DETERMINANTS OF DIAGNOSTIC PROTOTYPICALITY JUDGMENTS OF THE PERSONALITY DISORDERS

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We evaluated the impact of three factors that have been suggested to be important determinants of the diagnostic process pertaining to personality disorders: (a) the number of features representative of a personality disorder category; (b) the extent to which those features are typical of the category, and (c) the dominance or proportion of category features to the total number of features. Thirty-two clinical psychologists evaluated 12 profiles of hypothetical patients in which these factors were varied factorially. The results revealed strong effects of typicality and dominance, but no effects for number. Implications for the assessment and classification of personality disorders are discussed.

Recent years have witnessed a growing interest in the classification of personality disorders. Most current nosological systems, including recent editions of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM; American Psychiatric Association, 1980, 1987, 1994) are rooted largely in classical models of categorization. If all members of a classical category possess the same set of necessary and sufficient features, it follows that all category members are equally good and representative instances of the category, and equally poor and unrepresentative examples of other categories. According to the classical model, category membership is inherently clear-cut, with homogeneity within categories, clearly demarcated boundaries, and heterogeneity between categories. These assumptions, however, do not reflect the more complex reality of many psychological concepts. Such models, in which a list of necessary and sufficient criteria define category membership, have been found to be problematic in relation to many psychological concepts, including the personality disorders (Cantor & Mischel, 1977; Lakoff, 1987; Rosch, 1973, 1978). The personality disorders defy the assumptions of classical categorization in several ways. These include the high degree of heterogeneity within each disorder, the fact that

various personality disorders share features in common, the lack of clear boundaries between different personality disorders or between any personality disorder, and nonclinical personality variants.

An alternative model of classification holds that category membership is defined in relation to prototypic or ideal types of phenomena. According to the prototype model, category members share a "family resemblance" rather than a specific set of necessary and sufficient criteria (Rosch, 1978). The model explicitly recognizes the lack of clear boundaries between categories, thereby allowing for heterogeneity within categories and similarities across categories. Several authors have suggested that a dimensional model such as one based on the prototype concept is more appropriate than the classical model for describing disorders of personality (e.g., Cloninger, 1987; Kendell, 1975; Livesley, 1991; Millon 1986).

Several studies have examined factors that affect prototypicality judgments of various types of categories, including natural objects (Malt & Smith, 1984; Reed, 1972; Rosch, 1973; Rosch & Mervis, 1975), personality types (Cantor & Mischel, 1977, 1979), and psychodiagnostic groups (Cantor & Genero, 1986; Horowitz, Wright, Lowenstein, & Parad, 1981; Horowitz, Post, French, Wallis, & Siegelman, 1981). Researchers have begun to examine factors that determine diagnostic judgments of the personality disorders within a prototypic classification framework. For example, Clarkin, Widiger, Frances, Hurt, and Gilmore (1983) calculated the "diagnostic efficiency" or prototypicallity of features of Borderline Personality Disorder (BPD) using information about each feature's prevalence within BPD and its distinctiveness to BPD. Blashfield, Sprock, Pinkston, & Hodgin (1985) were able to identify prototypic cases for the personality disorders for 8 out of the 11 current DSM-III categories based on high levels of agreement among professionals and quick reaction time. Blashfield, Sprock, Haymaker, and Hodgin (1989) found a positive correlation between diagnostic reliability and the number of features characteristic of a given personality disorder. Trull et al. (1998) examined the 2-year stability of borderline personality measures and found that, for the most part, reliability was highest for prototypic non-borderline participants as compared to those who were subthreshold for the diagnosis (i.e., nonprototypic). Shopshire and Craik (1996) had clinicians and nonclinicians rate the prototypicality of behavioral acts to everyday personality dispositions and the personality disorders, respectively. Results showed that clinicians judged many of these behavioral exemplars as being prototypical of personality disorders and nonclinicians judged them as being prototypical of everyday personality dispositions. For example, behavioral descriptors prototypical of self-dramatizing and vain dispositions were also found to be prototypical of histrionic personality disorder.

Livesley and colleagues compiled extensive lists of traits and behaviors representative of each of the 11 DSM-III personality disorders from the nosological literature, and had 938 psychiatrists rate each of these items on the basis of prototypicality (Livesley, 1986; Livesley, Reiffer, Sheldon, & West, 1987). The items differed greatly in how typical they were judged to be of the various disorders, and there was surprisingly high reliability across the raters. Boykin (1987) designed case vignettes based upon Livesley's

descriptors, varying the degree of typicality and distinctiveness of the features. As predicted, vignettes composed of highly typical and highly distinctive features were associated with greater diagnostic accuracy and overall prototypicality ratings than vignettes with less typical and/or less distinctive features.

