Latent Structure Analysis of DSM-IV Borderline Personality Disorder Criteria

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The aim of this study was to evaluate the structure of DSM-IV borderline personality disorder (BPD) criteria. The study group consisted of 564 consecutively admitted inpatients and outpatients. BPD criteria discriminatory power was tested by using corrected item-to-total and item-to-diagnosis correlations. Weighted least-squares (WLS) confirmatory factor analysis (CFA) was used to assess the fit of DSM-IV BPD unidimensional model. The categorial model of BPD was tested by exploratory latent class analysis (LCA). Item analysis suggested a hierarchy in BPD criteria discriminatory power, even if with different rank order with respect to the DSM-IV model. CFA showed a unifactorial structure with congeneric items as the best fitting model for DSM-IV BPD criteria ($\chi^2 = 18.89$, $df = 27$, $P > .87$). LCA showed evidence for three latent classes; heterogeneity was observed only among subjects falling below DSM-IV diagnostic threshold for BPD. These results support the categorial model of BPD, even if with several differences with respect to DSM-IV.

BORDERLINE PERSONALITY DISORDER (BPD) is one of the most studied personality disorders (PDs).[1,2] DSM-III[3] and DSM-III-R[4] described BPD as a unidimensional, categorial PD. It should be stressed that unidimensionality does not mean homogeneity. A unidimensional model of BPD simply means that all the diagnostic criteria measure, and belong to, a single diagnostic entity (namely, BPD), even if with different prevalence and diagnostic efficiency. None of the criteria can be considered as pathognomonic, i.e., as the necessary and sufficient condition for diagnosing the disorder. With respect to diagnostic criteria, the unidimensional model hypothesizes a certain degree of variability (i.e., heterogeneity) within BPD subjects, but not the existence of distinct subpopulations of BPD. Moreover, DSM-III-R considered BPD, as well as several other mental disorders, as a diagnostic class with clinical features which make it clearly recognizable and establish clear boundaries with respect to other axis I and II diagnoses (i.e., as a categorial construct).

However, this model of BPD raised much controversy. Some studies based on exploratory factor analysis (EFA) or cluster analysis questioned the assumption of unidimensionality of BPD, suggesting the presence of three to four subsets of DSM-III-R BPD criteria.[5-7] These data suggested the presence of clinical heterogeneity within the BPD criteria set, as well as within BPD patients.[8] However, the structure of BPD criteria subsets could not be completely replicated between different studies due to different BPD assessment, sample size and characteristics, and statistical analyses. Moreover, none of these studies statistically assessed the goodness-of-fit of a specific BPD multidimensional model (i.e., distinct subsyndromes of BPD), as well as its superiority to the DSM-III-R unidimensional model.

A second criticism concerns the categorial model of BPD adopted by DSM-III-R. Several authors questioned the validity of the categorial model of PDs, suggesting a shift towards dimensional conceptualization and assessment.[9-13] Few studies were performed specifically to test the hypothesis of BPD categorial structure[14,15]; their results were contrasting,[13] because they did not support the categorial hypothesis of BPD. At the same time, they did not find clear evidence of a dimensional model. Many taxometric techniques were used, ranging from cluster analysis to admixture and maximum covariation analysis.[11,13] Latent class analysis (LCA), a statistical method particularly useful in detecting latent taxons when categorial manifest variables (such as DSM-III-R PD criteria) are used,[16] was never applied to BPD criteria.[13]

It should be stressed that these studies were highly relevant, because they showed that the categorial model of necessary and sufficient conditions was not optimal for BPD, and raised the

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scientific inquiry on this topic to a higher level. Their results suggested the need for further studies, based on different statistical techniques, and played a major role in the aims and design of this study.

With the introduction of the DSM-IV,[17] the debate on these topics raised to a deeper level. Despite the suggestion of adopting a dimensional model,[11,13] DSM-IV maintained a categorial model for BPD, as well as for other PDs. According to criticisms to DSM-III-R polythetic format[11] and psychometric studies of the diagnostic efficiency of the individual PD criteria,[18] polythetic PD diagnoses were slightly modified in DSM-IV by entering a hierarchy in PD criteria. Research findings played a major role in entering a new BPD diagnostic feature (stress-related paranoid ideation or severe dissociative symptoms).

Starting from these considerations, the present study was performed to provide the following: (1) an analysis of the diagnostic efficiency of the individual DSM-IV BPD criteria; (2) a test of the fit of DSM-IV unidimensional model of BPD, and its superiority to other proposed models; and (3) an evaluation of the presence and number of latent taxons underlying the DSM-IV BPD criteria.

