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Prototypic Typology and the Borderline Personality Disorder

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Based on interview data from 76 outpatients, the implications of a prototypic rather than a classical model of personality-disorder classification were demonstrated for DSM-III (*Diagnostic and Statistical Manual of Mental Disorders*, 3rd ed.) Axis II Borderline Personality Disorder (BPD). Heterogeneity of membership is described, and conditional probabilities are used to demonstrate the relative efficiency of single diagnostic criteria and combinations of criteria and the degree of overlap among BPD and other personality disorders. The conditional probability approach can be used to determine empirically the covariation of symptoms and to link the study of prototypicality to the individual patient rather than to the group.

This article investigates the confluence of two significant developments in the theory. and method of diagnostic classification: the conception of prototypic diagnostic categories and the introduction of the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III; American Psychiatric Association, 1980). Cantor, Smith, French, and Mezzich (1980) consider DSM-III diagnoses a movement toward prototypic rather than *classical* categorization because many DSM-III diagnoses depend on sets of correlated features rather than on singly necessary and jointly sufficient features. DSM-III is also prototypic in that it (a) requires multiaxial diagnoses, (b) encourages multiple diagnoses within each of its axes, and (c) does not rely on the assumption that mental disorders are discrete entities.

The classical and prototypic models of classification have differing assumptions and implications regarding the homogeneity of the members within the diagnostic category, the extent of overlap between categories, and the validation of diagnostic criteria (e.g., Horowitz, Post, French, Wallis, & Siegelman, 1981). In prototypic classification, defining

Requests for reprints should be sent to John F. Clarkin, 21 Bloomingdale Road, White Plains, New York 10605. features need only be correlated with category membership, rather than being singly necessary and jointly sufficient. Thus, prototype categorization is inherently probabilistic and requires empirical determination of the diagnostic efficiency (Meehl & Rosen, 1955) of the defining features. Heterogeneity of membership in prototypic categories may be so great that only a few of the memberss meet all of the inclusive and exclusive criteria. Each example of any prototype may have few or many features in common with others and may thus be correspondingly more or less distinctive.

The present study empirically demonstrates the features of a prototypic typology in the particular case of the DSM-III Axis II diagnosis of Borderline Personality Disorder (BPD). The BPD is a particularly useful demonstration case because of its popularity, its controversial status (Spitzer, Endicott, & Gibbon, 1979), the likely heterogeneity of its membership, and the importance of studying its differential diagnosis relative to other personality disorders (Widiger, 1982). First we develop hypotheses regarding the BPD diagnosis as a prototypic category. Then we present the empirical data used to test the hypotheses. We illustrate the application of conditional probabilities in elucidating the characteristics of a prototypic system. The method of analysis and the model of classi-

263

fication we use are equally applicable to other diagnostic categories.

Heterogeneity of Membership

In a classical system of categorization, members of each category are presumed to be homogeneous with respect to the defining features. For example, in the case of the abstract category square, all squares have four equal sides joined at right angles. Likewise, Kernberg's (1981) criteria for the Borderline Personality Organization follow the requirements of a classical category in that all BPD patients are assumed to have (a) clear differentiation of self and other representations, (b) sharply contradictory and poorly integrated aspects of self and other representations, (c) a reliance on splitting and other primitive defenses, and (d) the capacity to test reality except in relation to the evaluation of self and others. Kernberg (1975), however, does allow for heterogeneity in overt, phenomenological characteristics.

DSM-III has some Axis II categories (e.g., Avoidant, Dependent, and Schizoid) defined in a classical way that requires all essential features to be present; it has other categories (e.g., Antisocial Personality Disorder, Borderline Personality Disorder, and Schizotypal Personality Disorder) defined in a prototypic way that requires only the presence of some combination of many features considered to be associated with membership. Although the criteria for these latter diagnoses are fixed by strict rules, they are polythetic in that they provide multiple ways in which diagnostic membership can be achieved.

The DSM-III category of BPD, as is true for all prototypic DSM-III categories, has two sources of potential heterogeneity. One source is derived from the acknowledged heterogeneity that lies outside the definitional criteria, and the second source is derived from the fact that any five of the eight definitional features need to be present for classification. These definitional features can be summarized as follows: (a) impulsivity or unpredictability in at least two self-damaging areas, (b) unstable and intense interpersonal relations, (c) intense or uncontrolled anger, (d) identity disturbance, (e) affective instability, (f) intolerance of being alone, (g) physically self-damaging acts, and (h) chronic feelings of boredom and emptiness. There are 93 possible ways of selecting combinations of five or more of the eight features, irrespective of order. The extent to which the BPD diagnostic criteria select a heterogeneous membership is an empirical question to be tested in this study. It is possible that patients who meet the five criteria necessary for membership also tend to possess the other three. Furthermore, even if most patients fail to meet all eight criteria, it is possible that patients share the same or only a few of the possible subsets of criteria. We hypothesize, however, that membership will be heterogeneous.

