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Types of Dissociation and Dissociative Types: A Taxometric Analysis of Dissociative Experiences

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This article examined evidence for dimensional and typological models of dissociation. The authors reviewed previous research with the Dissociative Experiences Scale (DES; E. B. Bernstein-Carlson & F. W. Putnam, 1986) and note that this scale, like other dissociation questionnaires, was developed to measure that so-called dissociative continuum. Next, recently developed taxometric methods for distinguishing typological from dimensional constructs are described and applied to DES item-response data from 228 adults with diagnosed multiple personality disorder and 228 normal controls. The taxometric findings empirically justify the distinction between two types of dissociative experiences. Nonpathological dissociative experiences are manifestations of a dissociative trait, whereas pathological dissociative experiences are manifestations of a latent class variable. The taxometric findings also indicate that there are two types of dissociators. Individuals in the pathological dissociative class (taxon) can be identified with a brief, 8-item questionnaire called the *DES-T.* Scores on the DES-T and DES are compared in 11 clinical and nonclinical samples. It is concluded that the DES-T is a sensitive measure of pathological dissociation, and the implications of these taxometric results for the identification, treatment, and understanding of multiple personality disorder and allied pathological dissociative states are discussed.

In his original formulation of the construct, Pierre Janet (1889) viewed clinical dissociation as a discontinuity in awareness that is rarely experienced by healthy individuals (Perry & Laurence, 1984). His contemporaries, William James (1890/1983) and Morton Prince (1905/1978), disagreed, arguing that dissociation is a continuous or quantitative variable present to a greater or lesser degree in everyone, a view that is widely held today. Although some continue to hold open the possibility of a qualitative difference between normal and pathological forms of dissociation (e.g., Frankel, 1990), most investigators conceptualize dissociation as ranging along a continuum from ''normal'' dissociative states such as daydreaming (Singer, 1966) to the more pathological forms represented by the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) dissociative disorders (American Psychiatric Association [APA], 1987).

Consistent with this latter model, recently developed dissociation scales (Bernstein-Carlson & Putnam, 1986; Carlson & Putnam, 1993; Putnam, Helmers, & Trickett, 1993; Riley, 1988; S. Sanders, 1986) assess a person's standing on one or more dissociative dimensions. Research on these scales has

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also relied on statistical procedures for dimensional reduction. For instance, the Dissociative Experiences Scale (DES; Bernstein-Carlson & Putnam, 1986; Carlson & Putnam, 1993), which is "the most widely used and studied screening instrument in the dissociative disorders field" (Kluft, 1993, p. 1), has been the focus of several recent factor-analytic studies (Fischer & Elnitsky, 1990; Ross, Joshi, & Currie, 1991). A consistent finding from these studies is that when a diverse pool of dissociation items are examined, three factors reliably emerge: (a) Absorption, (b) Derealization/Depersonalization, and (c) Amnesia for Dissociative States. Although this line of research has advanced our understanding of dissociative symptomatology, caution may be in order here because, to date, no study has directly assessed the verisimilitude of the dimensional model of dissociation (cf. Balthazard & Woody, 1989; Barrett, 1992; Frankel, 1990).

In this article, we propose that there are distinguishable types of dissociative phenomena and that for one type of dissociation the dimensional or trait model is misguided. Specifically, we propose that Janet's (1889) original typological model of dissociation better accounts for the empirical relations among pathological dissociative symptoms. In support of our position, we present several converging lines of evidence that indicate that pathological dissociation behaves as a taxon or discrete latent variable.

In the following sections we review the DES and other dissociation measures and suggest that many of these scales conflate two related, though conceptually and empirically distinguishable, constructs that we call *pathological* and *nonpathological dissociation.* We maintain that evidence supporting the trait model of dissociation derives primarily from studies of nonpathological dissociation, such as investigations of hypnotizability (H. Spiegel, 1963) and absorption (Tellegen & Atkinson, 1974; Tellegen, Lykken, Bouchard, & Wilcox, 1988). Next, we review recently developed taxometric procedures (Golden, 1982; Golden & Meehl, 1973; Grove & Meehl, 1993; Meehl, 1973; Meehl & Golden, 1982; Meehl & Yonce, 1994) that are designed to distinguish taxonic (typological) from dimensional constructs. We then apply three taxometric methods to DES item-response data from a large sample of normal persons and persons diagnosed with multiple personality disorder (MPD; Putnam, 1989a; Ross, 1989). Our taxometric findings suggest that taxon members can be reliably identified with a brief eight-item subscale from the DES, which we have labeled the *DES-T.* Finally, using data from an aggregated pool of 1,574 subjects, we compare the DES-T and DES in 11 clinical and nonclinical samples. In the remainder of this section we describe the measurement of dissociative experiences and present a didactic overview of taxometric procedures.

Measuring Dissociative Experiences

The DES was created in the mid-1980s to address two deficits: (a) the need for a simple clinical screening instrument to detect dissociative disorders and (b) the need for a measure to quantify dissociation in research studies. DES questions were derived from several sources. A number of the questions were adapted from an earlier, unpublished dissociation measure, the General Amnesia Profile, authored by David Caul and Cornelia Wilbur. Others were adapted from oral clinical tradition best exemplified by the MPD clinical interview taught over the last decade and a half as part of the annual American Psychiatric Association workshop on multiple personality disorder. Some of the questions were based on extensive clinical experience.

As conceptualized at the time of writing, there were several themes or issues evident in the DES questions. First and foremost were two themes related to amnesia: (a) evidence that an individual had engaged in complex behavior for which he or she had no memory and (b) the experience of "coming to" in the midst of some activity and having little or no idea how one became engaged in the situation. A second theme involved depersonalization/derealization, assessed by questions that specifically probed more extreme forms of these experiences such as out-of-body experiences or sensory disturbances. A third theme concerned experiences of intense absorption in which one lost contact with current surroundings. A number of questions, having to do with determining whether experiences or memories really occurred or were only imagined, are related to all of the above themes and tap the effects of dissociation on metacognitive self-monitoring functions.

As previously noted, the underlying structure of the DES (Bernstein-Carlson & Putnam, 1986) has been investigated by factor analysis. To date, four studies (Carlson et al., 1991; Fischer & Elnitsky, 1990; Frischholz, Schwartz, Braun, & Sachs, 1991; Ross et al., 1991) have directly assessed the DES factor structure. Three of these (Carlson et al., 1991; Frischholz et al., 1991; Ross et al., 1991) conclude that a three-factor solution best accounts for the empirical relations among the dissociative experiences tapped by the DES, whereas the fourth study (Fischer & Elnitsky, 1990) suggests that a single dimension is sufficient. In other words, some studies support the notion of multiple forms of dissociative experiences, whereas others argue for a unitary or homogeneous dissociative continuum. In the multidimensional solutions the three factors were labeled as follows: (a) Amnesia for Dissociative Experiences (example item: Some people have the experience of finding themselves in a place and having no idea how they got there), (b) Absorption and Imaginative Involvement (example item: Some people find that when they are watching television or a movie they become so absorbed in the story that they are unaware of other events happening around them), and (c) Derealization/Depersonalization (example item: Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something and they actually see themselves as if they were looking at another person).

Other psychological constructs that are often included under the dissociation rubric include Hypnotic Susceptibility (Weitzenhoffer & Hilgard, 1963), fantasy proneness (reviewed by Lynn & Rhue, 1988), and absorption and imaginative involvement (Tellegen & Atkinson, 1974; Tellegen & Waller, in press). The theoretical and empirical relations among these constructs have recently been examined (Cardeña & Spiegel, 1991; Frischholz et al., 1992; Lynn & Rhue, 1988; Nemiah, 1985; O'Grady, 1980; Smyser & Baron, 1993; D. Spiegel, Hunt, & Dondershine, 1988). We have found that drawing firm conclusions from this literature is difficult because many investigators use the word *dissociation* loosely to denote both pathological and nonpathological altered ego states (Frankel, 1990). This is unfortunate for several reasons. Although measures of hypnosis and absorption often correlate with popular dissociation scales (e.g., Frischholz et al., 1992), they generally do not assess the more pathological dissociative symptoms—such as amnesia for dissociative states—that are definitive of the clinical dissociative disorders (Frankel, 1990; Smyser & Baron, 1993). Rather, they correlate more strongly with the nonpathological or healthy forms of dissociation that are also represented in scales such as the DES (e.g., by the absorption items). Nevertheless, some of this literature is pertinent to our thesis that pathological dissociation behaves as a typological variable.

