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Organization of co-occurring Axis II features in borderline personality disorder

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Objectives. Considerable heterogeneity exists in the comorbid Axis II features that frequently accompany borderline personality disorder (BPD). These features have potential to be meaningfully organized, relate to specific BPD presentation, and have implications for treatment process and outcome. The present study explored patterns of Axis II comorbidity in order to identify subtypes of BPD.

Design. A well-defined sample of 90 patients diagnosed with BPD was recruited as part of an RCT study. Participants were administered the International Personality Disorder Examination (Loranger, 1999) to diagnose BPD and assess comorbid Axis II features. Other measures were also administered to assess aspects of current work and relationship functioning, symptomatology, and self-concept.

Methods and results. Q-factoring was used to develop subtypes based on commonly occurring Axis II profiles, identifying three: Cluster A (elevated paranoid and schizotypal features), Cluster B (elevated narcissistic and histrionic features), and Cluster C (elevated avoidant and obsessive–compulsive features). An additional factor analysis revealed two dimensions underlying the comorbid features identifiable as: extraversion versus introversion and antagonism versus constraint. Validity of these two maps of comorbidity was explored in terms of the BPD criteria themselves, as well as on work and relationship functioning, identity diffusion, views of self and others, positive and negative affect, behavioural dyscontrol, and symptomatic distress.

Conclusions. Clinically meaningful subtypes can be identified for BPD based on co-occurring Axis II features. Further research is needed to replicate and further establish base-rates of these subtypes as well as their differential implications for treatment.

Since its creation by DSM-III in 1980, borderline personality disorder (BPD) has been the focus of intense investigation in reference to its psychopathology, phenomenology, and treatment. Probably the most vexing problem, and one that impedes advance in the area, is the heterogeneity of the patient group that meets criteria for the disorder. The polythetic definition of BPD, with any five out of nine criteria required for diagnosis,

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leads to heterogeneity in terms of the number and nature of its constituent features. Compounding the problem still further, BPD shows extensive comorbidity with all of the other personality disorders (PDs) as well as multiple diagnoses on Axis I of the DSM.

Numerous studies have mapped the comorbidity of BPD with Axis I symptom disorders and with the other personality disorders. For PD, various patterns of more versus less comorbidity have emerged across different samples, with BPD showing some degree of overlap with all other PD categories. In a study involving a large in-patient sample (Zanarini *et al.*, 1998), Cluster A (odd, eccentric), Cluster B (dramatic, erratic), and Cluster C (anxious, fearful) subsets of disorder were all observed to co-occur with BPD. In addition, Cluster A and C disorders were significantly more common when compared with other Axis II controls. Gender differences were also observed in the sample with male BPD manifesting more comorbidity with paranoid, passive–aggressive, narcissistic, sadistic, and antisocial personality disorders. In another in-patient sample, adult BPD showed significant comorbidity only with another Cluster B disorder, while adolescent BPD displayed a broader pattern of comorbidity, encompassing Clusters A and C (Becker, Grilo, Edell, & McGlashan, 2000). In a study using a large sample of out-patients, BPD was associated primarily with avoidant, paranoid, and dependent diagnoses (Conklin & Westen, 2005). Findings from Axis II assessment of Spanish-speaking out-patients with substance use disorders (Grilo, Anez, & McGlashan, 2002) showed a greater co-occurrence of BPD with antisocial, avoidant, and depressive PD for men, but not for women.

'Comorbidity' has a number of possible meanings, each with a different implication for theories of PD that might address overlap, but usually implying that each co-occurring disorder is a distinct entity (Clarkin & Kendall, 1992; Lilienfeld, Waldman, & Israel, 1994). An intriguing alternative explanation for co-occurrence is that multiple disorders may reflect a single set of underlying problems or processes in what has been called a 'consanguine' relationship (i.e. 'of the same lineage or origin', following Tyrer, 1996). Similarly, it has been argued that there may be some common domain, or perhaps a few intersecting dimensions of personality pathology that have no true separation at the phenotypic level (Depue & Lenzenweger, 2001). From these latter points of view, typical use of the term 'comorbid' is odd, being applied to categories that are not expected (nor convincingly shown by empirical work) to be separate. In light of such considerations, Tyrer (2005) has argued that measurement of Axis II pathology should place more emphasis on the overall number and severity of features rather than their specific type. Other theorists have predicted complex patterns of linkage and association between various Axis II feature sets based on psychosocial learning history, basic dimensions of personality, biology, and more (e.g. Benjamin, 1996; Clarkin & Posner, 2005; Kernberg & Caligor, 2005; Widiger, Trull, Clarkin, Sanderson, & Costa, 2002).

Despite problems with internal and external feature heterogeneity, evidence suggests that BPD can be meaningfully viewed as a coherent diagnostic construct (Clifton & Pilkonis, 2007; Johansen, Karterud, Pedersen, Gude, & Falkum, 2004; Sanislow *et al.*, 2002). This creates a paradox in that while BPD can be seen from a psychometric standpoint as representing a single entity, clinicians are nevertheless working with patients who show a diversity of specific presenting symptoms and problems, despite receiving the same diagnosis. A unitary approach to the treatment of BPD may not be indicated despite accumulating evidence in favour of taxonicity. Clifton and Pilkonis acknowledge this paradox in a recent study by concluding that BPD is a single diagnostic entity, but recommending exploration of useful subtypes of BPD in

terms of variables that 'supplement' the DSM criteria. Descriptive research documenting patterns of PD criteria co-occurrence in well-defined, representative samples is a necessary step in such a process. In the present study, we address the problem in an out-patient sample of BPD patients by exploring for prototypic Axis II comorbidity/ co-occurrence[1] profiles. In doing so, we attempt to go beyond the simple tabulation of BPD comorbidity with other Axis II disorders. Instead, we use an approach that parallels other profile-based work used to address Axis II as a whole (e.g. Westen & Shedler, 2000) including subthreshold elevations on PD scales. Our goal is to identify the more common subtypes of BPD based on profile-based patterns of feature overlap across Axis II disorders.

