experience of racing thoughts	0.055	0.112	0.845
Distractibility	0.032	0.101	0.843
Increase activity or psychomotor agitation	−0.025	−0.035	0.991
Excessive involvement in pleasurable activities	0.084	0.061	0.793

[a]Shaded areas in each column indicate the items loading on each factor. For example, the shaded areas in the Factor 1 column indicate which items load on Factor 1.
[b]$\chi^2_{228} = 1{,}329.957$, $P < .001$; root mean square error of approximation = 0.017; comparative fit index = 0.997.
Abbreviation: NESARC = National Epidemiologic Survey on Alcohol and Related Conditions.

parameter and standard error estimates as well as model fit calculations. The default estimator for all analyses was the variance-adjusted weighted least squares, a robust estimator that does not assume normally distributed variables and provides the best option for modeling categorical or ordered data.[21]

To focus on the latent structure of bipolar disorder and borderline personality disorder, symptoms of other disorders were not included in these analyses. Analyses of the latent structure of other disorders have been previously presented,[22–24] as have analyses of overall structure and predictive validity of disorders.[25]

RESULTS

Exploratory Factor Analyses

The EFA indicated that there were 3 eigenvalues ≥ 1.0. The eigenvalues were 3.178, 3.531, and 2.765 (Table 1). All remaining eigenvalues were smaller than 1.0 (between 0.084 and 0.80). One-factor ($\chi^2_{275} = 15{,}418.986$, $P < .001$, RMSEA = 0.056, CFI = 0.959), 2-factor ($\chi^2_{251} = 6{,}321.090$, $P < .001$, RMSEA = 0.037, CFI = 0.984), and 3-factor ($\chi^2_{228} = 1{,}329.957$, RMSEA = 0.017, CFI = 0.997, $P < .001$) solutions were obtained. Four- and 5-factor solutions were also examined, but were unacceptable because several items had loadings smaller than 0.4. The 3-factor solution was also easily interpretable. In the 3-factor solution, factor 1 (Borderline Personality Disorder) included all 9 borderline personality disorder symptoms, factor 2 (Depression) included 8 symptoms of depression, and factor 3 (Mania) included the 7 symptoms of mania/hypomania plus the psychomotor agitation item assessed as part of the depression section.

Confirmatory Factor Analyses

A CFA with the 3 factors derived from the symptoms identified in the EFA obtained good fit indices ($\chi^2_{272} = 2{,}921.514$, $P < .001$, RMSEA = 0.024, CFI = 0.993) (Table 2). The correlations between the Borderline Personality Disorder and Depression factors ($r = 0.328$) and between the Borderline Personality Disorder and Mania factors ($r = 0.394$) were smaller than the correlation between the Depression and Mania factors ($r = 0.538$).

DISCUSSION

To our knowledge, this study is the first to jointly examine the latent structure of the symptoms of bipolar disorder and borderline personality disorder in a nationally representative sample. We found that a model with 3 positively correlated factors (ie, dimensions) provided an excellent fit for the latent structure of borderline personality disorder and bipolar disorder symptoms. These findings indicate that the dimensions underlying bipolar disorder and borderline

Table 2. Results of the Confirmatory Factor Analysis for the 3-Factor Model in the Second Split-Half of the NESARC Sample (N = 17,327)[a]

Item	Estimate	SE	*P*
Borderline Personality Disorder			
Efforts to avoid abandonment	1.000	0.000	NS
Unstable interpersonal relationships	0.957	0.031	<.0001
Identity disturbance	1.065	0.041	<.0001
Impulsivity	0.853	0.029	<.0001
Suicidal behavior/self-mutilating behavior	1.235	0.039	<.0001
Affective instability	1.222	0.031	<.0001
Feelings of emptiness	1.206	0.032	<.0001
Anger	0.925	0.032	<.0001
Transient paranoid ideation or dissociative symptoms	1.094	0.031	<.0001
Depression			
Depressed mood	1.000	0.000	NS
Diminished interest or pleasure	0.984	0.004	<.0001
Weight loss or weight gain	0.947	0.005	<.0001
Insomnia or hypersomnia	0.988	0.004	<.0001
Fatigue	0.974	0.004	<.0001
Worthlessness or excessive guilt	0.964	0.004	<.0001
Diminished ability to think	0.994	0.004	<.0001
Thoughts of death/suicidal ideation/suicide attempt	0.904	0.005	<.0001
Mania			
Psychomotor agitation or retardation	1.000	0.000	NS
Inflated self-esteem or grandiosity	0.765	0.018	NS
Decreased need for sleep	0.859	0.011	<.0001
Increased talkativeness	0.889	0.011	<.0001
Subjective experience of racing thoughts	0.904	0.010	<.0001
Distractibility	0.881	0.010	<.0001
Increase in activity or psychomotor agitation	0.926	0.008	<.0001
Excessive involvement in pleasurable activities	0.823	0.013	<.0001