Hilgard (1965, pp. 221–227) speculated that there are discrete hypnotic types (see also Balthazard & Woody, 1989; Pekala, 1991) on the basis of the finding that hypnotic suggestibility scores are bimodally distributed. Hilgard also observed (Hilgard & Hommel, 1961), as have other investigators (Cooper, 1972; Evans & Thorn, 1966), that posthypnotic amnesia scores are distributed bimodally. These observations are relevant in this context because under some conditions (Murphy, 1964), but not others (Grayson, 1987), bimodality provides evidence for the typological nature of a construct. Moreover, Hilgard found that only a fraction of highly hypnotizable subjects—the so-called hypnotic virtuosos (Hilgard, 1977, p. 155) or somnambulists—experience the hidden observer phenomenon that has played such a prominent role in his neodissociation theory (Hilgard, 1977). Collectively, these observations provide additional evidence for the typological model of pathological dissociation, because psychogenic amnesia and divided consciousness are clinically relevant dissociative symptoms (Steinberg, 1993).

In summary, we noted that most theoretical and empirical work on psychological dissociation has either implicitly or explicitly endorsed the notion of a dissociative continuum. We cautioned that the dimensional model of dissociation has yet to be rigorously tested, and we emphasized that the word *dissociation* has been used loosely to refer to conceptually distinguishable constructs. Finally, we suggested that a taxonic or typological model may be better suited for characterizing pathological dissociative symptoms. In the following sections we outline three psychometric methods that distinguish taxa from dimensional constructs, and we apply these methods to a large sample of DES item-response data to compare the relative utility of the dimensional and typological models of dissociation.

A Conceptual Review of Taxometric Methods

The word *taxon,* as with many scientific terms, cannot be defined precisely (Carnap, 1945). It has been used contextually to imply a "type," a "natural category," or a "nonarbitrary class" (Meehl, 1992, p. 120). Procedures for identifying taxa—or for distinguishing taxonic from dimensional variables—are called taxometric methods. The taxometric methods described in the following sections were originally developed by Paul Meehl and his colleagues (Grove & Meehl, 1993; Meehl, 1965; 1973; Meehl & Golden, 1982; Meehl & Yonce, 1994) to rigorously test Meehl's typological model of schizotaxia (Meehl, 1962, 1989; see also Lenzenweger & Korfine, 1992). In recent years these methods have been used to identify other heuristic clinical and personological types (Erlenmeyer-Kimling, Golden, & Cornblatt, 1989; Gangestad & Snyder, 1985; Golden & Meehl, 1979; Strube, 1989). They have also been used to test the typological status of categorically defined psychiatric diagnoses, such as the *DSM* (3rd ed., rev.; *DSM–III–R*) conception of Borderline Personality Disorder (APA, 1987; Trull, Widiger, & Guthrie, 1990).

An important characteristic of our taxometric procedures is that they allow the data, rather than professional fiat (cf. Trull et al., 1990), to determine whether the taxonic model is appropriate. Notice that when we use the word *taxon,* we are not referring to an arbitrary class or a convenient dichotomization of a continuously distributed variable. Stated more formally, we are not referring to a densification in an indicator hyperspace that is hypostatized for communicative convenience. Social scientists frequently use words such as *obese* and *extrovert* as if they referred to natural types, when in actuality these terms merely signify an unspecified range on the upper tails of continuous distributions (obesity and extroversion). In contrast with this practice, we believe in the reality of certain psychological types. Consequently, we require our putative taxon indicators to cohere in a specifiable manner that is psychometrically distinguishable from that produced by dimensional variables.

In the next section we describe the requisite taxometric evidence for distinguishing types from continua. In our discussion of this material we emphasize basic concepts rather than algebraic proofs whenever possible, and we illustrate these concepts with graphical displays. Readers wishing for a more mathematical treatment of these issues can consult the original sources that are cited below. The three taxometric procedures that we describe are MAMBAC (Meehl & Yonce, 1994), MAXSLOPE (Grove & Meehl, 1993), and MAXCOV-HITMAX (Meehl, 1973; Meehl & Golden, 1982).

MAMBAC

MAMBAC is an easily implemented yet powerful taxometric procedure that was developed by Meehl and described by Meehl and Yonce (1994). The acronym is an abbreviation of the phrase mean above minus mean below a sliding cut. The name is descriptively accurate because when implementing MAMBAC, a researcher systematically partitions an ordered list of taxon indicator scores at a desired cut and then subtracts the mean of the scores below the cut from the mean of the scores above the cut. A plot of the mean differences takes on a characteristic shape if the indicators measure a taxonic variable and a different but equally recognizable shape if they measure a dimensional variable. Illustrative MAMBAC plots are presented later. First, we explicate the logic of MAMBAC and other taxonic methods by considering a well-known typological variable from organic medicine: meningitis. Our treatment of this example draws heavily from recent publications and professional talks by Paul Meehl (Meehl, 1995; Meehl & Yonce, 1994).

Meningitis is a disease state that is characterized by several well-known diagnostic symptoms. For example, persons with meningitis often complain of pain on anteroflection of the neck. Afflicted persons also typically present with high fever. Both of these symptoms are diagnostically informative, although it is noteworthy that within an ailing sample the covariance (or alternatively, the correlation) between the symptoms is essentially zero. We emphasize this last point because of its relevance to the logic of taxometrics. Specifically, in a sample of patients with meningitis the degree of painful neck stiffness is not a function of body temperature, or vice versa. Nevertheless, both symptoms are recognized signs of disease status.

Imagine a sample of healthy individuals, or at least a collection of people without meningitis. Most people in this sample will be free of painful neck stiffness, although a few persons may feel stiff because of a poor sleeping posture, whiplash, or a different cause that is not related to meningitis. Likewise, most people will have normal body temperatures, although some may be feverish because of nonspecific maladies. The important point here is that in a sample of healthy subjects the correlation between the two symptoms is also zero.

Now imagine that a healthy sample and an afflicted sample have been combined. What happens to the correlation between the two indicators? It is easily demonstrated that in the combined sample the symptoms will be positively correlated. Most afflicted persons will have painful neck stiffness and elevated body temperatures, whereas most healthy persons will have neither symptom. Meehl (1973) has demonstrated that with taxonic data from a mixed sample the covariance between taxon indicators is a specifiable function of (among other terms) the group mixture proportions and the difference between the taxon and complement group means on the two indicators. He has formalized this result in an important equation known as the general covariance mixture theorem (Meehl & Golden, 1982), which states that the covariance between any pair of taxon indicators, x and y, can be expressed as

$$\text{cov}(xy) = P\,\text{cov}_t\,(xy) + Q\,\text{cov}_c\,(xy) + PQ(\bar{x}_t - \bar{x}_c)(\bar{y}_t - \bar{y}_c), \qquad (1)$$

where cov(xy) denotes the covariance of variables x and y; $\bar{x}_i$ is the mean of variable x in subgroup i; $\bar{y}_i$ is the mean of variable y in subgroup i; P refers to the taxon base rate or the proportion of taxon members in the mixed sample; Q equals $1 - P$; and subscripts t and c denote the taxon and complement groups, respectively.

An interesting situation arises when the covariance between a pair of taxon indicators is a function of only the mean group differences and the group mixture proportions. Meehl (1973) has established that when the within-group (intrataxon or nuisance) covariances are zero or smallish (defined as a correlation less than .30) it is possible to estimate the taxon and complement base rates (i.e., the P and Q of Equation 1) in a mixed sample. These values can then be used to obtain likelihood estimates that a given individual belongs to the taxon or complement latent class.

Because MAMBAC focuses on group means rather than indicator covariances or correlations, the relevance of the general covariance mixture theorem for understanding MAMBAC may not be immediately apparent. It is relevant because a correlation between a continuous variable and a dichotomous variable can be reexpressed, without loss of information, as a standardized group mean difference (see Rosenthal, 1984, p. 21). That is, a point-biserial correlation and a t test provide alternative and equally informative means of describing the linear relationship between a continuous variable and a dichotomous variable. In the case of MAMBAC the dichotomous variable signifies membership status in the hypothesized taxon. The problem, of course, is in determining the members of the taxon class. MAMBAC solves this problem as follows.