Method

Participants

The participants were 90 out-patients included in a randomized control trial comparing three different psychotherapies for BPD (Clarkin, Levy, Lenzenweger, & Kernberg, 2004, 2007). In this context, the current exploration represents an initial phase of our attempt to identify personality-based moderators of treatment response. Potential study participants were referred to from a variety of clinical sources (e.g. psychiatric hospitals, private practices, employee assistance programmes) in and around New York City to be screened for participation in a study investigating psychosocial treatments for BPD. Trained interviewers, primarily postdoctoral fellows in psychology, conducted assessments prior to assignment to treatment condition.

Out of the 90 participants in the present study, 83 (92.2%) were females. Marital status: 7 (8%) were married, 40 (44%) were divorced, and 43 (48%) were single, never married. The participant age ranged from 18 to 51 years ($M = 30.9$, $SD = 7.9$). The racial/ethnic distribution of the sample was as follows: Caucasian, 61 (68%); African-American, 9 (10%); Hispanic, 8 (9%); Asian, 5 (6%); Other, 7 (8%). Education: Less than high school, 3 (3%); High school diploma or GED, 7 (8%); AA degree or some college, 34 (38%); Bachelors degree completed, 29 (32%); Graduate degree completed, 17 (19%).[2]

Each participant included in the study received a diagnosis of BPD based on DSM-IV criteria as assessed by the International Personality Disorders Examination (IPDE; Loranger, 1999). The IPDE is a well-validated semi-structured interview for DSM-IV Axis II. Items assessing DSM personality disorder criteria are presented based on common themes or domains of experience being assessed (e.g. interpersonal relationships, affect, impulse control, etc.), rather than disorder by disorder. High levels of reliability were obtained for the number of BPD criteria met by each participant (single rater ICC[1, 1] = 0.83). An acceptable level of reliability for BPD categorical diagnosis was also obtained ($\kappa = 0.64$). A high base-rate of BPD was noted for our referrals and helps ensure that the sample contains valid BPD diagnoses (Critchfield, Levy, & Clarkin, 2007).

In addition to diagnosing BPD, the IPDE was used to assess for the presence of co-occurring Axis II features. Dimensional scores for each personality disorder listed in the DSM-IV, transformed to range from 0 to 1, were used in the present set of analyses. Values fell in the good to excellent range, with ICC(1,1), ranging from .67 (schizotypal)

[1] *Given the ambiguity that currently exists, we will use the more common, but theory-laden, term 'comorbid' interchangeably with the more strictly descriptive term 'co-occurring'.*

[2] *One participant had missing data for race/ethnicity and education.*

to .93 (paranoid). The mean ICC(1,1) across scales was 0.82 ($SD = 0.10$). Specific BPD criteria also showed good reliability with a mean ICC(1,1) of .70. Reliability of the IPDE dimensional scores in this study is similar to validation work with the instrument in diverse clinical samples (Critchfield *et al.*, 2007; Loranger, 1999).

A range of BPD pathology was included in the study. Participants meeting BPD criteria were excluded only if they also met criteria for psychosis, mental retardation, current uncontrolled major depression or substance dependence (history of these was not a rule-out), or any history of Bipolar I as assessed with the SCID-I interview for DSM-IV (First, Spitzer, Gibbon, & Williams, 1996).

Consistent with the expectation for high levels of psychiatric comorbidity and impairment in BPD, the participants had an average of 2.7 lifetime DSM-IV diagnoses on Axis I, with substantial amounts of mood (77%), anxiety (55%), substance use (38%), and eating disorders (34%) being present in participant histories assessed with SCID-I. They showed an average of 1.5 Axis II diagnoses in addition to their primary BPD diagnosis on the IPDE. The global assessment of functioning (GAF) score from Axis V of DSM-IV showed a mean of 50 ($SD = 10$) at the time of assessment. The average age of the first therapeutic contact (whether for psychotherapy, psychiatric medication, or hospitalization) was 17 ($SD = 7$ years). The mean lifetime suicide attempts for the sample was 1.2 ($SD = 1.8$) with a non-normal distribution ranging from 0 to 10 attempts (median attempts is 1.0). Non-suicidal self-harm or 'parasuicide' showed wide variability among the participants and a non-normal distribution, with a mean of 71.6 ($SD = 248.0$) but a median of 1.5 episodes (range from 0 to 1,350). The mean number of lifetime psychiatric hospitalizations was 1.7.

Supplementary measures

Prior to randomization to a treatment cell, an extensive battery of self-report questionnaires and interview-based measures were administered to each participant individually. Scales from a subset of these, detailed below, were selected for the present analysis to aid in interpretation and evaluation of findings derived from the IPDE. Domains of interest were broad-based to encompass areas impacted by PD, and included measures of (1) work functioning; (2) relationship functioning; (3) identity/views of self and others; (4) positive and negative affect; (5) behavioural dyscontrol (vs. constraint); and (6) symptomatic distress.

Relevant scales were selected from the following well-established measures: Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), Barratt Impulsivity Scale – 11 (BIS; Patton, Stanford, & Barratt, 1995), Brief Symptom Inventory (BSI; Derogatis, 1993), Experiences in Close Relationships Scale (ECR; Brennan, Clark, & Shaver, 1998), Global Assessment of Functioning (GAF) from DSM-IV, Inventory of Personality Organization (IPO; Clarkin, Foelsch, & Kernberg, 2001), Suicide Attempt Self-Injury Interview (SASII: Linehan, Comtois, Brown, Heard, & Wagner, 2006), and the Social Adjustment Scale (SAS; Weissman & Bothwell, 1976). In addition, a summary rating of functioning in separate domains of Work (school and/or employment) and Love (intimate relationships) were derived from responses to the SAS. The intra-class correlation coefficients to assess the reliability between two independent raters in scoring of these summaries were .99 and .98, respectively. Higher order scales from the Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982) were used to capture positive and negative affect as well as constraint.