Indicators With Varying Degrees of Diagnostic Efficiency

In a classical model, all of the definitional features have the same true positive hit rate (i.e., 100%). They can have different degrees of diagnostic efficiency only if they differ in terms of their true negative hit rates (percentage in the comparison group that do not possess the feature) or if changes in the base rate of the syndrome have a differential effect on the true negative hit rates (Finn, 1982; Meehl & Rosen, 1955).

In contrast, in a prototypic model the features can also differ considerably in terms of their true positive hit rates (Cantor et al., 1980). As a result, the features of a prototypic system are much more likely to differ significantly in terms of their diagnostic efficiency (Rosch, 1978). This characteristic of a prototypic typology is not explicitly acknowledged by the DSM-III definition of BPD. There is no indication that any one of the features should carry more or less weight in diagnosis than the others. The absence of differential efficiency weights in the DSM-III classification is due to the lack of any relevant empirical data to support them (Frances, 1982). The present study demonstrates how the method of conditional probabilities may be used to determine the differential efficiency of each feature and each combination of features.

There is some theoretical basis on which to expect differential efficiency for the eight BPD features. Although identity disturbance is not an essential criterion in DSM-III, high efficiency for this item might be expected because of its necessary presence in Kernberg's (1981) classical category of Borderline Personality Organization. The conditional probability of meeting the criteria for BPD given the possession of each feature will be calculated.

It is also possible that a feature with low efficiency when present alone may become quite important when present in combination with other features. A localized headache is not especially diagnostic by itself, but in combination with certain other symptoms (e.g., contralateral sensory impairments) it becomes highly suggestive. Thus, it may be misleading to dismiss a symptom based on its diagnostic efficiency when it is considered by itself, ignoring its contribution when combined with other symptoms. Past researchers have often assessed the conditional probabilities of diagnoses (e.g., schizophrenia) or outcomes (e.g., suicide) on the basis of single symptoms or events but have rarely considered the joint conditional probability of a combination of symptoms or events.

A consideration of the conditional probability of various combinations of features is not irrelevant to classical categories (again due to the possible variation in true negative hit rates and differential effect of base rates), but it is certainly far more important in a prototypic model. In a classical model, all of the members have the same combination of features (i.e., a true positive hit rate of 100%) for one possible combination), whereas in a prototypic model the true positive rate for various combinations of features can vary considerably. For example, it is likely that the 93 different possible combinations of features for a BPD diagnosis (five or more of eight features) will differ considerably in terms of their true positive hit rates. There is then an especial interest in comparing the conditional probabilities for various combinations of features because some combinations (e.g., identity disturbance with unstable relations) may be much more efficient in diagnosis than others.

A consideration of the conditional probability of BPD given a combination of features also demonstrates whether there is empirical support for the choice of five features as the cutoff necessary to obtain the BPD diagnosis. Finn (1982) has demonstrated that the cutoff point of five features may not be necessary if the base rate of the diagnosis is sufficiently high. It is possible that, with certain comparison groups, particular combinations of fewer than five features are enough to make the BPD diagnosis (in some comparisons, even one feature may be sufficient).

Absence of Distinct Boundaries

As noted by Cantor et al. (1980), one implication of the classical assumption that categories are defined by a set of necessary and sufficient features is that "the boundaries of the category should therefore be distinct, with few or no borderline cases" (p. 182). The presence of distinct, homogeneous categories with few or no borderline cases further implies little or no overlap between categories. A lack of borderline cases implies that cases tend to be either in one category or another but not in both. A geometric figure can be either a square or a triangle but not both.

Are classical categories, therefore, mutually exclusive? This is unclear. There is certainly overlap when one category is nested within a higher order category (e.g., a square is also a rectangle) or when the categories involve independent, separate dimensions or domains of classification (e.g., a person can be both a U.S. citizen and a Catholic). But just as a square is never a circle and a Catholic is not a Baptist, some would argue (from the assumption of homogeneous groups with distinct boundaries) that it is illogical for a patient to be diagnosed meeting criteria for Schizophrenia and a Bipolar Affective Disorder. A prototypic model provides greater ease in handling borderline cases, overlapping classifications, and multiple classifications with the same level or domain of categorization. If it is acknowledged that classification is imperfect and that borderline cases abound, it is quite reasonable to expect that many persons could be placed in a number of different categories. Axis II of DSM-III is in this respect consistent with a prototypic model in that it explicitly acknowledges the absence of distinct boundaries and allows for multiple diagnoses of personality disorders (Frances, 1980, 1982; Spitzer & Williams, 1980).

The direction of overlap among the personality disorders is not likely to be random. Some of the diagnostic criteria explicitly overlap (e.g., manipulative suicidal acts and irrational tantrums are criteria for both a Histrionic Personality Disorder and a Borderline Personality Disorder). Based on survey data, Spitzer, Endicott, and Gibbon (1979) expect patients to meet the criteria for both Schizotypal Personality Disorder and Borderline Personality Disorder 50% of the time. In Millon's (1981) taxonomy, the Borderline Personality Disorder is considered to be a more disturbed variant of the mild Histrionic, Dependent, Compulsive, and Passive-Aggressive personality disorders. Because the Borderline Personality Disorder category shares the basic "ambivalent" and "dependent" personality styles evident in the milder Histrionic, Dependent, Compulsive, and Passive-Aggressive disorders, one might expect the Borderline Personality Disorder to overlap with these latter four subtypes. On the other hand, it is possible that the Borderline Personality Disorder will be more similar to disorders with the same level of severity of disturbance than to ones that share a similar personality style. In these data, the extent and direction of overlap between BPD and other personality disorders (OPD) are based on the calculation of conditional probabilities.