First, consider a quantitative indicator y with sizable validity for discriminating taxon from nontaxon members. In the aforementioned example, body temperature would be such an indicator. If we partition the sample into two groups according to taxon status—that is, we place all of the true taxon members in one group and all of the true nontaxon members in the complement group—then the difference between the group means on y ($\Delta\bar{y}$) will be as large as can be made without directly considering the y values when forming the groups. Now if we arbitrarily assign taxon members to the complement class (e.g., if we randomly call a few individuals with meningitis healthy), and we assign a few nontaxon members to the taxon class (we randomly call some healthy individuals affected), the difference between the group means on y will be smaller than before. As group assignments become increasingly random, the group differences on y approach 0.00.

Now consider a second variable, x, that also possesses high validity for discriminating the taxon from nontaxon members. If x and y are independent within groups (i.e., the intragroup or nuisance covariance of x and y is zero), then, as noted previously, the indicator correlation within the mixed-sample results solely from the taxonic mixture (i.e., the proportion of members in each class and the class mean differences on the indicator variables; see Equation 1). This suggests that the optimal cut for partitioning the data can be identified by first sorting the y scores on the basis of their x values. If x and y are valid indicators of the taxon, then sorting y on the basis of x will also tend to sort y on the basis of the underlying class variable. That is, persons with scores at one extreme of the sorted y values will have a high likelihood of belonging to the taxon class, whereas persons with scores at the other extreme of the y values will have a high likelihood of belonging to the nontaxon class. Meehl has ascertained that under these conditions there will be an orderly relationship between the mean group differences on y when groups are formed according to an ordered series of partitions on x.

Specifically, Meehl and Yonce (1994) defined $\bar{d}_y(x)$ as the difference between the mean of the y scores that are above an x cut and the mean of the y scores that are below an x cut. For any pair of indicators there will be as many group differences on y as there are cuts on x. These mean differences on y can be plotted for each x cut as the cut moves along the ordered x scores. As is illustrated in Figure 1, plots from taxonic data look unmistakably different from plots that are produced by dimensional data. Figure 1A illustrates that a plot from taxonic data resembles a curve that is convex (like a hill), whereas Figure 1B shows that a plot from dimensional data resembles a curve that is concave (like a valley). To highlight the orderly pattern of these data, we have overlaid

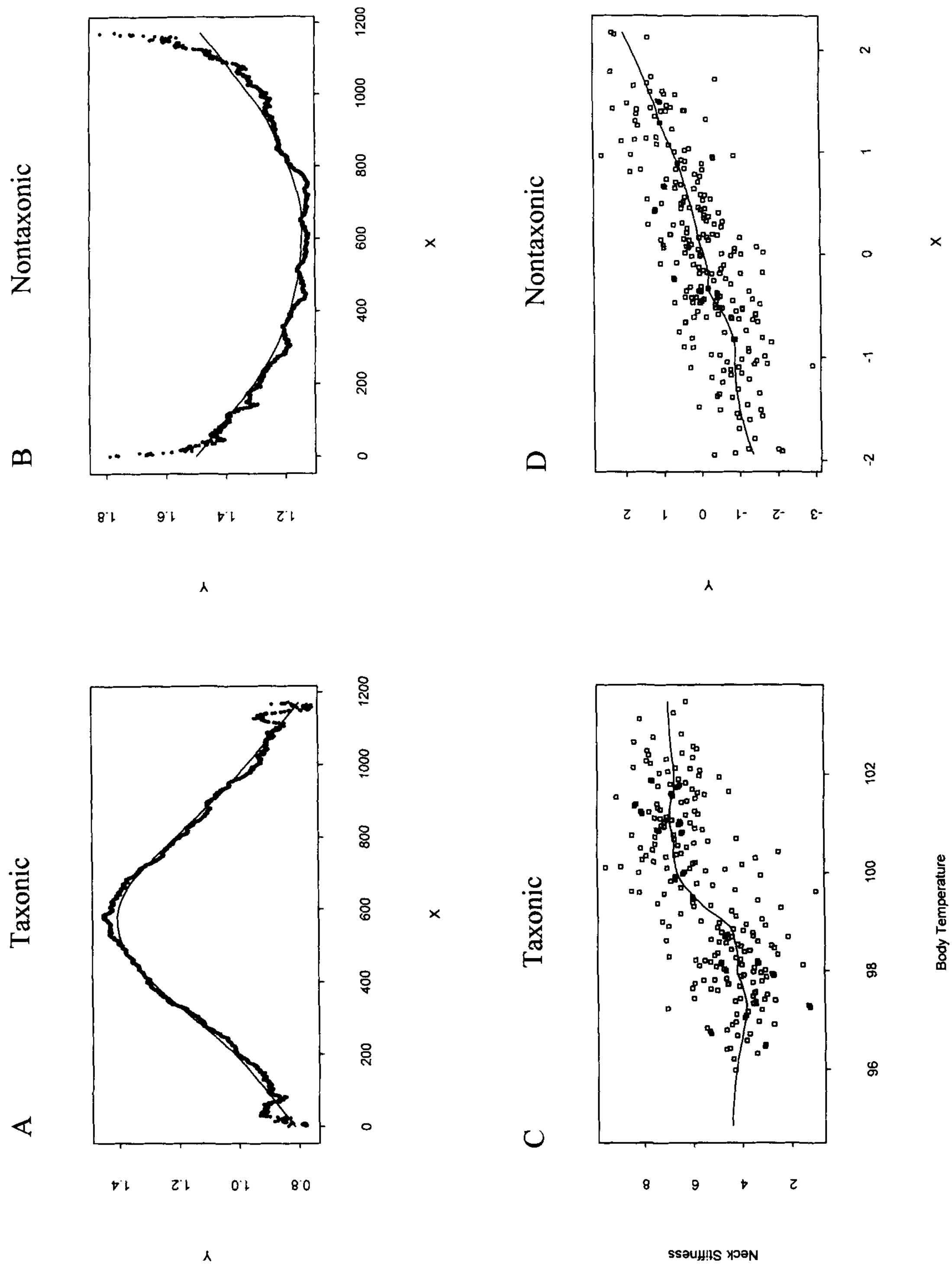

Figure 1. Representative taxonic and nontaxonic plots.

smoothed regression lines on the plots using a locally weighted smoother known as LOWESS (locally weighted scatterplot smoother; Chambers, Cleveland, Kleiner, & Tukey, 1983; Cleveland, 1979).

Distinguishing taxonic from dimensional MAMBAC plots is a relatively easy task. In a recent large-scale investigation of this problem, Meehl and Yonce (1994) demonstrated that even psychometrically naive individuals can identify taxonic MAMBAC plots with an accuracy that is greater than 95%. These authors also reported how MAMBAC can be used to estimate taxon base rates in mixed samples and to assign individuals to either the taxon or nontaxon class.

As with all taxometric procedures, MAMBAC is most powerful when it is used on multiple indicators. When more than two indicators are available, an investigator can examine the consistency of the various MAMBAC parameter estimates (e.g., the base-rate estimates). Consistency among the estimates provides additional (and necessary) evidence that the data have been sampled from a mixture of at least two distinct populations. In other words, the data provide consistent evidence for the existence of at least two types of individuals. In the next section we describe a second taxometric procedure, called *MAXSLOPE* (Grove & Meehl, 1993), that also can be used with a minimum of two indicators.

MAXSLOPE

MAXSLOPE is a simple regression-based procedure for taxometric analyses that was recently developed by Grove and Meehl (1993). Two powerful features of the procedure (that are shared with MAMBAC) are that it is easily illustrated using graphical displays and that it can be easily implemented using widely available statistical software (Becker, Chambers, & Wilks, 1988; StatSci, 1993). To grasp the underlying logic of MAXSLOPE, imagine once again that one is working with a pair of valid indicators of a conjectured latent taxon. Call these indicators x and y. Previously, we noted that the covariance of x and y can be formalized in terms of the general covariance mixture theorem (Equation 1). Recognizing that the variance of a variable is simply the covariance of that variable with itself (Hayduk, 1987, p. 13), one can also use the general covariance mixture theorem to define the components of the variance in a mixed sample. Specifically,

$$\mathrm{var}(x) = P\ \mathrm{var}_t(x) + Q\ \mathrm{var}_c(x) + PQ(\bar{x}_t - \bar{x}_c)(\bar{x}_t - \bar{x}_c), \tag{2}$$

and

$$\mathrm{var}(y) = P\ \mathrm{var}_t(y) + Q\ \mathrm{var}_c(y) + PQ(\bar{y}_t - \bar{y}_c)(\bar{y}_t - \bar{y}_c), \tag{3}$$

where all terms that appear in Equation 1 are defined as before; any expression of the form $\mathrm{var}_i(a)$ denotes the variance of variable a in subgroup i. These equations hold in the total sample and in any subset on variable a (e.g., x or y) when subsets include all persons in the interval a_{lower} to a_{upper}.