Statistical analysis

Two approaches were used to explore Axis II BPD heterogeneity. The first focused on the identification of prototypic profiles based on Axis II features that co-occurred with the BPD diagnosis. The second approach identified dimensions underlying the co-occurring features through factor analysis. Overall results were compared to scales from the measures listed above to explore the validity of the resulting maps of Axis II heterogeneity in BPD.

Approach 1: Common prototypes generated from IPDE profiles

Q-factoring was used to generate prototypic Axis II profiles of comorbidity. Originally developed as a variant of factor analysis by Thomson (1935), Q-factoring is akin to cluster analysis in the sense that it can be used to group participants together based on the similarity of their profiles. The procedure begins with the creation of a matrix populated by within-subject correlations for every pairing of participant profiles, in this case from the IPDE. This 'Q-matrix' is then subjected to conventional factor analytic techniques.[3] For this exploratory study, principal components analysis followed by Varimax rotation was performed to generate initial prototypes from the Q-matrix. Scree plots, eigenvalues, and the percentage of variance accounted for, as well as their overall interpretability, were used to aid in making initial decisions about the number of Q-factors to extract.[4] Following extraction, prototype profiles were constructed for interpretation by weighting and averaging the case profiles significantly loading on (i.e. matching) the prototype using weights derived from Q-factor loadings for each participant and reliability estimates for the scales (for more on this method, see Brown, 1980, and McKeown & Thomas, 1988).

Q-factoring was chosen over other cluster analytic strategies for two reasons: (1) it uses Pearson's correlation coefficient as a measure of case similarity, important because of this statistic's sensitivity to profile shape (i.e. differential patterning of features) and insensitivity to profile elevation (i.e. overall number of criteria met, which we see as a secondary issue to be explored separately because 'type' of profile, rather than overall severity, is of primary interest here), and (2) it produces a factor space within which each case is located and has no requirement that all cases be assigned to a prototype. Prototypic Q-factors thus represent the more common profile shapes in the sample and may suggest an initial taxonomy for Axis II co-occurrence in BPD.

Approach 2: Exploratory factor analysis of IPDE dimensions

The IPDE dimensional scores (excluding the BPD dimension) were transformed to remove the mean level of Axis II features. This allows for primary focus on their patterning. The mean level of features is analysed separately. Exploratory principal components analysis (PCA) was conducted with the transformed data. Scree plots, eigenvalues, and the percentage of variance were used to determine the number of

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[3] *An 'R-type' matrix is used as the basis for the more common factor analytic approaches and contains correlations among variables (across cases).*

[4] *There is a debate in the Q-analysis literature regarding optimal sample size and variable-to-case ratio. The sample size used in this study is sufficient for descriptive clustering and comparable to samples used in other Q-analytic work (see reviews in Aldenderfer & Blashfield, 1984; Brown, 1980). As a check on Q-analytic results, analyses were also attempted with other clustering methods and algorithms. These usually produced similar results and classifications when Pearson's r was used as a basic similarity measure, especially when cases that did not load on a Q-factor were excluded from analysis.*

factors to extract. Varimax rotation was used to aid in interpreting factor results. Further analyses compare results of the categorical (Q-factoring) and dimensional (factor analytic) approaches outlined above and correlate the IPDE results with external variables.

Results

Subtypes of BPD based on comorbid features: Q-analysis of IPDE profile data

As expected, the sample had a high mean level of BPD features along with a considerable variability for the other IPDE scales. A Q-analysis was performed and a three-factor solution was judged to be the most appropriate. This solution accounted for 75% of the variance among cases. Assignment of cases to groups yielded the prototype profiles shown in Figure 1. The prototypes are differentiable mainly due to the elevated presence of (1) histrionic/narcissistic, (2) avoidant/obsessive–compulsive, and (3) paranoid/schizotypal features, respectively.[5] The prototypes were thus identified as Cluster A ($N = 10$), Cluster B ($N = 28$), and Cluster C ($N = 23$) subtypes, corresponding to the DSM-IV clusters of the prominent disorders in each prototype. Five participants were not classified due to significant association with more than one prototype. Twenty-four participants (27% of the sample) were unclassified due to non-significant associations with any prototype. A qualitative inspection of the unclassified profiles revealed significant presence of co-occurring Axis II features, but no consistent discernible themes.

Constructs underlying BPD heterogeneity: Exploratory factor analysis of IPDE dimensions

The correlation matrix produced from the IPDE dimensions revealed strong areas of overlap between Axis II disorders. The mean level of Axis II symptoms was removed from individual profiles and a number of moderate correlations remained after transformation, suggesting the presence of a patterned comorbidity that is not a simple function of the overall personality pathology. A PCA was conducted using the transformed matrix. Analysis of eigenvalues and Scree plots suggested the presence of two factors, each with an eigenvalue greater than 1, which together accounted for 47% of the variance. An inspection of communalities for this solution revealed that only low to moderate amounts of variance were extracted from many variables ($h^2 = .30$ to 0.76), with particularly low values for Antisocial ($h^2 = .20$) and Dependent scales ($h^2 = .26$). Varimax rotation was used to maximize the interpretability of the two-factor solution. Scale loadings and communalities are presented in Table 1.