Method

Subjects were 76 outpatients, from 18 to 45 years of age, seen in the psychiatric outpatient department of the New York Hospital-Payne Whitney Clinic. Most of the patients were self-referred or were referred by the medical clinics at New York Hospital. The Payne Whitney Clinic is a large, nonprofit, university-affiliated teaching hospital located in mid-Manhattan. The clinic has a wide variety of patients and provides a wide range of services. Initial interviewers referred to the study those patients who they believed fulfilled criteria for a DSM-III diagnosis of an Axis II personality disorder but who did not satisfy criteria for an Axis I organic, schizophrenic, or major affective disorder (i.e., patients with a primary diagnosis of personality disorder). All patients gave informed consent. Demographically, the BPD group did not differ significantly from the OPD group. The mean age of patients in both groups was in the early 30s $(BPD = 30.0 \pm 8.0; OPD = 32.0 \pm 8.9)$. Both groups were predominantly female (BPD = 92%, OPD = 72%), single (both 58%), had at least some college education (BPD = 76%, OPD = 68%), and were most often employed in administrative or managerial positions (BPD = 33%, OPD = 39%). Only one patient was non-Caucasian.

Procedure

Each patient received a 1-hour clinical interview performed conjointly by a mixed number of raters (1-3)who assessed symptoms specific to personality disorders. The interview was structured so that the raters specifically documented the presence or absence of each feature of the DSM-III diagnosis of BPD and systematically tested for all features within any other Axis II or Axis I disorder that in the judgment of any interviewer might possibly be relevant. Interviewers (raters) alternated in the role of primary interviewer, and ample time was reserved for questions by the other interviewers. Ratings were made independently. Eleven percent of the patients were rated by one rater, 46% by two raters, and 43% by three raters.

A separate team of raters administered the Diagnostic Interview for Borderline Patients (DIB) developed by Gunderson, Kolb, and Austin (1981). The DIB raters were also blind to the other DIB ratings and to the data gathered in other portions of the study. Each rater had been trained by Kolb in the use of the DIB.

Results

Diagnostic Classification

A BPD diagnosis is assigned to a patient when at least five of the eight criteria are present (American Psychiatric Association, 1980). As expected, the three raters did not always agree as to the presence or absence of a particular feature. Nevertheless, there was fair agreement among the study's raters on individual BPD criteria (average kappa = .59) and good agreement on the presence or absence of a BPD diagnosis (kappa = .72). These data are presented in more detail elsewhere (Frances, Clarkin, Gilmore, Hurt, & Brown, in press).

There are at least two ways in which one could achieve a consensus diagnosis. One way is to assign a diagnosis of BPD when the mean number of features attributed to the patient is 4.6 or greater. A second way is to assign the diagnosis of BPD to the patient only if five or more features are each considered to be present by a majority (67% or greater) of raters. The first system is referred to as the less restrictive (LR) method and the second as the more restrictive (MR) method. In all analyses in which the results are broken down according to the number of features, the feature was considered to be present only if a majority of raters scored it as present.

The MR classification is more restrictive because it eliminates those patients who meet

the criteria according to two or more raters who disagree as to which particular features are present. The MR system resulted in 20 of the 76 patients being classified as BPD (26%), whereas the LR system resulted in 26 patients (34%) being classified as BPD. The MR system is most useful for an analysis of the presence and absence of particular features, but the LR system possesses greater concurrent validity with the DIB. Of the six cases in which there was a discrepancy between the MR and the LR systems, five met the DIB criteria for a BPD diagnosis. In the spirit of a study concerned with the procedure and implications of diagnostic classification, data are presented, where relevant, for both the LR and MR systems.

Heterogeneity of Membership

Presence and absence of defining features. Table 1 presents the number of cases that possessed each of the eight features of a DSM-III diagnosis of BPD. Consistent with the MR criteria, a feature was considered to be present only when a majority of the raters were in agreement.

It appears that the BPD diagnosis is heterogeneous with respect to a subset of features. One hundred percent of the BPD patients possessed the feature of impulsivity; 95%, affective instability; 90%, a pattern of unstable and/or intense relationships; and 90%, inappropriate, intense, or uncontrolled anger. However, only 25% of the patients were intolerant of being alone. Patients who meet the minimal criteria of five features do not necessarily possess the remaining three. Only 10% of the BPD group possessed all eight features, 25% had seven, 40% had six, and 25% had five features.