A well-known result from statistical theory is that the linear regression of y on x can be expressed as the ratio of cov(y, x) over var(x). This implies that the regression coefficient can also be expressed as the ratio of Equation 1 over Equation 2. Moreover, this result holds in any subset of the data when subsets are defined as above, that is, when individuals are chosen such that their x scores lie between lower and upper bounds on the x continuum. As the width of the interval becomes smaller, the regression weight converges to a constant that can be interpreted as the conditional slope (i.e., the derivative) of y on x for a specific x value.

In cases where x and y are indicators of a dimensional variable, the conditional slopes will be approximately equal. On the other hand, when x and y are indicators of a taxonic variable, the conditional slopes will not be equal. This is easily demonstrated by plotting regression lines for both dimensional and taxonic data.

Figures 1C and 1D illustrate MAXSLOPE regression lines for both taxonic and dimensional data sets. We constructed the former plot to reflect the meningitis data that was discussed in our earlier example. Notice that the y axis corresponds to individual differences in neck stiffness, whereas the x axis represents variability in body temperature. Recall that the aggregated data represent a mixture of two samples: (a) a sample of healthy individuals and (b) a sample of persons with meningitis. When viewing Figure 1C, try to identify the samples by spotting the two partially overlapping point clouds. One cloud is centered in the bottom left-hand side of the figure, whereas the other point cloud is centered in the upper right-hand side of the figure. Once you have identified the underlying samples, notice that for most healthy individuals (i.e., those with normal-range body temperature and unstiff necks) the regression line for the two symptoms is relatively flat. This illustrates that body temperature and neck stiffness are not correlated in healthy individuals. Now notice that the regression line is also flat in the sample of diseased individuals. It is clearly not horizontal where the two samples overlap, however. The slope obtains a maximum value in the interval where there is an equal number of taxon and nontaxon members ($P = Q = 0.5$). Because the magnitude of the conditional slopes is partly a function of the taxon mixture, the regression line for the entire sample is nonlinear.

Figure 1D illustrates an example where x and y are indicators of a dimensional construct. Notice that in this plot the regression line is relatively straight (although not horizontal) over the full range of x. One interpretation of this finding is that the covariance of x and y is not a function of the magnitude of x. Another interpretation is that the data were drawn from a single population and that x and y are dimensional variables. Figures 1C and 1D nicely illustrate that it is relatively easy to distinguish taxonic from dimensional data using regression procedures that are available in commercial software. The regression lines in this example were produced with the LOWESS smoothing procedure (Chambers et al., 1983; Cleveland, 1979) included in the S-PLUS programming language (StatSci, 1993).

Returning for a moment to Figure 1C, it is evident that the x interval with the maximum conditional regression slope (and hence the name, MAXSLOPE) contains the optimal cut point for assigning individuals to the taxon or the nontaxon classes. As one moves away from this interval, the number of taxon members will either increase or decrease depending on the direction of movement. Besides identifying the optimal cut point in a mixed distribution, MAXSLOPE can also be used to derive a variety of other key taxometric parameters, such as the taxon base rate. Interested readers should consult Grove and Meehl (1993) for further details.

MAXCOV-HITMAX

The final taxometric procedure to be used here is called MAXCOV-HITMAX (Meehl, 1973; Meehl & Golden, 1982). Unlike the former procedures, MAXCOV requires at least three indicators of the conjectured class variable. Of course, using more than three indicators is desirable. In the following discussion we assume that k indicators are available.

The first step in a MAXCOV analysis is to select two variables, i and j, from a pool of k indicators. In one variant of the method the remaining $k - 2$ variables are summed to form a third variable, which we call l (alternatively, when a goal of the analysis is to estimate Bayesian taxon membership probabilities for each case, l is a single variable from the set of $k - 2$ variables). The observed scores on l are ordered, and the covariance between i and j is computed for all subjects with the lowest score (or lowest interval) on l. Next, the covariance between i and j is computed for all subjects with the second lowest score on l. This process is repeated until all of the l values have been exhausted. There can be as many covariances between indicators i and j as there are distinct values of l. The distribution of these conditional covariances will take on one of two characteristic shapes.

If the indicators are measures of a dimensional construct, or if the individuals have been sampled from a single population, the conditional covariances between i and j will be randomly distributed around an average value. This is not true of taxonic data. Using results derivable from the general covariance mixture theorem (Meehl, 1973; Equation 1, above), Meehl noted that with taxonic data the expected distribution of the conditional covariances forms a convex curve (shaped like a hill) that peaks at the optimal cut score for separating the two samples. This point is called the *hitmax* cut because it is the point on the l distribution that produces the minimum number of taxon classification errors. In other words, dividing the distribution at the hitmax point maximizes the number of taxon classification "hits." With dimensional data there is no hitmax cut because the data are drawn from a single population.

It may be helpful to realize that with the MAXCOV-HITMAX procedure, latent class indicators produce a peaked distribution of conditional covariances for the same reason that they produce a peaked distribution of conditional regression slopes in the MAXSLOPE method. Although the two methods are conceptually related, they are not totally redundant, and the parameter estimates from one taxometric method can be compared with those of the other method as a means of checking the reasonableness of the taxonic model.

Ideally, an investigator conducts MAXCOV analyses on all indicator triads that can be formed from the k variables (for $k > 3$ there are $k * [(k - 1)!/(k - 3)!2!]$ triads). After all triads have been analyzed, the output from the analyses can be used (using the formula described by Meehl, 1973, and Meehl & Golden, 1982) to estimate Bayes's generated likelihood estimates of taxon membership for each subject. As is described in a later section, these estimates provide a defensible means of bifurcating a mixed sample into taxon and nontaxon classes.

Subjects

Two data sets—one of which is a subsample of the other—were used in this study. The larger sample includes data from 1,574 subjects from the 11 diagnostic groups that are shown in Table 1. These data were collected at seven research sites from individuals in a variety of settings across the United States and in Canada. The patients in the sample either were subjects in other research projects or treatment studies or were psychiatric inpatients or outpatients. Detailed descriptions of the clinical settings are provided elsewhere (Carlson et al., 1993). All patients were diagnosed using *DSM* (3rd ed., *DSM–III*) or *DSM–III* (rev.; *DSM–III–R*) criteria for the given disorder. The results of the DES were not used to determine patient diagnoses at any center. Nonclinical subjects were not screened for mental disorder, but the samples are presumed to be predominantly nondisordered. Subjects of traditional college age (18–22) were considered separately from other nonclinical subjects because of previous research findings indicating that late adolescents and young adults have higher DES scores than do persons in older age brackets (Ross, Ryan, Anderson, Ross, & Hardy, 1989; B. Sanders, McRoberts, & Tollefson, 1989). All late adolescents were college or university students. All subjects were at least 18 years of age and gave informed consent to participate in a research study, except in those cases in which the data were collected as part of a routine psychiatric assessment.

Our second data set contains 556 subjects that were selected from the aforementioned aggregate sample. Data from these individuals were used in the initial taxometric analyses that are described below. This subsample includes 228 subjects with a diagnosis of multiple personality disorder (our entire sample of such individuals) and 228 individuals from our pool of normal controls. As described in the Results section, if the data are truly taxonic, then this selection scheme affords us the possibility of working with a mixed population that contains approximately 50% taxon members. Monte Carlo studies (reported in Meehl & Golden, 1982; Waller & Meehl, 1996) have shown that distinguishing taxonic from nontaxonic data is easiest when the base rate is close to 50%.