Taken together, these studies suggest that measures of the diagnostic reliability and prototypicality judgments of the personality disorders are associated with the *number* of category features presented, how *typical* or central those features are of the personality disorder, and how *distinctive* or unique the features are to the disorder. Another potential determinant of diagnostic prototypicality judgments, suggested by Cantor (1978), is the proportion of category features (i.e., those characteristic of a given disorder) relative to the total number of features present, known as *dominance*. The present study examines the role of the feature number, feature typicality, and dominance as determinants of the diagnosis of personality disorders. The present investigation was the first to examine the interactive effects of these factors upon the diagnostic process.

METHOD
PARTICIPANTS

Potential participants were randomly selected from telephone directories and from a mailing list of licensed psychologists provided by the North Carolina State Board of Psychology, and were mailed letters requesting their participation in the study. Participation was solicited from 125 licensed, doctoral-level clinical and counseling psychologists who treat individuals with personality disorders in north-central North Carolina. The first 32 clinicians who consented to participate served as subjects. The sample consisted of equal numbers of men and women. The mean age was 41.5 years (SD = 8.0), and the mean number of years of clinical experience was 13.6 (SD = 7.6). Ninety-one percent of the sample worked primarily in outpatient private practice settings, with the remaining 9% working in hospital settings. All subjects reported ongoing experience in the diagnosis and treatment of individuals with personality disorders.

EXPERIMENTAL DESIGN

We examined the role of three factors on the diagnosis of personality disorders from the erratic-dramatic cluster of the DSM-III-R (i.e., histrionic, antisocial, borderline, and narcissistic).[1] The independent variables were: (a) the *number* of category features presented; (b) the degree to which those fea-

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1. The DSM-III-R was used rather than the DSM-IV as the profiles were based on data kindly provided by Livesley (1986) that were based on DSM-III-R criteria. We focused on the four cluster B disorders to ensure that the results were not due to idiosyncratic aspects of any single disorder. Moreover, by limiting the study exclusively to cluster B, we were able to vary the specific disorders portrayed across the various experimental conditions such that each disorder was represented equally across each condition. This would not have been possible if we had included all personality disorders in the DSM-III-R.

tures were highly *typical* of the disorder in question; and (c) the *dominance* of those features (i.e., the proportion of category features to the total number of both category and noncategory features).

The principal design was a 2 (high vs. low category number) x 2 (high vs. medium typicality) x 2 (high vs. low dominance) factorial design, with repeated measures on each factor. Varying both category number and dominance in this manner, however, resulted in the total number of category features covarying with dominance. In order to isolate any effects of dominance from those due simply to the total number of features presented, four additional cells were added to the design. In this addition, the total number of features was varied relative to the original design, while dominance was held constant; the two levels of category number and the two levels of typicality remained unchanged. Thus, the final design consisted of 12 experimental conditions (see Figure 1). The distinctiveness of the category features was held constant across conditions.

As noted in Figure 1, the dominance or proportion of category features over the total number of features presented was one-third for the low-dominance condition and two-thirds for the high-dominance condition. Within the low-dominance condition, the number of category features was one and three for low versus high number of category features, respectively. Within the high-dominance condition, the number of category features was two and six, respectively.

The typicality of the category features was varied from medium to high, rather than from low to high. Since the noncategory features were of low typicality, it was necessary to present category features of at least medium typicality in order to obtain a sufficient contrast with the low typicality noncategory features. In addition, medium versus high typicality conditions were selected to reduce the likelihood of a robust main effect for typicality to override any interactions among the independent variables. As elaborated below, the medium and high typicality features were derived from data provided by Livesley (1986).

STIMULUS MATERIALS

A total of 48 personality profiles was constructed, with a profile representing each of the four erratic-dramatic cluster personality disorders from DSM-III-R in each of the 12 experimental conditions. The profiles were composed of various behavioral and trait descriptions derived by Livesley (1986; e.g., "reacts intensely to separation from others"; see Appendix A). The profiles consisted simply of a list of such descriptors, without demographic or other case history information. The profiles consisted of both "category features," which represented the intended target personality disorder, as well as "noncategory features," described below. The category features varied from high to medium typicality. The high-typicality personality features were drawn from the first quartile of Livesley's item ranking for each personality disorder (i.e., those receiving the highest typicality ratings by 938 clinicians). The medium-typicality features were drawn from the middle two quartiles, and the noncategory features were drawn from the fourth quartile (i.e., least typical) of the seven personality disorders that were *not* part of the