These results were largely repeated when the LR system of classification was applied. Table 2 presents these results. The rank order of the presence of the defining features is consistent across the two systems, but the LR system results in increased heterogeneity with respect to both the presence and the absence of features. This is most evident in the increased proportion of patients who possessed only a minimal set of criteria for membership. Eighty-five percent of the BPD patients had a mean number of features of only 6.5 or less. This result is expected, inasmuch as the LR criteria for BPD classification are less restrictive than the MR criteria.

Combination of features. There does appear to be considerable heterogeneity with respect to the particular combinations of features. There are 56 different ways of combining five of eight features, and some combinations are present more often than others. Sixty-five percent of the patients diagnosed as BPD within the MR classification pos-

Table 1

Number of Cases With BPD Features and Associated Conditional Probability of a BDP Diagnosis—More Restrictive Classification

	Number of features												
· · · · · ·		BP	D pa	tient	s			OPD	patie	nts		-	BPD
Feature	8	7	6	5	5-8	4	3	2	1	0	0-4	10tal 0-8	prob- ability*
Impulsivity	2	5	8	5	20	6	6	1	1	0	14	34	.59
Unstable/intense relationships	2	4	7	5	18	3	2	3	0	0	8	26	.69
Intense/uncontrolled anger		5	7	4	.18	6	6	4	2	0	18	. 36	.50
Identity disturbance		5	4	2	13	2	3	1	3	0	9	22	.59
Affective instability		5	8	4	19	7	7	3	2	Ò O	19	38	.50
Intolerance of being alone		1	2	0	5	· 5	3.	0	0	0	8	13	.38
Physically self-damaging acts	2	5	5	3	15	5	5	1	1	0	12	27	.56
Chronic boredom/emptiness	2	5	7	2	16	2	4	1	2	0	9	25	.64
N	2	5	8	5	- 20	9	12	7	11	17	56	76	

Note. OPD = other personality disorder; BPD = Borderline Personality Disorder.

^a Conditional probability of a BPD diagnosis given the presence of the individual criterion listed.

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Feature	7.6–8.0	6.6-7.5	5.6-6.5	4.6-5.5	4.6-8.0	3.6-4.5	2.6-3.5	1.6-2.5	0.6-1.5	0.0-0.5	0.0-4.5	Iotal 0.0-8.0	prob- ability ^a
Impulsivity	2	7	11	œ	23	9	ę	0	I	1	11	34	.68
Unstable/intense relationships	2	7	6	9	19	2	ę	2	0	0	7	26	.73
Intense/uncontrolled anger	7	7	10	6	20	œ	7	ε	ŝ	0	16	36	.56
Identity disturbance	ы	7	9	ŝ	15	7	0	1	4	0	7	22	68
Affective instability	7	7	11	œ	23	7	4	ŝ	1	0	15	38	.61
Intolerance of being alone	2	0	ę	4	6	2	1	0	I	0	4	13	69.
Physically self-damaging acts	7	7	6	6	19	5	I	7	0	0	×	27	.70
Chronic boredom/emptiness	7	2	10	5	19	2	1	2	2	0	7	26	.73
N	2	5	11	11	26	10	5	6	15	11	50	76	
<i>Note</i> . OPD = other personality	disorder, H	3PD = Bor	derline Per	sonality D	isorder.								

sessed at least the five features of impulsivity. unstable and/or intense relationships, intense and/or uncontrolled anger, affective instability, and chronic feelings of boredom or emptiness. The next most frequent combination was an overlapping group of 55% of the patients who possessed a similar combination except that chronic boredom and emptiness was replaced by physically self-damaging acts. These two combinations were again the most prevalent within the LR classification, but they were not as predominant as before. The first combination occurred only 46% of the time, and the second combination occurred 42% of the time. The fact that the most frequent combination occurred less than 50% of the time indicates heterogeneity within the LR classification. There were many infrequent or unique combinations as well.

Varying Degrees of Diagnostic Efficiency

Single features. The fact that a feature occurred in all of the BPD patients does not indicate whether it is a discriminating feature of the diagnosis. All BPD patients are human, but membership in the species is not diagnostic of a BPD. The features with the highest prevalence among BPD patients might not be differentially diagnostic if they are also prevalent in other personality disorders. Tables 1 and 2 present the conditional probabilities of meeting the criteria for a BPD given the possession of each particular feature. These conditional probabilities consider not only the proportion of BPD patients who possess the feature but also the proportion of OPD patients who possess the feature.

In the MR classification, although impulsivity occurred in 100% of the BPD patients, it had only the third largest conditional probability because it also occurred in 25% of the OPD patients. Affective instability occurred in 95% of the BPD patients, but it had only a .50 conditional probability because of its frequency in the comparison group. The presence of unstable and/or intense relationships and chronic feelings of boredom and emptiness appear to be the most specific and sensitive indicators of BPD. Intense and/or uncontrolled anger and affective instability are as indicative of an OPD diagnosis as of a BPD diagnosis when they are considered

^a Conditional probability of a BPD diagnosis given the presence of the individual criterion listed

alone, although the conditional probabilities of these features still represent a substantial improvement over the .26 base rate of the BPD diagnosis in this sample.