The first factor ranged from histrionic and narcissistic to avoidant and schizoid features, and was interpreted as representing a dimension of extraversion versus introversion. The second factor ranged from paranoid, schizotypal, and antisocial features to obsessive–compulsive and dependent features. This second dimension is labelled antagonism versus constraint, ranging from disorders characterized by hostility

[5] *All subscales with the exception of schizoid and borderline showed significant differences between the Q-analysis groups using ANOVA. Profiles were identified and named simply based on their most prominent, and thus clinically noticeable, peaks to simplify description.*

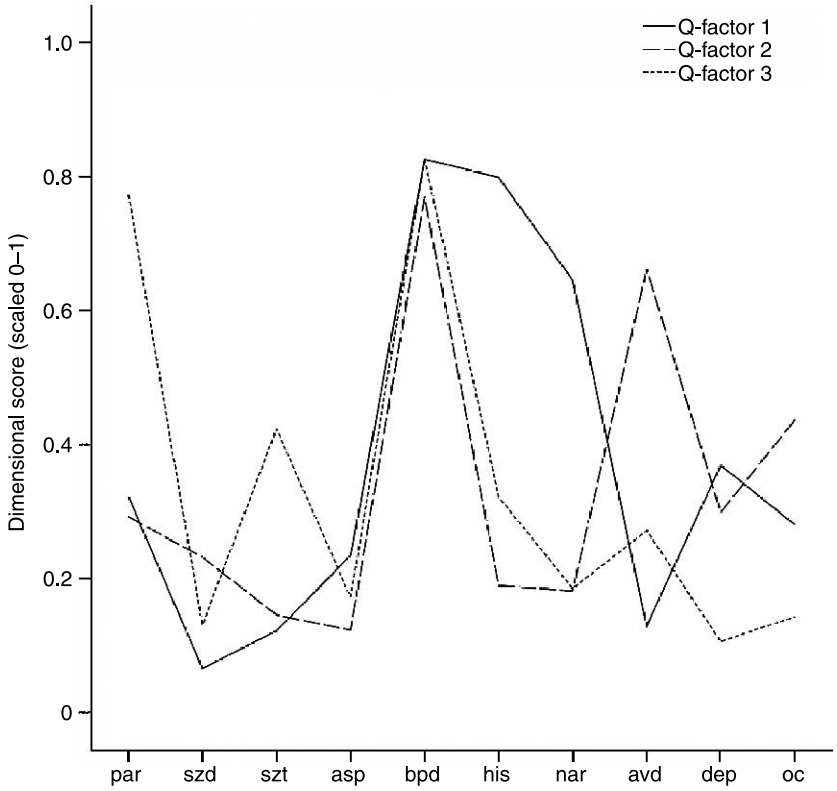

Figure 1. Q-factor profiles.

and relational disengagement to disorders characterized by friendlier, but still problematic and restricted, forms of relating with self and others.

Correlation of the factor solution with prototypic groups

Figure 2 locates individual participants, clustered by prototype pattern, within the two-dimensional factor space. The groups are coherently located within the graph suggesting a consistency between categorical and dimensional views of the data. Cluster A participants are located in the lower graphed region associated with more antagonism. Clusters B and C are located in the middle and upper regions of the graph, being differentiated from each other primarily by extraversion/introversion.

Validation of results with selected external measures

The factor-analytically derived dimensions from the IPDE were correlated with external measures to aid in interpretation and evaluation of the factor solution.[6] The mean level of co-occurring Axis II features was also included at this stage of analysis to better understand the role of overall PD comorbidity, regardless of its specific quality. An alpha

[6] *Differences between clusters were not explored due to their strong overlap with the dimensional results and because of the reduction in power that results from the large number of unclassified cases.*

Table 1. Two factor orthogonal PCA solution for co-occurring Axis II features in BPD

IPDE scale	Factor 1: Extraversion versus introversion	Factor 2: Antagonism versus constraint	h^2
Histrionic	**.87**	−.08	.76
Narcissistic	**.78**	−.07	.61
Avoidant	**−.70**	−.17	.51
Schizoid	**−.64**	.01	.41
Schizotypal	−.39	**.72**	.67
Obsessive–compulsive	−.32	**−.62**	.49
Paranoid	.00	**.55**	.30
Dependent	.06	**−.50**	.26
Antisocial	.06	**.44**	.20
Eigenvalue % of variance	2.52 28	1.69 19	

Criteria for determining loadings (indicated in bold) was set at 0.40 plus a difference of more than 0.10 on the opposite factor.