	Low Dominance Low Total Number		Low Dominance High Total Number		High Dominance Low Total Number	
	Low Category Number	High Category Number	Low Category Number	High Category Number	Low Category Number	High Category Number
Medium Typicality	$\frac{1}{3}$	$\frac{3}{9}$	$\frac{2}{6}$	$\frac{6}{18}$	$\frac{2}{3}$	$\frac{6}{9}$
High Typicality	$\frac{1}{3}$	$\frac{3}{9}$	$\frac{2}{6}$	$\frac{6}{18}$	$\frac{2}{3}$	$\frac{6}{9}$

FIGURE 1. Experimental Design. *Note.* Within each cell, the numerator represents the number of category features and the denominator represents the total number of features.

erratic-dramatic cluster. Each subject received 12 profiles, one for each experimental condition. The disorders portrayed in the profiles were counterbalanced across the conditions so that each subject received three profiles representing each of the four disorders. In addition, the order of presentation of the features within each profile was varied randomly.

DEPENDENT MEASURES

After reading each of the 12 patient profiles, subjects were asked to provide ratings on 1 to 7 Likert scales of how typical the profile was of *each* of the 11 DSM-III-R personality disorders, with 1 representing the least and 7 representing the most typical. Subjects then provided the diagnosis that they felt best fit the person described in the profile. The principal dependent measure was the 1 to 7 prototypicality rating for the target personality disorder divided by the mean typicality rating given by that subject for the other 10 personality disorders. This "prototypicality index" could range from 1/7 (or .14290) to 7. This measure provided an index of the subject's assessment of how prototypical each profile was of the target personality disorder in the context of his or her baseline prototypicality ratings of the other personality disorders.

PROCEDURE

Subjects were mailed the 12 personality profiles, along with detailed instructions. They were instructed to complete the task in one sitting. It was emphasized that the study was not a test of their clinical abilities, but rather a study of the diagnostic process of experienced, practicing clinicians. Sub-

jects were therefore requested to refrain from referring to the DSM-III-R, textbooks, or any other source when completing the task. Upon completion, subjects mailed the materials back to the experimenter, and were subsequently fully debriefed.

RESULTS

For the purpose of data analysis, the 12 experimental conditions were broken down into two separate but overlapping designs, each of which was analyzed by means of a repeated measures analysis of variance (ANOVA). The first analysis examined the effects of feature typicality, dominance, and category number. As noted above, because varying the levels of dominance also resulted in covariation of the total number of features presented, a second analysis examined typicality, total feature number, and category number.[2]

The first analysis was a 2 (medium vs. high typicality) X 2 (low vs. high dominance) X 2 (low vs. high category number) repeated measures ANOVA (see Table 1). A main effect for typicality was revealed, with profiles composed of highly typical features being rated as more typical than profiles composed of moderately typical features, $F(1, 222) = 31.52$, $p < 0001$. A main effect for dominance was also found, $F(1,222) = 13.14$, $p < .0001$. Clinicians rated the hypothetical patient as being a more prototypical case of the target diagnosis when the category features in the profile represented a high proportion of all features presented relative to when they represented a less dominant proportion. The main effect for category number did not reach significance, nor were there any significant interaction effects (all ps > .05).

To ensure that there were no effects due to the total number of features presented in the profiles, a 2 (medium vs. high typicality) x 2 (low vs. high category number) x 2 (low vs. high total number) repeated measures analysis of variance was conducted (see Table 2). A significant main effect was again found for feature typicality, $F(1, 218) = 26.20$, $p < .0001$, with clinicians rating the patient as being more prototypical of the target diagnosis when category features were of high typicality as compared to those of only medium typicality. A significant main effect was not found for category number ($p > .05$). Also, consistent with predictions, there was no effect for total feature number, and none of the interactions approached statistical significance (all ps > .05).

DISCUSSION

The purpose of the present study was to examine how features associated with particular personality disorders, as well as how the contexts in which those features are presented, impact clinicians' judgments of the prototypicality of personality profiles with respect to the DSM-III-R personality disorders. Consistent with prior research, our results revealed that

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2. In addition to the ANOVAs on the ratio dependent measure, the data were also analyzed using unadjusted raw scores. These results paralleled exactly those described below for the ratio measure, and are therefore not described in detail.