These conditional probabilities are also based on the rather arbitrary cutoff point of five of eight features for a BPD diagnosis. By lowering the cutoff point to four features, the base rate for a BPD diagnosis increases to .38 and the conditional probabilities for intolerance of being alone and affective instability rise from .38 to .77 and from .50 to .68, respectively. These large changes are due to the large and specific prevalence of these two criteria within the group of patients who possessed only four features. If the cutoff point was raised to six, then the base rate would drop to .20 and the conditional probability for unstable/intense relationships would fall from its present .69 to .50.

Table 2 presents the conditional probabilities for the LR classification. In this case, the BPD diagnosis has a .34 base rate, and a number of features become useful discriminators. Six of the features are within the interval from .68 to .73. The most notable change was the increased utility of the feature of intolerance of being alone—from .38 to .69. This change reflects the frequency of this feature within the literally borderline BPD patients. Intense/uncontrolled anger and affective instability, however, remain relatively inefficient. Despite possessing the highest prevalence (88%) within the BPD group, affective instability again has relatively low diagnostic value when considered alone.

Combination of features. Table 3 presents

the conditional probability of a BPD given the presence of the combination of two of the features for the MR classification. Because of the large number of conditional probabilities, only the results of the MR classification are presented.

When at least two BPD features are present, there is at least a 50–50 chance that the person will meet the BPD criteria, no matter which two features are present. This is true even for the low-efficiency feature intolerance of being alone, especially when the latter is combined with impulsivity, affective instability, or chronic boredom/emptiness. Intolerance of being alone, however, remains the least effective feature.

The combinations of impulsivity and unstable/intense relationships, physically selfdamaging acts and unstable/intense relationships, physically self-damaging acts and chronic boredom/emptiness, and unstable/ intense relationships and identity disturbance all had conditional probabilities greater than .90. The presence of any of the above combinations of two features makes one highly confident of the BPD diagnosis. In fact, one could diagnose BPD with certainty in the present sample with just the features of identity disturbance and unstable/intense relationships. This combination occurred in 60% of the BPD patients (sensitivity) but not in anv of the OPD patients (100% specificity). Although identity disturbance is a relatively ineffective indicator when alone, in combination with unstable/intense relationships it diagnosed with certainty.

A consideration of the conditional prob-

Table 3

Conditional Probabilities and Percentages for a Borderline Personality Disorder (BPD) Diagnosis Given a Combination of Two Features

			BPD p	robability*/	′% BPD⁵		
Feature	A	В	С	D	Е	F	G
Impulsivity (A)				-			
Unstable/intense relationships (B)	.90/80						
Intense/uncontrolled anger (C)	.69/80	.84/80					
Identity disturbance (D)	.87/65	1.0/60	.80/60				
Affective instability (E)	.70/95	.74/85	.65/85	.80/60			
Intolerance of being alone (F)	.62/40	.60/15	.57/20	.57/20	.62/20		
Physically self-damaging acts (G)	.71/75	.93/65	.67/70	.82/45	.67/70	.57/20	
Chronic boredom/emptiness (H)	.89/80	.88/70	.88/70	.75/45	.89/80	.62/25	.94/60

^a Conditional probability of the diagnosis of BPD given the presence of two criteria. ^b Percentage of BPD patients with the two criteria. abilities of combinations of features as well as single features also demonstrated some rather counterintuitive results. The conditional probability of a BPD diagnosis given unstable/intense relationships was .69, but when this feature was combined with intolerance of being alone, the conditional probability dropped to .60. In some cases the probability of the diagnosis decreases with an increase in the number of defining features. This results when the combination of features is less frequent in the BPD group than in each single feature and when the combination of features is less discriminating than the single feature between the BPD and OPD groups.

Table 4 presents the conditional probabilities for a BPD diagnosis given the combination of three of the features. One can diagnose with certainty in the present sample in 29 (52%) of the 56 possible combinations. Whenever the symptoms of identity disturbance and unstable/intense relations are together, the probability of a BPD diagnosis remains certain, no matter what the third symptom is. The combination of impulsivity, unstable/intense relationships, and intense/ uncontrolled anger not only diagnosed with certainty but also occurred in 80% of the BPD sample.

There are 70 ways of combining four of eight features, irrespective of order. The combinations ABEH, ACDF, ACEG, BCEF, BCEG, and CDFH were the only ones that occurred in the nine patients who possessed only four of the BPD features (the features

Table 4

Conditional Probabilities and Percentages For a Borderline Personality Disorder (BPD) Diagnosis Given a Combination Of Three Features