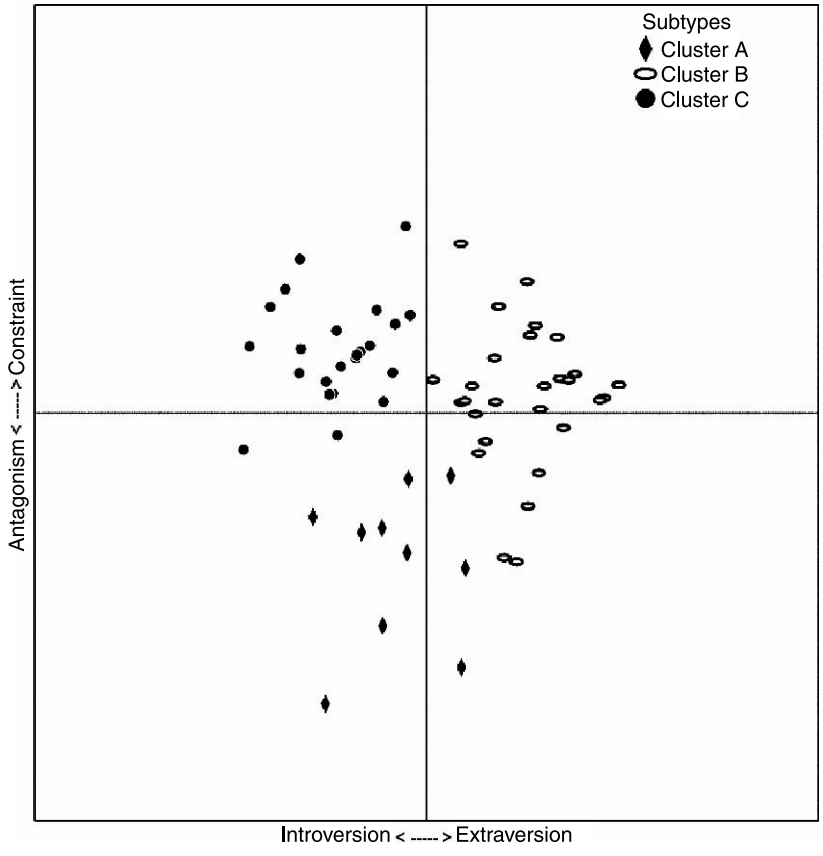

Figure 2. Patient clusters located in derived factor space.

level of $p < .05$ was set. Given the exploratory nature of these analyses and multiple conceptual domains being tested, no adjustments were made for multiple tests.

As can be seen in Table 2, total co-occurring Axis II features were associated with greater identity diffusion, negative affect, symptomatic distress, and worse overall social adjustment. The extraversion dimension was positively associated with trait impulsivity and negatively associated with relational avoidance, parasuicide, and symptomatic distress. Participants with higher scores on the antagonism dimension tended towards less anxiety about close relationships, but worse work performance, and less constraint on the MPQ.

Relation of comorbidity profiles to specific BPD criteria

Chi-squared association analyses were used to explore associations between the Q-factor-derived groups and the presence versus absence of each of the nine criteria that define DSM-IV BPD. A significant association ($p < .05$) was found between the comorbidity groups and DSM criteria 1 (efforts to avoid abandonment: $\chi^2 = 10.99$, $df = 2$) and 4 (reckless impulsivity: $\chi^2 = 12.24$, $df = 2$). The participants with comorbid Cluster A profiles were less likely to avoid abandonment, those with Cluster C profiles were less likely to qualify for reckless impulsivity.

BPD criteria were also examined in a series of logistic regression analyses predicting the presence versus absence of each BPD criterion from the factor-analytically derived dimensions of extraversion and antagonism. These analyses were more powerful because they utilized the entire sample, and because a greater variance is available for analysis from the dimensions. Significant results ($p < .05$) were obtained for a number of criteria as shown in Table 3. Higher extraversion scores were associated with greater presence of criteria 1 (avoids abandonment), 4 (impulsivity), and 8 (inappropriate anger), while scores in the direction of introversion were associated with criterion 5 (recurrent suicidality). Increased antagonism was associated with criterion 9 (transient, stress-related, paranoia or dissociative experiences) and the lesser presence of criterion 1 (avoids abandonment). The interaction of the two dimensions predicted significant variance in impulsivity, with more extraversion and antagonism jointly combining to predict presence of this BPD criterion.

In supplementary analyses, the total number of comorbid features (regardless of patterning) significantly predicted presence of: 2 (unstable relationships), 3 (identity disturbance), and 4 (impulsivity).[7] Overall, these results suggest that different forms of Axis II comorbidity predict different feature sets diagnostic of BPD.

Discussion

The extensive co-occurrence of Axis II features among those diagnosed with BPD poses a problem for the DSM-defined, categorical conception of this disorder. Even though evidence is accumulating to suggest BPD is a coherent diagnostic construct, co-occurring features nevertheless add to difficulties faced in clinical practice and raise the possibility of a need to tailor treatment for differing clinical presentations.

[7] *If total comorbid features are entered in logistic regression analyses prior to the factor analytic dimensions, the pattern of results is unchanged with one exception: the interaction of extraversion and antagonism becomes the only significantly predictive term for impulsivity.*

Table 2. Correlation of external variables with co-occurring Axis II features in BPD

External scale	Total comorbid features	Factor 1: Extraversion versus introversion	Factor 2: Antagonism versus constraint
Work functioning			
SAS: Summary work rating	−.08	−.02	−.32*
Relationship functioning			
ECR: Avoidance	.11	−.23*	.08
ECR: Relationship anxiety	.18	.06	−.25*
SAS: Summary love rating	−.10	.07	−.15
Sense of self and others			
IPO: Identity diffusion	.24*	−.03	−.01
Affect			
MPQ: Negative affect	.28*	−.07	.08
MPQ: Positive affect	−.07	.15	.05
Behavioural dyscontrol			
BIS: Total impulsivity	.11	.27*	.08
MPQ: Constraint	.02	−.08	−.28*
SASII: Suicide attempts[a]	.03	−.12	−.11
SASII: Parasuicide[a]	.07	−.28*	.11
Symptomatic distress			
BDI: Total depression	.26*	−.25*	.02
BSI: Global severity index	.22*	−.26*	.14
Overall functioning			
Interviewer GAF rating	−.16	.04	−.19
SAS: Total score	−.31*	.08	−.18

*$p < .05$. The sample size varies from $N = 75$ to 90 due to missing data on some instruments. BDI, Beck Depression Inventory; BIS, Barratt Impulsivity Scale; BSI, Brief Symptom Inventory; ECR, Experiences in Close Relationships; GAF, Global Assessment of Functioning; IPO, Inventory of Personality Organization; MPQ, Multidimensional Personality Questionnaire; SASII, Suicide Attempt Self-Injury Interview; SAS, Social Adjustment Scale. For the ease of interpretation, scores on the SAS are presented so that higher scores indicate a better functioning.

[a] Non-parametric Spearman's rho was used in place of Pearson's correlation due to significant skewness in these variables.