The Dissociative Experiences Scale

The DES is a 28-item self-report measure that asks subjects to indicate the frequency of various dissociative experiences, such as amnesia for dissociative states, discontinuities in awareness, depersonalization, derealization, absorption, and imaginative involvement. Example experiences tapped by the DES items include having no memory for important past events in your life (psychogenic amnesia), feeling that your body does not belong to you (depersonalization), being in a familiar place and finding it strange and unfamiliar (derealization), and becoming so absorbed when watching television or a movie that you are unaware of what is happening around you (absorption). Persons who are administered the DES are instructed not to consider possible dissociative experiences that occurred when they were under the influence of alcohol or drugs. The scale takes about

Table 1
Diagnostic Breakdown of Combined Subject Pool

Diagnosis	Frequency	Percentage	Cumulative frequency	Cumulative percentage
Affective	101	6.4	101	6.4
Anxiety	97	6.2	198	12.6
Dissociative disorders not otherwise specified (non-MPD)	117	7.4	315	20.0
Eating disorders	120	7.6	435	27.6
Late adolescent–college	108	6.9	543	34.5
Multiple personality disorder (MPD)	228	14.5	771	49.0
Neurological	131	8.3	902	57.3
Normal	415	26.4	1317	83.7
Other psychiatric disorders	80	5.1	1397	88.8
Posttraumatic stress disorder	116	7.4	1513	96.1
Schizophrenia	61	3.9	1574	100.0

10 min to complete and yields item scores that range from 0 to 100. Total scale scores are calculated by averaging the 28 item scores (thus, the total score also ranges from 0 to 100). Previous research with the DES indicates that the scale possesses good reliability and validity in a variety of research settings (e.g., Frischholz et al., 1992; Ross, Norton, & Anderson, 1988). A detailed discussion of studies relating to the reliability and validity of the DES can be found in Carlson and Putnam (1993).

Results

Our study was conducted with two goals in mind. The first was to determine whether there are distinguishable types of dissociative experiences. Specifically, we wondered whether nonpathological and pathological dissociative symptoms could be empirically distinguished. The second goal was to determine whether there are distinguishable dissociative types. In other words, we wondered whether there is a specific class of individuals who are uniquely prone to experience pathological dissociation. To realize these goals, we conducted a taxometric analysis of DES data from a large sample of clinical and nonclinical subjects.

The first step in the taxometric analyses was to screen the DES item pool for potential taxon indicators. To accomplish this task in the most effective and efficient manner, we used the MAMBAC procedure.[1] For many data sets it is relatively easy to distinguish typological from dimensional indicators by scanning MAMBAC plots. This is especially true when the sample consists of an equal mixture of two discrete populations, in other words, when the taxon base rate is approximately 0.50 (Meehl & Yonce, 1994). Obviously, we did not know the taxon base rate prior to carrying out the study. We did not even know whether the data were taxonic. Nevertheless, it was possible to sample a portion of the combined data that would have a high probability of including two, equally represented populations. We reasoned that a defensible first step would be to select a sample of 228 persons with diagnosed multiple personality disorder and 228 normal controls. It is generally believed that individuals with MPD fall at the high end of the "dissociative continuum" (Braun, 1993; Ross, 1989; Spiegel & Cardena, 1991) and that normal controls fall at the opposite extreme. If dissociation is really a taxonic variable rather than a dimensional variable, individuals with MPD should belong in the taxon class.

As was noted previously, the MAMBAC technique considers two variables at a time. Because variable order is important in this method (i.e., MAMBAC $\{x, y\}$ and MAMBAC $\{y, x\}$ yield potentially different results) the number of taxometric analyses required to investigate a scale of even moderate length is oftentimes prohibitively large. For example, with 28 DES items there are 756 (28×27) possible MAMBAC plots that can be generated. Fortunately, we were able to screen a smaller number of indicator pairs without compromising our goals. We surmised that the most powerful MAMBAC analyses would be those that included nonoverlapping items from the three content facets of the DES item pool: (a) absorption, (b) amnesia for dissociative states, and (c) depersonalization/derealization. By restricting our analyses to item pairs from different facets we also minimized the effect of facet-specific variance on the MAMBAC results. For the initial analyses we used 18 items from the three DES content facets that have been identified in previous research (e.g., Frischholz et al., 1991). From the absorption (AB) factor we selected Items 2, 14, 15, 17, 18, and 20; from the amnesia for dissociative states (AM) factor we choose Items 3, 4, 5, 8, 25, and 26; and from the depersonalization/derealization (DD) factor we selected Items 7, 11, 12, 13, 27, and 28.

Two hundred sixteen MAMBAC plots were generated by the following procedure: (a) each item from one of the aforementioned factors (AB, AM, and DD) was paired with all items from the remaining factors, and (b) no two items from the same factor were ever paired together. With three factors of six items each, there are 108 item pairs. This process was repeated with the within-pair, item order reversed, producing a total of 216 MAMBAC plots. Next, each of the 216 plots was inspected by Niels G. Waller for signs of taxonicity (a convex shape), and each plot was rated on the following three-point scale. The plot was given

[1] All of the taxometric analyses reported in this study were carried out with a computer program written by Niels G. Waller in the S-PLUS language (StatSci, 1993). We have found S-PLUS to be an especially attractive language for taxometric work because of its powerful graphical capabilities. Our MAMBAC code is a modification of a program that was originally written by Leslie Yonce. The shell of the MAXSLOPE program was originally written by William Grove.

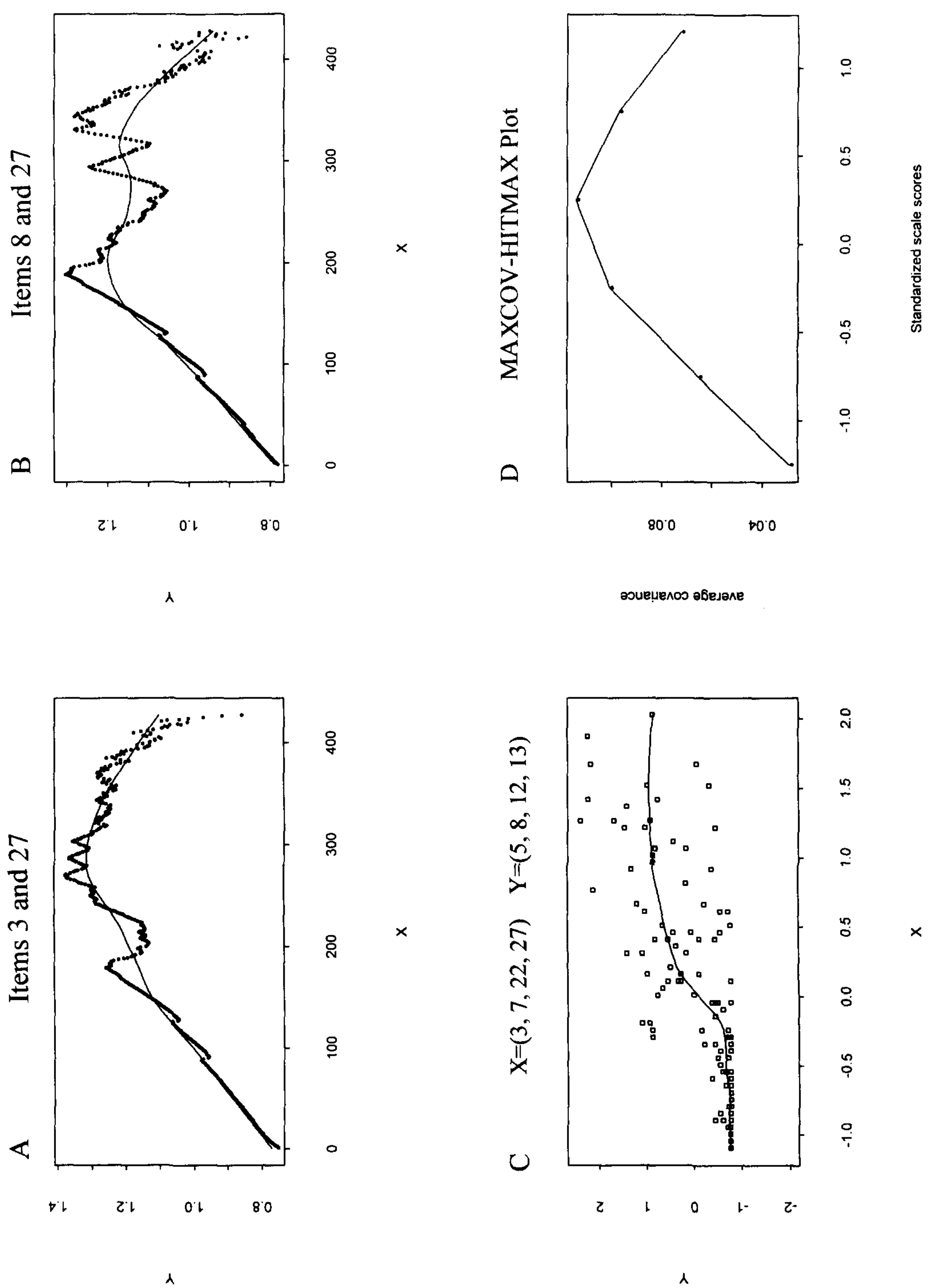

Figure 2. Sample taxonic plots from the Dissociative Experiences Scale—Taxonic.

a 1 if it was characteristic of taxonic data, it was given a 0 if its taxonic status was ambiguous, and it was given a −1 if it was characteristic of dimensional data. The 216 ratings were recorded in an 18 (number of items) × 12 (number of pairings) matrix, and the ratings in each row were summed to yield summary scores for each item. Possible item scores ranged from −12 to 12, with higher numbers indicating greater confidence that the item tapped a typological variable. Two representative MAMBAC plots from this analysis are depicted in Figures 2A and 2B.