Feature combination	BPD probability ^a	%BPD ^b	Feature combination	BPD probability ^a	%BPD ^b
ABC	1.0	80	BDG	1.0	40
ABD	1.0	60	BDH	1.0	35
ABE	.92	60	BEF	.60	15
ABF	1.0	15	BEG	.86	60
ABG	1.0	65	BEH	.93	70
ABH	.88	75	BFG	1.0	10
ACD	.92	60	BFH	1.0	15
ACE	.77	85	BGH	1.0	50
ACF	.80	20	CDE	1.0	55
ACG	.82	70	CDF	.60	15
ACH	1.0	70	CDG	1.0	45
ADE '	1.0	65	CDH	.90	45
ADF	.80	20	CEF	.80	20
ADG	.90	45	CEG	.72	65
ADH	1.0	50	CEH	1.0	70
AEF	.71	25	CFG	1.0	20
AEG	.78	70	CFH	.80	20
AEH	.94	80	CGH	1.0	55
AFG	.67	20	DEF	1.0	20
AFH	1.0	25	DEG	1.0	45
AGH	1.0	55	DEH	.91	50
BCD	1.0	55	DFG	1.0	15
BCE	.88	75	DFH	.67	20
BCF	.67	10	DGH	1.0	35
BCG	.92	60	EFG	.67	20
BCH	1.0	60	EFH	1.0	25
BDE	1.0	55	EGH	1.0	60
BDF	1.0	15	FGH	.80	20

Note. A = impulsivity; B = unstable/intense relationships; C = intense/uncontrolled anger; D = identity disturbance; E = affective instability; F = intolerance of being alone; G = physically self-damaging acts; H = chronic boredom/ emptiness.

^a Conditional probability of the diagnosis of BPD given the presence of three criteria.

^b Percentage of BPD patients with the three criteria.

BORDERLINE PERSONALITY

	Numbe	r of cases ^a	• •	
Personality disorder	Only OPD	OPD + BPD	BPD probability ^b	OPD probability ^c
Paranoid	- 4	2	.33	,10
Schizoid	1	0	0	0
Schizotypal	3	8	.73	.40
Histrionic	13	4	.24	.20
Narcissistic	9	3		.15
Antisocial	2	0	0	0
Avoidant	15	1	.06	.05
Dependent	17	3	.15	.15
Compulsive	6	0	` 0	• 0
Passive-Aggressive	7	Ő	0	0
Atypical/Mixed	20	0	0	Ō

Table 5Overlap of Borderline Personality Disorder (BPD) With Other Personality Disorders (OPD)For the More Restrictive Classification

Note. Of 76 patients, 20 met the criteria for BPD.

* Some patients met the criteria for more than one of the other personality disorders.

^b Conditional probability of a BPD diagnosis given a diagnosis of the other indicated personality disorder.

^c Conditional probability of the diagnosis of the indicated other personality disorder given a diagnosis of BPD.

are identified by the code presented in Table 3). The high efficiency of a combination of four features is not surprising because only nine of the OPD patients possessed four features. It does appear, however, that one might not need all five features to diagnose the BPD with confidence. The combination of the four features of impulsivity, unstable/intense relationships, intense/uncontrolled anger, and affective instability had a conditional probability of 1.0 and occurred in 75% of the BPD group. This was the most sensitive (frequent) combination, consisting of the four most sensitive features when considered alone (each occurred in at least 90% of the BPD group).

Absence of Distinct Boundaries

Tables 5 and 6 present the percentages of BPD patients and OPD patients who met the

Table 6

Overlap of Borderline Personality Disorder (BPD) With Other Personality Disorders (OPD) For the Less Restrictive Classification

	Numbe	r of cases ^a		· · · · · · · · · · · · · · · · · · ·
Personality disorder	Only OPD	OPD + BPD	BPD probability ^b	OPD probability ^c
Paranoid	3	· 3	.50	.12
Schizoid	1	Ō	0	0
Schizotypal	3	8	.73	.31
Histrionic	12	5	.29	.19
Narcissistic	8	4	.33	.15
Antisocial	2	0	0	0
Avoidant	14	2	.14	.08 ·
Dependent	13	7	.35	.27
Compulsive	. 6	0	0	0
Passive-Aggressive	7	0	0	Õ
Atypical/Mixed	19	1	.05	.04

Note. Of 76 patients, 26 met the criteria for BPD.

* Some patients met the criteria for more than one of the other personality disorders.

^b Conditional probability of a BPD diagnosis given a diagnosis of the other indicated personality disorder.

^c Conditional probability of the diagnosis of the indicated other personality disorder given a diagnosis of BPD.

criteria for other personality disorders for the MR and LR systems of classification, respectively. Most patients who meet the criteria for a BPD diagnosis also meet the criteria for another personality disorder. This occurred in 60% and 69% of the cases for the MR and LR systems, respectively.

The results also indicate that the overlap is not random. There is an especial tendency to overlap with the Schizotypal Personality Disorder diagnosis, as expected by Spitzer et al. (1979). The Schizotypal Personality Disorder diagnosis occurred in 40% of the BPD group and in only 5% of the cases in the OPD group. If the patient met the criteria for a Schizotypal Personality Disorder diagnosis, there was a .73 probability that the patient also met the criteria for a BPD diagnosis for both the MR and LR systems. The reverse, however, was not true. The conditional probability of obtaining a Schizotypal Personality Disorder diagnosis if the patient had a BPD diagnosis was only .40 for the MR and .31 for the LR systems.