In this investigation, we have attempted to extend previous work examining comorbidity among PD diagnoses by searching for coherent subgroups within the BPD diagnosis based on Axis II feature profiles. We have done this in terms of the commonly occurring types (categories) as well as in terms of the underlying constructs (dimensions). Q-factoring was used to generate prototypic Axis II profile patterns. Three prototypes emerged and accounted for 68% of the cases suggesting that patients diagnosed with BPD can be identified as belonging to one of three common subtypes: Cluster A (elevated paranoid and schizotypal features), Cluster B (elevated histrionic and narcissistic features), or Cluster C (elevated avoidant and obsessive–compulsive features).

Profile results that emerged from Q-factoring seem to confirm the wisdom inherent in the three-cluster framework used for Axis II of the DSM. Perhaps more interesting is that the comorbidity profiles were associated with different BPD criteria, enhancing arguments that they represent clinically meaningful subtypes of BPD *per se*, whereas

Table 3. Logistic regression analyses predicting individual BPD criteria from Axis II comorbidity factors

BPD criteria	Overall model χ^2 ($df = 3$)	Extraversion/introversion		Antagonism/constraint		Interaction term	
		Wald test ($df = 1$)	Odds ratio	Wald test ($df = 1$)	Odds ratio	Wald test ($df = 1$)	Odds ratio
1. Avoids abandonment	13.26*	5.34**	1.78	6.56*	0.52	0.04	
2. Unstable relationships	3.63						
3. Identity disturbance	0.52						
4. Reckless impulsivity	15.05*	4.74**	1.79	1.50		4.79**	0.51
5. Recurrent suicidality	10.42**	7.85*	0.47	0.56		0.91	
6. Affective instability	0.24						
7. Feelings of emptiness	0.96						
8. Inappropriate anger	10.47**	7.26*	2.21	2.32		0.96	
9. Transient paranoia, dissociation	9.15**	0.37		7.36*	2.00	0.11	

*$p > .01$; **$p > .05$. Details withheld for non-significant models and variables.

those classified as having Cluster A comorbidity were less concerned about abandonment than those in the other two groups, and those with Cluster C profiles qualified for anger and impulsivity criteria less often than those in the other two clusters. Interpretation of the present results as suggesting distinct subtypes fits with research identifying a different longitudinal course for BPD patients with comorbid Cluster C diagnoses (longer time-to-remission) than those with other Axis II comorbidity (Zanarini *et al.*, 2004).

After adjusting for the mean level of Axis II features, factor analysis of the Axis II data revealed two dimensions. The first ranged from the number of criteria present among the histrionic and narcissistic criteria sets to criteria in the avoidant and schizoid disorders and was interpreted as extraversion versus introversion. This factor is reminiscent of traditions that examine for 'internalizers' and 'externalizers' among children, more recently extended to conceptualizations of adult psychopathology (e.g. Krueger, Markon, Patrick, & Iacono, 2005; Miller, Kaloupek, Dillon, & Keane, 2004). However, a potential problem with this interpretation is that antisocial personality, the prototypic 'externalizing' disorder, appears to have a low loading. The factor thus seems more consistent with extraversion *per se*. A second factor extended from paranoid, schizotypal, and antisocial criteria sets, to those in the obsessive–compulsive and dependent PDs. This factor also may be interpreted as being consistent with the dimensionally based personality literature, representing a version of constraint. Together, these two dimensions accounted for roughly one-half of the variance in PD features comorbid with BPD.

The initial construct validity of the two factors was examined by correlation with clinically relevant constructs related to personality functioning: social, work-related, and global adjustment, affective experience, behavioural dyscontrol (including suicidal and self-destructive behaviour), and identity diffusion, as well as the BPD criteria. These analyses suggested useful distinctions among the BPD comorbidity dimensions based on differences in their expected clinical correlates; for example, extraversion was associated with impulsivity. By contrast, introversion was associated with avoidance of close relationships, stronger parasuicide history, and greater degrees of symptomatic distress.

On the antagonism (vs. constraint) dimension, low scores were associated with less constraint on the MPQ and worse work performance. Low scores were also associated with less anxiety about close relationships. Relationally anxious patients at the constrained end of the spectrum may overvalue close relationships, depending on them for a sense of self as worthwhile, loved, or esteemed, while patients at the antagonistic end (antisocial, paranoid, and schizotypal features) do not value relationships in this way, and are thus less anxious about them.

A higher mean level of comorbid Axis II pathology, regardless of type, was associated with more severe problems of identity diffusion, negative affect, symptomatic distress, and worse overall social adjustment. The total comorbid personality features were also associated with the BPD criteria for unstable relationships, identity disturbance, and impulsivity. These findings would indicate, consistent with Tyrer's (2005) observation cited in the introduction, that the overall *presence* of problem personality features plays a role in the nature and extent of personality maladjustment as a separate consideration from the precise quality of the Axis II pathology.

The ability to divide the same sample in coherent and complementary ways into both categories/subtypes and dimensions leaves open questions as to which view is 'better'. The present data would suggest that these are complementary ways to organize the

same information. The best approach to conceptualizing BPD comorbidity may ultimately be a function of the specific application of the information. For example, comorbid profiles can be useful in identifying the subtypes of BPD and tailoring treatments to focus on specific subgroups. The dimensional representation has added statistical power, and seems to lend itself more to research focused on relationships with other clinical variables. Interestingly, Q-factoring of participant profiles led to subtypes that reflect the DSM cluster format, while dimensional analysis yields constructs recognizable from the general personality literature. This kind of mapping may be helpful for continued attempts by the field to better integrate categorical and dimensional views of personality disorder (cf. Depue & Lenzenweger, 2001).