[a] $X^2_{272} = 2{,}921.514$, $P < .001$; root mean square error of approximation = 0.024; comparative fit index = 0.993.
Abbreviation: NESARC = National Epidemiologic Survey on Alcohol and Related Conditions, NS = not significant

personality disorder are not separate entities, but rather correlated constructs and, therefore, greater severity in one dimension increases the likelihood of having symptoms in the other dimensions. Furthermore, although the correlations between the factors were all positive, the correlation between the Depression and Mania factors was higher than the correlation between the Borderline Personality Disorder factor and the other 2 factors. This pattern of correlation is consistent with the existence of 3 syndromes, 2 of which (depression and mania/hypomania) often alternate or co-occur and constitute a unitary psychiatric entity (bipolar disorder) and a third syndrome (borderline personality disorder) that is often comorbid with bipolar disorder[1] and shares important clinical manifestations with it, but represents an independent nosologic entity. Because our study was not limited to individuals meeting full diagnostic criteria for bipolar disorder or borderline personality disorder, its findings are also applicable to those meeting some, but not all, criteria for those disorders.

The relatively high correlations of the Borderline Personality Disorder factor with the Depression and Mania factors is consistent with results from studies that have documented a high degree of overlap in the prevalence, comorbidity, and symptoms of borderline personality disorder and bipolar disorder.[2,6,26] For example, some studies have found that both borderline personality disorder and bipolar disorder increase the risk for family history of depression, antisocial personality, and substance use disorders, suggesting that those disorders may have shared genetic variance.[27–29] Some studies have also documented that borderline personality disorder and bipolar disorder share some environmental risk factors, including early trauma, childhood sexual abuse, childhood emotional abuse, childhood parental loss, and disturbed family environment.[7,30–34] Twin studies using bivariate modeling techniques may be able to quantify the proportion of genetic variance shared by borderline personality disorder and bipolar disorder and the relative contribution of unique and shared environmental factors to the development of each disorder.

Our findings have clinical and etiologic implications. From the etiologic point of view, similarities between borderline personality disorder and bipolar disorder may help identify risk factors that may be shared by both disorders and possibly by a broader range of psychiatric disorders. For example, childhood trauma may increase vulnerability to impulsive aggression or suicidal behavior of individuals with borderline personality disorder or bipolar disorder.[29,35] It will be important to determine to what extent differences between borderline personality disorder and bipolar disorder are due to differences in the presence, time of exposure, or effect of specific risk factors.

From the clinical point of view, the finding that Borderline Personality Disorder factor was moderately correlated with the Depression and Mania factors suggests some degree of overlap between borderline personality disorder and bipolar disorder and is consistent with the fact that some, but not all, treatments that are efficacious for one disorder may be useful for the other. For example, substantial evidence supports the use of several anticonvulsant and antipsychotic drugs in the treatment of bipolar disorder.[36–38] Although medications have limited utility in borderline personality disorder,[39] recent studies have suggested that these drugs may also help reduce impulsivity and affective lability as well as irritability and aggressive behavior in borderline patients.[40–45] On one hand, according to most clinical guidelines, specific psychotherapies, like dialectical behavioral therapy, are the treatment of choice for borderline personality disorder and are not indicated for the treatment in bipolar disorder per se.[46–50] On the other hand, the efficacy of psychoeducation has been shown in the treatment of bipolar disorder.[51,52] As our understanding of the similarities and differences in the etiology of borderline personality disorder and bipolar disorder improves, it may be easier to predict which treatments are likely to be effective for both disorders.

Our study should be interpreted in light of several limitations common to most large-scale surveys. First, information on criteria was based on self-report and not confirmed by collateral informants. Second, because the NESARC sample included only civilian households and group quarters populations 18 years and older, information was unavailable on

adolescents or individuals in prison. Third, our analysis is limited to the factor structure of borderline personality disorder and bipolar disorder, which may provide only a partial account of the relationship between these disorders. Fourth, *DSM-5* was not available in the time of the design of the study, so interviews based on *DSM-IV* criteria were used. Neuroimaging, genetic epidemiologic, and longitudinal studies may help provide complementary information on the relationship between borderline personality disorder and bipolar disorder.

Despite these limitations, this study is the first to examine the distinction between borderline personality disorder and bipolar disorder using exploratory and confirmatory factor analyses, and the relevance of its results is enhanced by the size and national representativeness of the sample. Borderline personality disorder and bipolar disorder appear to represent correlated but clearly differentiated latent constructs. These findings may serve to inform ongoing efforts to refine the existing psychiatric nosology and to suggest new avenues for etiologic and treatment research.

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