TABLE 1. Typicality by Dominance by Category Number Repeated Measures Analysis of Variance

Source	Sums of Squared	df	F	p
Typicality	25.51	1	31.562	0.0001*
Dominance	10.63	1	13.18	0.0001*
Category Number	0.58	1	0.72	0.097
Typ × Dom	1.87	1	2.31	0.097
Typ × Cat#	0.12	1	0.15	0.130
Dom × Cat#	1.76	1	2.17	0.701
Typ × Dom × Cat#	0.80	1	0.99	0.321
Error	179.71	222		

*$p < .0001$

case descriptions were judged as being more prototypical of a specific personality disorder when they contained features that were highly typical of that disorder rather than features that were less typical. Interestingly, the number of features typical of a diagnosis was not found to be related to prototypicality ratings. In addition, stronger effects were noted for dominance, or the proportion of features consistent with a diagnostic category compared to the effects for the total number of features presented.

Results suggest that clinicians may use a prototype-based model instead of a classic category classification system when diagnosing personality disorders, and future editions of the DSM may benefit from systems that capitalize on these information-processing tendencies in clinical decision making. The strong effects of feature typicality underscore the importance of incorporating features of prototype models in the classification of personality disorders. The personality disorder categories of DSM-III-R, and more recently DSM-IV, are vastly improved relative to earlier systems, but are still based on the assumption of equal importance of the category features. Moreover, the number of category features is emphasized to the exclusion of other factors. For example, in the case of Borderline Personality Disorder, the DSM-IV requires only that any five of a list of nine symptoms be present. The present results suggest that some symptoms are much more critical than others, and this variability must be taken into account if the utility of the diagnostic system is to be maximized. For example, rather than requiring any five of a list of nine features for a diagnosis of Borderline Personality Disorder, each feature could be assigned an empirically-derived typicality weight. The sum of these weights would reflect the degree to which the personality disorder prototype in question characterized that patient (Widiger, Frances, Spitzer, & Williams, 1988). If a categorical diagnosis was required, it could be made when the sum of the weights reached a certain empirically-derived threshold. Alternatively, one could rate each patient on each feature, and multiply that rating by the weight of the feature.

Others have suggested classification systems that are more amenable to a prototypic approach that also capitalize on dimensional-based diagnosis. Lynam and Widiger (2001) asked experts to rate prototypic cases of the ten DSM-IV personality disorders based on the Five-Factor Model of personality

TABLE 2. Typicality by Category Number by Total Number Repeated Measures Analysis of Variance

Source	Sums of Squared	df	F	p
Typicality	16.92	1	26.20	0.0001*
Category Number	0.52	1	0.80	0.37
Total Number	0.78	1	1.20	0.27
Typ × Cat#	2.31	1	3.58	0.060
Typ × Tot#	0.19	1	0.30	0.587
Cat# × Tot#	1.66	1	2.58	0.110
Typ × Cat# × Tot#	0.10	1	0.15	0.702
Error	179.71	222		

*$p < .0001$

traits (Widiger & Costa, 1994). Each of the five broad factors were subdivided into six subfacets, yielding 30 categories in all. A patient's profile based on the 30 subfacets could be compared to these expert-derived templates of the personality disorders, and the closer the correspondence, the more he/she can be said to exhibit the disorder. Westen and Shedler (2000) proposed a similar model. They argued for a classification system that capitalizes on the strengths of both dimensional and categorical diagnosis. Using a modified Q-sort procedure, they derived seven orthogonal factors from clinicians' rank ordering of personality descriptor cards. Westen and Shedler's system incorporates a prototype-matching model in which a patient's Q-sort scores are correlated with the Q-sort-derived diagnostic templates. The patient's personality can be rated on a 5-point scale for items within each template as to how typical he/she is of the particular descriptor. Empirically derived cutoff scores also could be used to provide a categorical classification. Of course, research is needed to determine if such systems would in fact result in increased diagnostic specificity and reliability, and if so, if these improvements would outweigh the increased cumbersomeness that such systems would entail.

There are also potential drawbacks to using a prototype approach to diagnosis that may actually be detrimental to the reliability and validity of clinical judgments (Salovey & Turk, 1991). For example, Blashfield and Flanagan (1998) used a non-prototype case to study clinical decision making. They presented the case to clinicians in cumulative bits of information and participants were asked to supply a diagnosis after each step based on what was already revealed. They found that the diagnostic choices that clinicians made at each step matched the personality disorder feature or prototype that was just presented. Furthermore, those who assigned a diagnosis of Borderline Personality Disorder at Step 3 tended to keep it as a final diagnosis (after Step 9). In other words, a confirmation bias emerged and clinical decision making was influenced by prototypic examples of the borderline diagnosis early on that were carried through, even in the face of disconfirming evidence later on.