The plots in Figures 2A and 2B, like many of the MAMBAC plots from this analysis, show clear signs of taxonicity. We were encouraged by these results because they supported our hunch that at least some forms of dissociation are consistent with a typological model. To explore this issue more fully, our next step was to construct a preliminary taxon scale on the basis of the MAMBAC results. This scale was developed by choosing only those items from the above analyses that had summary scores greater than six. Seven items met this arguably conservative criterion: Items 3 (AM), 5 (AM), 7 (DD), 8 (AM), 12 (DD), 13 (DD), and 27 (DD). Notice that none of the absorption items are included on this list. On the contrary, the impression we gleaned from the MAMBAC plots is that the absorption items measure a dimensional construct (the average summary score for the absorption items was −1.14), and the amnesia and depersonalization/derealization markers tap a typological construct.

The original measure of the dissociative taxon was developed from only 18 of the 28 DES items. It was therefore possible that other valid taxon indicators were included among the 10 items not considered in the initial analyses. To investigate this possibility, we paired the initial scale with all 28 DES items to generate 28 additional MAMBAC plots. These plots were then rated using the aforementioned three-point scale. Not surprisingly, the 7 items that emerged from the previous analyses uniformly showed signs of taxonicity on the MAMBAC plots. Of the 10 additional items, only 1 (Item 22) was judged as clearly taxonic by our purposely conservative criterion. This item concerns alterations in identity and reads as follows: "Some people find that in one situation they may act so differently compared with another situation that they feel almost as if they were two different people."

The eight items that passed our multiple taxometric hurdles are reported in the Appendix. Once again, we draw attention to the fact that none of the nonpathological or absorption items are included in this list. Instead, the taxon indicators inquire about amnesia for dissociative states (Items 3 and 5), feelings of depersonalization and derealization (Items 7, 8, 12, and 13), and instances of identity alteration (Item 22) or confusion. Importantly, these are also the pathological dissociative symptoms that are diagnostically definitive of the *DSM* (4th ed.; *DSM–IV*) dissociative disorders (cf. Steinberg, Cicchetti, Buchanan, Hall, & Rounsaville, 1993).

The taxometric findings from our first study indicate that the eight items in the Appendix identify a type of individual who experiences pathological dissociation. We believe that these items represent a powerful measure of the dissociative taxon, and we have labeled this scale the *DES-T* (T for taxon) to distinguish it from the original DES (Bernstein-Carlson & Putnam, 1986).

To search for additional evidence that the DES-T measures a dissociative taxon rather than a dissociative continuum, auxiliary MAMBAC procedures were used (as outlined by Meehl & Yonce, 1994) to estimate the taxon base rate in the mixed sample. In this method each indicator pair yields a potentially different base rate estimate. Thus, with eight items we were able to estimate the taxon base rate 57 times. Rather than report all 57 estimates, we note that distribution of the estimates was noticeably Gaussian (bell-shaped) with a mean of 0.33 and a median of 0.34. The robustness of these findings was later confirmed in the MAXSLOPE (Grove & Meehl, 1993) analyses reported below.

Previously, we noted that a MAXSLOPE analysis of taxonic data produces a nonlinear regression line with a characteristic shape. Dimensional indicators produce regression lines that are approximately straight. Taxonic markers produce regression lines that are shaped like an ogive (an s-shaped function). With eight indicators of the dissociative taxon it was possible to compute 112 regressions at the item level. Rather than focus on item scores, however, which are inherently less reliable than scale scores or item parcels, we conducted the MAXSLOPE regressions on pairs of mini scales. Each mini scale was composed of four items using the following procedure. First, a four-item scale was constructed by randomly selecting, without replacement, four of the eight items of the DES-T. Next, the item responses were combined and standardized to yield summary scores on the first mini scale. These steps were repeated with the four remaining items to yield scores for the second mini scale. For each pair of scales, a MAXSLOPE estimate of the taxon base rate was computed and temporarily stored on disk. This process was repeated 200 times, resulting in 200 semi-dependent estimates of the base rate. The average of these estimates was 0.366 with 50% of the values falling within the interval 0.28–0.40. Notice that the average estimate is reassuringly close to the mean value produced by the MAMBAC analyses. To illustrate the characteristic shape of a taxonic regression, we reproduce a representative MAXSLOPE regression plot from these analyses in Figure 2C.

As a final psychometric hurdle, we required each item on the DES-T to satisfy the conditions of Meehl's (1973) MAXCOV-HITMAX procedure before earning a tenured slot on the taxon questionnaire. Recall that in this method a plot of the conditional covariances of a pair of putative class indicators yields a convex curve when the indicators measure a taxonic variable and an approximately flat line when they measure a dimensional variable. Because of the number of available indicators there were several ways of conducting these analyses. We settled on the following procedure.

In terms of the previously defined nomenclature, two items were chosen to represent the i and j variables with which to compute the conditional covariances. The l input variables was created by aggregating the remaining six items. This method allowed us to compute a total of 28 MAXCOV-HITMAX plots. Without exception, these plots provided additional evidence that all items of the DES-T measure a latent class variable. The data from the 28 plots were averaged to produce the summary MAXCOV-HITMAX graph reproduced in Figure 2D. To enhance the interpretability of this figure, the averaged values were smoothed using a function described by Tukey (4[3RSR]2H twice; Tukey, 1977) and recommended by P. E. Meehl (personal communication, June 1993).

Figure 2D indicates that the optimal HITMAX cut for determining the taxon base rate for these data corresponds to a standardized scale score of 0.25 (note that in other samples a different HITMAX cut may be optimal).[2] When subjects with standardized DES-T scores of 0.25 or greater were assigned to the taxon class, and all other subjects were assigned to the nontaxon class, we derived a base rate estimate of 0.37. This estimate is also close to those generated by the other taxometric methods. Collectively, the three estimates of the taxon base rate provide mutually corroborating evidence that pathological dissociative experiences are manifestations of a latent class variable.

Corroborating a Typological Model of Dissociation

In the previous section we presented converging results from three quasi-independent taxometric analyses, each of which yielded findings that are consistent with a typological model of pathological dissociation. These analyses examined the internal coherence of the conjectured taxon indicators in a putative sample of taxon and nontaxon members. In this section we present additional corroborating evidence from this sample, as well as findings from nine independent samples that were not included in our original analyses.

Having constructed an eight-item measure of pathological dissociation, our goal at this stage of the study was to classify the 556 subjects that were used in the aforementioned taxometric analyses into taxon and nontaxon latent classes. Classification is accomplished in this approach by assigning Bayesian taxon membership probabilities for each individual using formulae that are described by Meehl (1973; see also Meehl & Golden, 1982, and Waller & Meehl, 1996). Results from Monte Carlo studies (reported by Meehl & Golden, 1982) have revealed that the distribution of these probabilities takes on a characteristic shape if the data are truly taxonic. Specifically, if the taxonic conjecture is correct, the Bayesian probabilities fall close to the boundaries of the [0, 1] probability continuum; whereas if the analyses reveal a pseudotaxon that results from arbitrarily dividing a latent dimension at a psychometric cut point, then the taxon membership probabilities assume more intermediate values.