Limitations

An important limitation of the present results is that the correlations presented to distinguish between BPD subgroups on clinical variables were neither based on *a priori* hypotheses nor adjusted for multiple tests. Where significant, these correlations tended not to be large, with absolute values ranging from .22 to .32. These results should be held tentatively until replication work can be done with a larger, naturalistic sample.

Participant characteristics may affect the generalizability of these results. In particular, the sample was predominantly female and treatment-seeking. Results are thus more likely to generalize to voluntary out-patient therapy settings. Different subtypes may appear in other settings where BPD diagnoses are also observed such as with males held in prison. A further limitation is that participants were selected for an RCT that employed rule-outs for comorbid bipolar conditions or any active, untreated depression or substance abuse. Other work has noted differences between PD profiles for samples of male versus female BPD patients (Grilo, *et al.*, 2002; Zanarini *et al.*, 1998). Replication of the present results in a similar treatment-seeking sample, as well as in more naturalistic samples that allow for greater presence of Axis I comorbidity and power to detect potential moderating effects of gender, is the needed next step.

Roughly one-quarter of our sample remained unclassified despite the presence of substantial Axis II comorbidity. It would not be surprising if some of the rarer patient profiles in the present sample were more common in other settings. The presence of a large number of unclassified profiles suggests that although the DSM profile-based approach utilized here can identify the commonly seen presentations, it by no means provides a complete catalogue. In one unclassified example from our database there is strong presence of both the histrionic and the obsessive–compulsive features. In another case, narcissistic and avoidant features predominate. Neither of these profiles appears with any frequency, but each poses unique clinical dilemmas that are essential to consider and may or may not be the same as for another BPD patient with a more common profile.

Concluding comments

The total number of patients treated in clinical trials for BPD is still very small. Critchfield and Benjamin (2006) note that individual differences on Axis II have a potential to impact treatment process and outcome, especially in terms of their interface with the therapeutic relationship and with the question of how to best help enhance and sustain patient motivation for change. It seems likely that co-occurring features not considered previously in treatment studies may interact with treatment approaches or

complicate patient outcomes. For example, a structured approach such as a DBT may work best with patients for whom such a warm and inviting structure is less threatening, such as the Cluster B and C groups. Those in Cluster A with more paranoid features may need more support, transparent discussion of treatment goals, and empathy, in order to establish an alliance strong enough to withstand (or prevent) reactance or anger that may occur upon introduction of structured interventions. At this point, statements about differing clinical needs of these patient groups can only be hypothesized based on simple consideration of the nature of comorbid features.

A map of the more commonly co-occurring Axis II features to define subtypes of BPD also seems to offer important information about clinical risk assessment and treatment planning. For example, more introverted and avoidant BPD patients in Cluster C appear to be at a higher risk for parasuicidality based on past history, while BPD patients with more extraverted, narcissistic, and histrionic features appear at a greater risk for reckless and impulsive behaviour. The more extraverted BPD patient is more likely to be concerned about abandonment, especially if she is low in antagonism, requiring a therapist to be more attentive to this issue in the patient's life experiences as well as in the therapeutic relationship. Further research is necessary to investigate the potential for different longitudinal courses and impacts of treatment for each of the BPD subtypes. Little is known about either topic, but literature is beginning to accumulate suggesting that the number of comorbid personality diagnoses in BPD is predictive of the persistent pathology over a span of 7 years (Links, Heselgrave, & van Reekum, 1999), and that Cluster C comorbidity predicts a longer persistence of pathology (Zanarini *et al.*, 2004). Our hope is that the present focus on BPD heterogeneity may eventually have an impact on clinical practice, identifying subtypes with potential to show differential response to treatment and suggest areas where careful tailoring of treatment could be used to optimize patient outcomes.

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References

Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster Analysis*, Newbury Park, CA: Sage Publication.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for the Beck Depression Inventory* (2nd ed.). San Antonio, TX: The Psychological Corporation.

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.

Benjamin, L. S. (1996). *Interpersonal diagnosis and treatment of personality disorders* (2nd ed.). New York: Guilford Press.

Brennan, K. A., Clark, C. L., & Shaver, P. (1998). Self-report measures of adult romantic attachment. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). New York: Guilford.

Brown, S. R. (1980). *Political subjectivity: Applications of Q methodology in political science*. New Haven, CT: Yale University Press.

Clarkin, J. F., Foelsch, P. A., & Kernberg, O. F. (2001). *The inventory of personality organization*. White Plains, NY: The Personality Disorders Institute, Weill College of Medicine of Cornell University.

Clarkin, J. F., & Kendall, P. C. (1992). Comorbidity and treatment planning: Summary and future directions. *Journal of Consulting and Clinical Psychology*, *60*, 904–908.

Clarkin, J. F., Levy, K. N., Lenzenweger, M. F., & Kernberg, O. F. (2004). The Personality Disorders Institute/Borderline Personality Disorder Research Foundation randomized control trial for borderline personality disorder: Rationale, methods, and patient characteristics. *Journal of Personality Disorders*, *18*(1), 52–72.

Clarkin, J. F., Levy, K. N., Lenzenweger, M. F., & Kernberg, O. F. (2007). Evaluating three treatments for borderline personality disorder: A multiwave study. *American Journal of Psychiatry*, *164*(6), 922–928.

Clarkin, J. F., & Posner, M. (2005). Defining the mechanisms of borderline personality disorder. *Psychopathology*, *38*, 56–63.

Clifton, A., & Pilkonis, P. A. (2007). Evidence for a single latent class of Diagnostic and Statistical Manual of Mental Disorders borderline personality pathology. *Comprehensive Psychiatry*, *48*(1), 70–78.

Conklin, C. Z., & Westen, D. (2005). Borderline personality disorder in clinical practice. *American Journal of Psychiatry*, *162*, 867–875.