METHOD

The study group consisted of 564 subjects consecutively admitted from January 1995 to May 1996 to the Medical Psychology and Psychotherapy Unit of the Scientific Institute H San Raffaele of Milan, Italy. None of these subjects met any of the following exclusion criteria: (1) DSM-IV axis I diagnosis of schizophrenia, schizoaffective disorder, delusional disorder, or delirium, dementia, amnestic, and cognitive disorder not otherwise specified (NOS); (2) IQ $\leq$ 75; or (3) education level lower than elementary school.

Two hundred thirty-nine (42.4%) subjects were male and 325 (57.6%) female; mean age was 29.92 (SD = 8.50) years. Three hundred sixty-eight (65.2%) were inpatients and 194 (34.8%) outpatients. Four hundred eighteen (74.2%) subjects received at least one DSM-IV axis I diagnosis; most frequently diagnosed DSM-IV axis I disorders were anxiety disorders (n = 178, 31.6%), eating disorders (n = 93, 16.5%), mood disorders (n = 63, 11.2%), substance abuse/dependence disorders (n = 59, 10.5%), and brief/NOS psychotic disorder (n = 35, 6.2%). Twenty-six subjects (4.6%) received other axis I diagnoses (e.g., paraphilias, sleep disorders, etc.). The cumulative frequency and percentage of subjects with specific DSM-IV axis I diagnoses exceeded the frequency and percentage of subjects with at least one DSM-IV axis I diagnosis because of multiple axis I diagnoses.

No significant difference was observed between inpatients and outpatients with respect to demographic variables; as expected, inpatients showed a significantly higher frequency of axis I diagnoses (n = 331, 89.9%) than outpatients (n = 87, 44.4%): Yates-corrected $\chi^2 = 135.986$, $df = 1$, $P < .001$. With respect to BPD diagnosis, no significant difference was observed between inpatients (n = 63, 17.1%) and outpatients (n = 37, 18.9%): Yates-corrected $\chi^2 = 0.164$, $df = 1$, $P > .60$.

After a complete description of the study to the subjects, written informed consent was obtained.

DSM-IV BPD criteria and diagnosis were assessed using Structured Clinical Interview for DSM-IV axis II Personality Disorders, Version 2.0 (SCID-II),[19] a semistructured interview designed to diagnose the DSM-IV PDs. SCID-II was preceeded by the administration of its self-report screening questionnaire (PQ). SCID-II was administered by eight trained raters blind to the hypothesis of this study, in the context of patient routine diagnostic assessment. Both SCID-II and PQ were translated into Italian; the adequacy of the Italian translation was checked through backversions by a professional English mother-tongue translator. Subjects with axis I diagnoses were administered SCID-II at acute symptom remission by expert, trained raters.

SCID-II interrater reliability was evaluated in a subsample composed by the first 231 consecutively admitted inpatients and outpatients. A pairwise interviewer-observer design was used to assess interrater reliability. Raters were paired randomly. Observers were explicitly not allowed to interfere with the interview. Both raters sat in on the interviews. Each rater served approximately equally as interviewer and observer. SCID-II was rated independently by interviewer and observer.

Shrout and Fleiss intraclass correlation coefficient 1.1 (ICC)[20] was used to evaluate interrater reliability of SCID-II PD dimensional diagnoses, while interrater reliability of dichotomously scored DSM-IV BPD criteria and categorial PD diagnoses was assessed by computing Cohen κ.

DSM-IV BPD diagnosis proved to have excellent interrater reliability (ICC = .952, κ = .909). Also, the individual DSM-IV BPD diagnostic criteria showed adequate interrater reliability (median κ = .868; Table 1). All other DSM-IV PD diagnoses presented satisfactory interrater reliability coefficients (median ICC = .937, minimum = .901 [Depressive PD], maximum = .982 [antisocial PD]; median κ = .912, minimum = .651 [Depressive PD], maximum = .981 [Narcissistic PD]). However, it should be considered that both SCID-II format and pairwise interview design could have spuriously increased the agreement between raters.

The presence of significant association between DSM-IV BPD and other PDs was assessed using phi coefficient. Nominal alpha level was controlled by using the Bonferroni procedure (.05/11 = .0045).

DSM-IV BPD criteria diagnostic accuracy was assessed by computing item-total (no. of criteria) point-biserial correlation coefficient ($_cr_{pbi}$) and item-diagnosis phi coefficient ($_c\phi$), both corrected for overlap.[21,22] Within each set of item-total and item-diagnosis comparisons, nominal alpha level was stabilized using Bonferroni correction (.05/9 = .0056). Correlations (ϕ coefficients) between DSM-IV BPD criteria and other DSM-IV PD diagnoses were computed to evaluate BPD criteria discriminatory power.

Sensitivity, specificity, efficiency (i.e., total probability of making a correct statement about the presence or absence of a particular disease; Youden J* was used as efficiency measure), and positive (PPP) and negative (NPP) predictive power of the individual BPD criteria could not be computed from standard

*Youden J = (sensitivity + specificity) − 1.