These Bayesian taxon membership probabilities can be calculated from output that is generated in a

[2] Meehl (1973; Meehl & Golden, 1982) has described sophisticated item-scoring procedures for deriving Bayesian probability estimates of taxon membership. Subjects with probability estimates greater than or equal to 0.50 are typically included in the taxon class, whereas subjects with estimated probabilities less than 0.50 are assigned to the nontaxon class. The classification precision of this method is partially dependent on sample-size considerations, with ideal sample sizes close to 1,000. Because we were less concerned with the validity of individual classificatory assignments and more concerned with summary statistics, such as taxon base-rate estimates, we used the less rigorous, but still theoretically justifiable, method of relying on the sample-derived HITMAX cut for our taxon assignments.

series of MAXCOV-HITMAX analyses. The calculation of these probabilities requires that the sorting variable in the MAXCOV analysis (denoted by l in the previous discussion of this procedure) be a single indicator rather than a sum of the $k - 2$ indicators. It is necessary to work with single-indicator sorting variables (rather than summary scores) so that the HITMAX points for the individual items can be identified (see Meehl & Golden, 1982, for details).

To assign the 556 subjects in our mixed sample into latent taxon and nontaxon classes required that we perform an additional 168 MAXCOV-HITMAX analyses. (Each item of the DES-T was used as a sorting variable in 21 analyses, resulting in 21 estimates of the item HITMAX score. The median HITMAX score for each item was used to calculate the taxon membership probabilities.) When these analyses were completed, we found that the taxon membership probabilities were visibly clustered at the boundaries of the [0, 1] probability continuum, a finding that lends additional support to our taxonic model of dissociation. A histogram of these values is presented in Figure 3.

Individuals with taxon membership probabilities that were greater than 0.50 were assigned to the taxon class, whereas all other individuals were assigned to the nontaxon class. Having assigned individuals to the latent classes, we were able to examine the latent distributions in greater detail. In particular, we were interested in examining the within-class item variances to rule out the possibility that the lack of inter-item covariance in the taxon and nontaxon classes was due merely to a lack of item variance (as might arise if our two samples were drawn from the extreme ends of a latent dimension). To explore this possibility, we standardized (in the mixed sample) each item to a z score metric ($M = 0.0$, $SD = 1.00$) and then compared the within-class item variances in the taxon and nontaxon classes. For the taxon class the item variances were 1.25, 1.49, 0.90, 1.65, 0.91, 0.88, 0.49, and 0.67, whereas for the nontaxon class the variances were 0.05, 0.06, 0.11, 0.14, 0.13, 0.11, 0.35, and 0.15. These values clearly show that the taxon members are not simply individuals at the extreme (high) end of a latent dimension. There is considerable intraitem variation on the DES-T for taxon members. If pathological dissociation was really a dimensional construct, then the presence of this within-class variation would have allowed the items to covary in the (artificially constructed) taxon class. Under these conditions our taxometric procedures would not have produced characteristic taxonic plots, such as those that are reproduced in Figure 2. We can also rule out the possibility that the low item variances for nontaxon members are due to psychometric floor effects, such as sometimes occur with poorly written item-response options. As was noted previously, the DES (and DES-T) is a self-report scale that asks subjects to rate the frequency of various dissociative experiences. Frequency ratings have a true zero point, and thus the low scores on the DES-T cannot be attributed to severe item censoring or truncation effects.

As a final analysis, we compared scores on the DES-T and the DES in 11 clinical and nonclinical samples. Similar comparisons using the DES have previously been reported (Bernstein-Carlson & Putnam, 1986; Carlson & Putnam, 1993; Putnam, 1989a, p. 11). A reliable finding from these reports is that

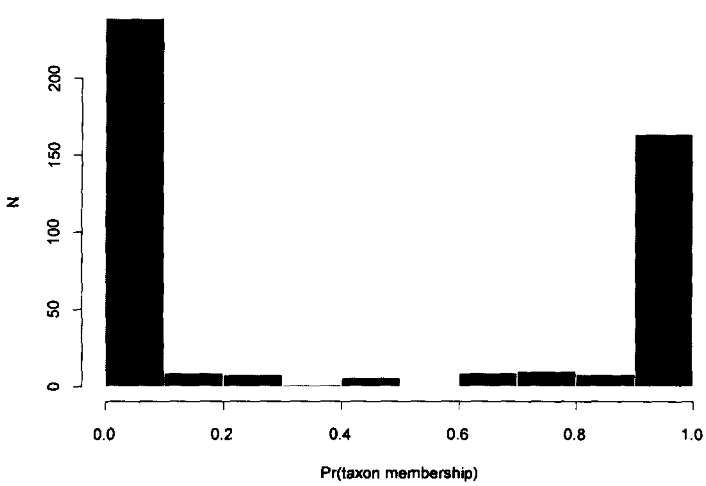

Figure 3. Bayesian taxon membership probabilities.

individuals with diagnosed dissociative disorders typically obtain DES scores that are 30 or larger. Most other diagnostic groups obtain DES scores that are appreciably lower, oftentimes with scores that are close to the floor of the scale. Two exceptions to this trend are that late adolescents attain scores that are moderately higher than those obtained by nonclinical adults (Ross et al., 1989; B. Sanders et al., 1989) and that individuals with posttraumatic stress disorder (PTSD) oftentimes produce scores in the clinically significant range (Carlson & Putnam, 1993).

Recognizing that the DES-T is a measure of a typological construct rather than a dimensional construct allowed us to make several predictions concerning the pattern of DES-T and DES scores in the various diagnostic categories. First, we predicted that scores on the DES-T would be lower than those on the DES for all groups in which pathological dissociation is not a core syndromal feature. Second, we predicted that the within-sample variation on the DES-T would be smaller than that for the DES for these same groups. The reason behind these predictions is that the DES-T has been purged of all dimensional markers of nonpathological dissociative experiences. Conceivably, individuals who are not members of the pathological dissociative class could receive moderate scores on the DES (but not on the DES-T) because of elevated scores on the nonpathological dissociative dimension. Both of our predictions turned out to be true.

Table 2 reports robust estimates of location and spread for the DES-T and the DES in the 11 clinical and nonclinical samples included in the aggregated subject pool. Several features of this table deserve mention. First, notice that our measures of location are not means or medians and that our measures of spread are not standard deviations or variances. We used robust measures of location and spread called *bisquare* and *MAD* estimates, respectively (for a thorough discussion of these estimates, see Hoaglin, Mosteller, & Tukey, 1983). In clinical data sets, such as our own, robust statistics offer important advantages over more common descriptive measures. In particular, robust estimates of location and spread are less likely to be influenced by extreme outliers. Traditional summaries such as the mean and standard deviation are very influenced by outliers. This is important in the present context because psychiatric diagnoses are notoriously fallible, and individuals with dissociative disorders are commonly misdiagnosed (Chu, 1991; Kluft, 1987; Putnam, Guroff, Silberman, Barban, & Post, 1986; Saxe et al., 1993). Therefore, it is very likely that a few individuals with MPD are wrongly included in other diagnostic groups. On the other side of the coin, the taxometric results suggest that only 35% of the original sample belongs in the pathological dissociative taxon, indicating that several patients with an MPD diagnosis might be better characterized with a different diagnostic label. In both cases these persons would produce DES-T and DES scores that are markedly deviant from those of the other members in their category.

As was predicted, for many groups the (robust) average DES-T scores are considerably lower than are the corresponding DES scores, and the (robust) standard deviations are noticeably smaller. This is espe-

Table 2
Robust Estimates of Location and Spread for the DES-T and the DES in 11 Clinical and Nonclinical Samples

	DES-T		DES		Difference	
Group	Location	Spread	Location	Spread	Location	Spread
Normal controls	0.71	0.93	5.72	5.03	−5.01	−4.10
Late adolescents	1.93	3.24	8.87	8.21	−6.94	−4.97
Neurological	2.83	3.71	7.03	6.35	−4.20	−2.64
Anxiety	4.01	4.63	7.56	5.29	−3.55	−0.66
Affective	5.41	6.49	10.71	8.47	−5.30	−1.98
Other psychiatric	6.19	7.88	13.59	12.97	−7.40	−5.09
Eating disorders	8.71	10.19	12.95	12.05	−4.24	−1.86
Schizophrenia	12.52	13.90	17.10	17.47	−4.58	−3.57
PTSD	23.23	19.45	30.66	19.72	−7.43	−0.27
Dissociative disorders NOS	24.21	20.39	29.27	19.06	−5.06	1.33
MPD	41.58	21.31	44.56	21.18	−2.98	0.13

Note. DES = Dissociative Experiences Scale; DES-T = DES–taxon; PTSD = posttraumatic stress disorder; MPD = multiple personality disorder; NOS = not otherwise specified.

cially true for the two groups with the lowest scores: the normal controls and the late adolescents. Notice that for the normal controls the average DES-T score is less than 1.00 on a 100-point scale. This value is only 12% of the average score on the DES for this group. The variability of the DES-T is also 80% smaller than that for the DES in the normal controls. The observed scale differences are even more striking in the group of late adolescents. Together, these findings strongly support the contention that persons free of mental illness rarely experience any pathological dissociative symptoms. They are just not that type of person.