Furthermore, the strong effects of dominance found in the present study suggest that case presentations with category features equivalent in typical-

ity, number, and distinctiveness can have very different effects upon the diagnostic process as a function of the total context in which that information is portrayed. If diagnoses were determined based only on the presence of certain category features, no dominance effect would have occurred. Our results support Livesley's (1985a, 1985b) assertion that a negative correlation exists between the number of competing features presented and measures of diagnostic prototypicality. Moreover, the strong dominance effect raises questions about the clinical lore that the more assessment information clinicians gather, the more attuned they necessarily are to the most important pathognomonic features of their patients' psychopathology. Although intricate accounts of the subtleties of a patient's behavior may be quite interesting, some of these accounts may mask highly prototypical and distinctive features that would otherwise lead to effective assessment and treatment.

The present results, together with those of Boykin (1987), contradict the general conclusion of the prototype literature that category feature number is the most critical determinant of the diagnostic process. The category features that were used in previous studies (e.g., Blashfield et al., 1989; Cantor & Mischel, 1979; Horowitz, Post et al., 1981; Horowitz, Wright et al., 1981; Rosch & Mervis, 1975) were uniformly of high typicality. Therefore, rather than simply varying the number of category features, these studies varied the number of highly typical category features. In each of these studies, the significant effects of the number of these highly typical features were attributed to number alone, rather than to feature typicality or a combination thereof. The present study, however, utilized previous data regarding feature typicality and distinctiveness (Livesley, 1986), thereby enabling an examination of the effects of other qualities of category features independent of number.

The absence of a significant effect for category feature number in this study may be due in part to the strong effects of feature typicality. Two or three very highly typical features characterize each of the personality disorders. It may be that when these features are present the diagnosis will generally be made, and the number of additional features becomes largely irrelevant. The present results do not suggest that category feature number plays a significant role in the outcome of the diagnostic process, but that other qualities of the category features themselves, as well as the context of all the features with which they are presented, are more important.

The analogue nature of the present methodology allowed for the disambiguation of the effects of factors that are otherwise difficult to tease apart. Nevertheless, further research is needed using more realistic stimulus materials (e.g., videotapes of actual or dramatized patients; cf. Herbert, Nelson, & Herbert, 1988) in order to increase the external validity of the results. Moreover, the study included only two levels of each factor, thereby limiting the generalizability of the results. Further research is needed to explore whether the present results hold up under other stimulus parameters.

Finally, it is important to note that the unit of observation in this study was the diagnostic behavior of clinicians rather than direct measurement of the attributes of persons with personality disorders. Although studies of factors that impact clinicians' diagnostic practices are vital (Livesley, 1991), they only indirectly reflect underlying "truths" about the nature of personality dis-

orders themselves (Grove & Tellegen, 1991). Trull, Widiger, and Guthrie (1990), for example, used a statistical technique known as maximum covariance analysis, and found that the pattern of occurrence of features of Borderline Personality Disorder among psychiatric inpatients is more consistent with a dimensional than a categorical model. Refinements in the nosology of the personality disorders must also take into account data derived directly from personality disordered individuals and their families.

APPENDIX. SAMPLE PERSONALITY PROFILE

1. Please read the following profile and think about the individual who is described. This individual can be described in the following way:

- reacts intensely to separation from others
- unstable interpersonal relationships
- loss of appreciation for total context due to preoccupation with trivia
- intense, irrational, inappropriate anger
- frequently overwhelmed by intense affects, either hostility or depression
- unable to experience pleasure; anhedonic
- shows impaired reality testing under stress
- feelings of depersonalization and derealization; sees self as artificial
- conflicting emotions of love, anger, and guilt felt toward those upon whom he/she depends

2. For each of the categories listed below, please circle a number between 1 and 7 to indicate how typical the individual is of each category.

3. After Step 2, please decide which single category best describes the individual. Put a checkmark (✓) in the blank next to the category you have selected. Use the optional comments section to clarify any responses you think might be misunderstood.

Category	Typicality Rating (how well the person described fits each category; 7 = best fit or "classic" example, 1 = poorest fit or most atypical example)
__ Antisocial P.D.	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
__ Avoidant P.D.	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
__ Borderline P.D.	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
__ Dependent P.D.	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
__ Histrionic P.D.	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
__ Narcissistic P.D.	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
__ Obsessive–Compulsive P.D.	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
__ Paranoid P.D.	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
__ Passive–Aggressive P.D.	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
__ Schizoid P.D.	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
__ Schizotypal P.D.	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
__ Other (specify: ____)	1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __

4. Comments (optional):

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