Critchfield, K. L., & Benjamin, L. S. (2006). Principles for psychosocial treatment of personality disorder: Summary of the APA Division 12 Task Force/NASPR review. *Journal of Clinical Psychology*, *62*, 661–674.

Critchfield, K. L., Levy, K. N., & Clarkin, J. F. (2007). The Personality Disorders Institute/Borderline Personality Disorder Research Foundation randomized control trial for borderline personality disorder: Reliability of Axis I and II diagnoses. *Psychiatric Quarterly*, *78*(1), 15–24.

Depue, R. A., & Lenzenweger, M. F. (2001). A neurobehavioral dimensional model. In L. W. John (Ed.), *Handbook of personality disorders: Theory, research, and treatment* (pp. 136–176). New York: Guilford Press.

Derogatis, L. R. (1993). *BSI Brief Symptom Inventory. Administration, scoring, and procedures manual* (4th ed.). Minneapolis, MN: National Computer Systems.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (1996). *Structured clinical interview for DSM-IV Axis I disorders, patient edition (SCID-I/P, Version 2.0)*. New York: Biometrics Research Department, New York State Psychiatric Institute.

Grilo, C. M., Anez, L. M., & McGlashan, T. H. (2002). DSM-IV Axis II comorbidity with borderline personality disorder in monolingual Hispanic psychiatric outpatients. *Journal of Nervous and Mental Disease*, *190*, 324–330.

Johansen, M., Karterud, S., Pedersen, G., Gude, T., & Falkum, E. (2004). An investigation of the prototype validity of the borderline DSM-IV construct. *Acta Psychiatrica Scandinavica*, *109*, 289–298.

Kernberg, O. F., & Caligor, E. (2005). A psychoanalytic theory of personality disorders. In M. F. Lenzenweger & J. F. Clarkin (Eds.), *Major theories of personality disorder* (2nd ed., pp. 114–156). New York: Guilford Press.

Krueger, R. F., Markon, K. E., Patrick, C. J., & Iacono, W. G. (2005). Externalizing psychopathology in adulthood: A dimensional-spectrum conceptualization and its implications for DSM-V. *Journal of Abnormal Psychology*, *114*(4), 537–550.

Lilienfeld, S. O., Waldman, I. D., & Israel, A. C. (1994). A critical examination of the use of the term and concept of comorbidity in psychopathology. *Clinical Psychology: Science and Practice*, *1*, 71–103.

Linehan, M. M., Comtois, K. A., Brown, M. Z., Heard, H. L., & Wagner, A. (2006). Suicide Attempt Self-Injury Interview (SASII): Development, reliability, and validity of a scale to assess suicide attempts and intentional self-injury. *Psychological Assessment*, *18*(3), 303–312.

Links, P. S., Heslegrave, R., & van Reekum, R. (1999). Impulsivity: Core aspect of borderline personality disorder. *Journal of Personality Disorders*, *13*(1), 1–9.

Loranger, A. W. (1999). *International personality disorder examination (IPDE) manual*. Odessa, FL: Psychological Assessment Resources.

McKeown, B., & Thomas, D. (1988). *Q methodology*. Newbury Park, CA: Sage.

Miller, M. W., Kaloupek, D. G., Dillon, A. L., & Keane, T. M. (2004). Externalizing and internalizing subtypes of combat-related PTSD: A replication and extension using the PSY-5 scales. *Journal of Abnormal Psychology*, *113*(4), 636–645.

Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology*, *51*(6), 768–774.

Sanislow, C. A., Morey, L. C., Grilo, C. M., Gunderson, J. G., Shea, M. T., Skodol, A. E., *et al.* (2002). Confirmatory factor analysis of DSM-IV borderline, schizotypal, avoidant and obsessive–compulsive personality disorders: Findings from the Collaborative Longitudinal Personality Disorders Study. *Acta Psychiatrica Scandinavica*, *105*, 28–36.

Tellegen, A. (1982). *Multidimensional personality questionnaire manual*. Minneapolis, MN: University of Minnesota Press.

Thomson, G. H. (1935). On complete families of correlation coefficients, and their tendency to zero tetrad-differences: Including a statement of the sampling theory of abilities. *British Journal of Psychology (General Section)*, *26*, 63–92.

Tyrer, P. (1996). Comorbidity or consanguinity. *British Journal of Psychiatry*, *168*, 669–671.

Tyrer, P. (2005). The problem of severity in the classification of personality disorder. *Journal of Personality Disorders*, *19*, 309–314.

Weissman, M. M., & Bothwell, S. (1976). Assessment of social adjustment by patient self-report. *Archives of General Psychiatry*, *33*(9), 1111–1115.

Westen, D., & Shedler, J. (2000). A prototype matching approach to diagnosing personality disorders: Toward DSM-V. *Journal of Personality Disorders*, *14*, 109–126.

Widiger, T. A., Trull, T. J., Clarkin, J. F., Sanderson, C., & Costa, P. T. (2002). A description of the DSM-IV personality disorders with the five-factor model of personality. In P. T. Costa & T. A. Widiger (Eds.), *Personality disorders and the five-factor model of personality* (2nd ed., pp. 89–99). Washington, DC: American Psychological Association.

Zanarini, M. C., Frankenburg, F. R., Dubo, E. D., Sickel, A. E., Trikha, A., Levin, A., *et al.* (1998). Axis II comorbidity of borderline personality disorder. *Comprehensive Psychiatry*, *39*, 296–302.

Zanarini, M. C., Frankenburg, F. R., Vujanovic, A. A., Hennen, J., Reich, D. B., & Silk, K. R. (2004). Axis II comorbidity of borderline personality disorder: Description of 6-year course and prediction to time-to-remission. *Acta Psychiatrica Scandinavica*, *110*, 416–420.

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