The Dependent Personality Disorder diagnosis also had a frequent overlap with the BPD diagnosis (27%) in the case of the LR classification but not as much in the case of the MR classification (15%). This reflected its prevalence within the group of (literally) borderline BPD patients. The conditional probabilities of BPD given a diagnosis of Paranoid Personality Disorder were relatively high (.33 and .50 in the MR and LR systems, respectively), despite a low percentage of overlap due to the relative infrequency of Paranoid Personality Disorders in the non-BPD group.

Discussion

The present study demonstrated a number of ways in which the Borderline Personality Disorder is consistent with a prototypic model of classification and inconsistent with a classical model. Membership within the category was heterogeneous with respect to the features of identity disturbance and physically self-damaging acts. One fourth of the BPD patients possessed only five features, most had less than seven, and there was a wide variety of combinations of features. There was an absence of distinct boundaries with many borderline cases and overlapping diagnoses. The definitional features varied considerably in their diagnostic efficiency.

Generalization of these findings regarding the BPD diagnosis is limited until they are replicated within another sample of patients. The results are likely to be most representative of outpatients with a predominant Axis II diagnosis, but caution is necessary because they were based on only 20 (26) BPD patients in the MR (LR) classification drawn from a sample of 76 patients with personality disorders in one particular clinic. A larger and/ or different sample of patients could result in different conditional probabilities, especially with regard to the combination of features. Because numerous conditional probabilities were calculated on a small number of patients, it is likely that some of the specific results will not be cross-validated. The results do demonstrate implications of a prototypic typology for psychiatric diagnosis and a useful methodology with which to assess the diagnostic efficiency of a single feature or combination of features. The implications of the results for the BPD diagnosis, and for diagnostic constructs in general, are discussed with these qualifications in mind.

Diagnosis of a Borderline Personality Disorder

The results of this study indicated that assurance of the presence of all five features of a BPD may not be necessary to make the DSM-III diagnosis with confidence. Finn (1982) demonstrated that with a sufficiently high base rate, only four of eight features might be necessary. However, efficient diagnosis considers not only the base rate of the syndrome but also the hit rate of the definitional features (Meehl & Rosen, 1955). Even though the base rate was relatively low in the present situation (.26), one could still make the diagnosis with relative confidence in certain patients with three, two, or even just one feature!

For example, if the person is an outpatient whose difficulties primarily involve a personality disorder, then simply knowing that the person has unstable/intense relationships (a feature that occurred in 90% of BPD cases) might diagnose BPD with a high probability (.69). If the person also has an identity disturbance, then the diagnosis may be made with certainty. A certain diagnosis of BPD was also possible in 50% of the 56 combinations of three features and 90% of the 70 combinations of four features. The combination of impulsivity, unstable/intense relationships, and intense/uncontrolled anger may be an especially sensitive as well as specific indicator.

The results also demonstrate the value of studying the ways in which the personality disorders overlap. There was a .73 (.73) and a .33 (.50) probability that a patient would meet the criteria for a BPD diagnosis given the presence of a Schizotypal Personality Disorder and a Paranoid Personality Disorder diagnosis, respectively, for the MR (LR) classification. The overlap with the Schizotypal Personality Disorder diagnosis is not surprising because, historically, these two "borderline" conditions have been lumped together (Spitzer et al., 1979). The additional overlap with the Paranoid Personality Disorder diagnosis, however, may be supportive of Millon's (1981) taxonomy if one argues that personality disorders overlap more with dissimilar personality types that share the same level of disturbance.

Some empirically based mutual exclusivity also occurred. None of the 13 Compulsive Personality Disorder or Passive-Aggressive Personality Disorder patients met the criteria for a BPD diagnosis or even possessed four of the eight features. If the patient meets the criteria for these latter personality disorders, it is highly unlikely that the patient also has BPD.

The results further indicate that the diagnostic efficiency of a feature should not be assessed in isolation from the other features. One might erroneously assume on the basis of the conditional probabilities for single features that identity disturbance is not an especially useful indicator. However, the combination of identity disturbance with unstable/ intense relationships is a very specific and sensitive indicator, supporting an essential aspect of Kernberg's (1981) theory of Borderline Personality Organization. Intolerance of being alone, however, remained a very infrequent and/or inefficient indicator, even when in combination with other features. Although the particular combinations of features that were found to be especially diagnostic in the present study might not be as potent in a cross-validation, the results do indicate the importance of assessing the conditional probability of the combination of symptoms, as well as single symptoms. The methodology employed in the present study is especially relevant to the "Chinese menu" style of diagnosis employed in DSM-III.

It is likely, of course, that the diagnostic importance of any one feature or combination of features will change with a change in the syndrome's base rate or in the composition of the comparison group. For example, if unstable/intense relationships are prevalent in the comparison group (e.g., a clinic specializing in family therapy), then the feature loses some of its differential diagnostic efficiency. It is important to emphasize, however, that the comparison group in the present study involved those patients who were most similar to the BPD patient. Past studies on the discriminant validity of the BPD features have typically compared the BPD diagnosis with quite dissimilar patients (e.g., schizophrenics), as well as used group mean differences rather than hit rates (Widiger, 1982). The present study compared the BPD with other personality disorders in an outpatient setting. This situation and setting provide the most difficult differential diagnostic situation. The fact that the conditional probabilities were so high despite the similarity of the comparison group is quite encouraging. A dissimilar comparison group (e.g., psychotic diagnoses) would likely result in even higher conditional probabilities for all of the features.

It is also possible that in the present study, the conditional probabilities, especially for the presence of certain symptom combinations, were biased by the interviewers' preexisting opinions about the covariation of certain features. If interviewers were prone to rate preferentially the presence (or absence) of one feature when another feature was present (or absent), this would clearly influence the conditional probabilities. Although it would have been preferable to have each feature assessed by independent judges, this would have required having eight judges interview each subject. Halo effects were minimized by structuring the interview so that each feature was assessed explicitly and independently for specific, clear examples of the feature and by the requirement that a majority of the judges independently agree on the presence of the feature for it to be considered present.

Judges may consistently rate as absent features that are difficult to assess. If intolerance of being alone was difficult to assess, leading judges consistently to rate it as absent, this would influence the conditional probabilities. Diagnostic efficiency would then be based on the ability to assess the feature and not on its actual covariation with the syndrome. The results, however, would still generalize to the diagnostic decisions of the average clinician.

Definition of a Borderline Disorder

Horowitz, Wright, Lowenstein, and Parad (1981) presented a method for empirically defining a prototype by identifying the most common characteristics that experts think of when they imagine the category. This is consistent with the method (i.e., literature review and survey of practicing clinicians) used for defining the DSM-III diagnosis of BPD (Spitzer et al., 1979). The present study, however, demonstrated that the "implicit diagnostic theory" of clinicians may not be consistent with the empirical prevalence and covariation of the diagnostic features. Four of the features (impulsivity, unstable/intense relationships, intense/uncontrolled anger, and affective instability) did occur in at least 90% of the BPD group. The combination of these symptoms was the most frequent of the four feature combinations (75% of cases) and resulted in a certain diagnosis of BPD. The rest of the features, however, occurred much less often and were at times of little diagnostic value (although identity disturbance was efficient when used in combination). Intolerance of being alone was especially infrequent (25%) and was of little diagnostic value either by itself or in combination.

Prevalence, however, is not necessarily synonymous with pathologic significance. Although the state of being human is just as common as impulsivity in the BPD group, humanness is not really of central or pathologic significance to the BPD syndrome. Nonetheless, relatively infrequent pathologic symptoms are best removed from the definition of the prototype unless their importance can be otherwise justified (e.g., the diagnostic value of identity disturbance when in combination with unstable/intense relationships).

It is tempting to limit the definition of the syndrome to those features that have the highest diagnostic efficiency, whether they are alone or in combination. However, diagnostic efficiency does not necessarily imply definitional or pathological significance. Impulsivity was present in all of the BPD cases but was not especially diagnostic of the disorder because it was also a fairly frequent symptom in the comparison group. Despite its low diagnostic efficiency, impulsivity retains its importance in the definition of the syndrome because of its ubiquity and close relationship to the BPD construct. Because the diagnostic efficiency of features is dependent upon the prevalence of the feature in both the criterion group and the comparison group-both of which can vary considerably across settings and times-it could be chaotic and confusing to define the syndrome only in terms of conditional probabilities. Nonetheless, features that are both infrequent and of low diagnostic efficiency (e.g., intolerance of being alone) do need considerable justification for inclusion as definitional criteria.

Our use of more restrictive (MR) and less restrictive (LR) methods of settling diagnostic disagreements among raters illustrates that different conventions for settling such disagreements can have a dramatic effect on the conditional probability of a symptom or symptom combinations. A set of diagnostic standards that minimizes disagreements between raters, the LR classification, selected a larger group of BPD cases. It is of interest. however, that five of the six patients who were selected by the LR classification and excluded by the MR classification were positive for the BPD diagnosis using the DIB as a criterion. Depending on whether sensitivity or specificity is more crucial in a given situation, the LR or the MR method of settling disagreements will be more useful.

Studies that base comparisons on group means or simple prevalence of single symptoms attempt to identify common and important features of a disorder by generating a hypothetical "modal" case. In contrast, the conditional-probabilities approach used here saves information. It enables clinicians and investigators to determine empirically the covariation of symptoms that are thought to be important in identifying the presence or absence of a disorder, and it links the study of prototypicality to the individual patient rather than to the group. All of the hypotheses about the prototypical method of categorization were confirmed by these data.

The method used here focuses exclusively on the internal consistency of the diagnostic features of the BPD category of the DSM-III and emphasizes the heterogeneity within the group. Despite this internal heterogeneity, there may well be important external characteristics satisfied by each member of the group. To determine the clinical value of any particular diagnostic feature or combination of features, it is necessary to explore their association with external validators such as etiology, course, family history, and treatment outcome.

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