Pathological dissociative experiences are also not prominent symptoms in many psychiatric syndromes, although transient dissociative states may not be that uncommon (Saxe et al., 1993). For the MPD group and dissociative disorders (other than MPD) group, however, the DES-T scores are characteristically elevated, as are the scores for the PTSD group. This latter observation is particularly intriguing because several investigators recently have linked MPD and PTSD on both theoretical and empirical grounds (Braun, 1993; Li & Spiegel, 1992; D. Spiegel, 1984, 1986). Our data apparently support this linkage, although there are important differences between the two groups on our measures. For example, the average DES-T score for the PTSD group—while certainly higher than that for many other diagnostic categories—is only half as large as that produced by the MPD sample. We wondered whether this finding is also true at the item level or whether individuals with PTSD obtain elevated sums because of extreme scores on only two or three dissociative symptoms. Our next analysis addressed this question.

Table 3 reports average item scores for the DES-T in the 11 clinical and nonclinical samples. A striking feature of this table is that for eight diagnostic groups the typical item score is 0.00. In other words, most subjects in these groups never experience pathological dissociative states. This is as it should be if our assertion concerning the taxonic nature of pathological dissociation is correct. Regarding the PTSD item responses, our data also indicate that each symptom measured by our scale is diagnostically relevant for this group. On the other hand, the items that reflect amnesia for dissociative states (Items 5 and 8) are less informative for the non-MPD dissociative disorders group.

Regretfully, our sample was insufficiently large to determine whether subjects with PTSD are also members of the pathological dissociation taxon. A taxometric analysis of the combined MPD–PTSD samples was attempted, but the results were inconclusive. We view this as extremely unfortunate and are currently amassing additional samples of DES-T protocols from persons with these diagnoses in order to settle this issue.

Discussion

We have presented cogent evidence for two types of dissociation and two types of dissociators. On the basis of the corroborating results of three taxometric analyses with MPD cases and normal controls, we have discovered that markers of nonpathological dissociation—such as indicators of absorption and imaginative involvement—measure a dimensional construct, whereas markers of pathological dissociation—such as indicators of amnesia for dissociative states, derealization, depersonalization, and identity alteration—measure a latent class or typological construct. These results support the view, originally espoused by Janet (1889), that there are two types of individuals: persons who experience chronic dissociative states and persons who do not. The former persons are members of a pathological dissociative taxon. To help identify taxon members, we used the results of our taxometric analyses to develop the DES-T, which is a brief, eight-item measure of pathological dissociation that can be administered in less than 5 min.

The discovery of an underlying class variable for pathological dissociation has important implications for the identification, treatment, and understanding of MPD and allied pathological dissociative states. Whereas the diagnosis of MPD has traditionally been a controversial subject (Dell, 1988; Fahey, 1988; Kluft, 1989; Merskey, 1992; Spanos, Weekes, & Bertrand, 1985), the items of the DES-T may provide an empirically based diagnostic profile that can reliably differentiate MPD from other clinical syndromes. We believe that adopting empirically validated criteria will increase the acceptability of this diagnosis for mental health professionals. We also believe that our taxonic findings have important treatment implications for MPD patients.

Current treatment models for the dissociative disorders (Allison, 1974; Braun, 1986) do not make distinctions between dissociative trait and type patients. This distinction is important since an underlying class variable implies an expected pattern of change following a therapeutic intervention (Strube, 1989). In particular, the existence of a class variable implies that therapeutic change from one class to another should occur in an all-or-none fashion rather than in a gradual manner (Strube, 1989). With MPD an important goal of therapy is known as integration (Putnam, 1989a). *Integration* is defined as the coming together of alter-personalities into a single psychological structure that is experienced as a unified self (Kluft, 1984a, 1984b; Putnam, 1986). MPD cases in which complete integration occurs in a saltatory fashion have been described (Braun, 1983), as have cases in which integration proceeds in a stepwise manner involving the consolidation of clusters of alter-personalities into larger composites that are later merged in a final step.

Like many findings in this field, our results raise several additional questions. Two of the most important concern the etiology of MPD: Why is pathological dissociation a taxonic variable rather than a dimensional variable? And which environmental or biological factors determine who becomes a taxon member? From the environmental perspective, clinical research has established that reports of severe, chronic childhood trauma are extremely common in MPD patients (Putnam et al., 1986). Notwithstanding concerns about the validity of these reports (e.g., Frankel, 1993), the literature indicates that between 85% and 98% of child, adolescent, and adult MPD patients give histories of traumatic events (Putnam et al., 1986). These figures suggest that exposure to extreme forms of abuse may reorganize an individual's cognitive apparatus in ways that heighten his or her

Table 3
Average Item Scores for the DES-T in 11 Clinical and Nonclinical Samples

Item	Normal controls	Late adolescents	Neurological	Anxiety	Affective	Other	Eating disorder	Schizophrenia	PTSD	DIS	MPD
3. Finding themselves in a place . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.79	12.16	30.08
5. Finding new things among belongings . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.52	0.00	21.54
7. Standing next to themselves . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.66	21.64	45.66
8. Do not recognize friends or family . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.54	0.00	5.22
12. Other people or objects are not real . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.39	28.68	26.67	42.30
13. Body does not belong to them . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.60	21.01	45.41
22. Act different in different situations . . .	0.00	4.99	0.00	7.31	4.87	3.53	23.74	5.11	36.11	42.34	65.63
27. Hear voices inside their head . . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.14	32.45	58.10

Note. The average values are bisquare robust estimates of location. Median item scores are virtually identical to the bisquare estimates. DES-T = Dissociative Experiences Scale–Taxon; PTSD = posttraumatic stress disorder; DIS = dissociative disorders other than MPD; MPD = multiple personality disorder.

chances of developing pathological dissociation (Chu & Dill, 1990). This scenario is only part of the story, however, because it does not explain why MPD occurs in only a small percentage of the millions of child maltreatment cases that are reported each year in the United States (National Center for Child Abuse and Neglect, 1988; U.S. Advisory Board on Child Abuse and Neglect, 1990). Childhood trauma is likely a necessary, but far from sufficient, factor in the etiology of pathological dissociation (Putnam et al., 1986; Stern, 1984; Wilbur, 1984). Additional factors meriting consideration include the nature of the trauma, the timing of the trauma (i.e., age of victim; Kirby, Chu, & Dill, 1993; Putnam, 1991), the nature of the family environment, and the possibility of a genetic diathesis for MPD (Braun, 1986, 1993). For instance, extreme and chronic trauma that occurs within a particular developmental window may disrupt the formation of a healthy autobiographical memory system. Moreover, although virtually nothing is known about the role of genetic influences in this domain, it is intriguing that genetic factors account for a sizable portion of the variance in other trauma-related symptoms: posttraumatic stress symptoms (True et al., 1993). Whether genes play a cardinal, or even auxiliary, role in the development, manifestation, and stability of pathological dissociative symptoms is unknown; we are currently conducting a community-based twin study to address this question. That study should further our understanding of the different types of dissociation and the different dissociative types.

The conclusions of this study emphasize the importance of investigating the conceptual and psychometric coherence of a behavioral domain. As methodologists, we too often presuppose that our data are unquestionably scaleable along latent dimensions or latent traits (factors or continuua). Consequently, we sometimes apply dimensional models—such as factor analysis and item-response theory—to data that are better modeled by taxometric procedures (latent class models). We believe that the taxometric procedures developed by Meehl (1973) and others (Meehl & Golden, 1982; Waller & Meehl, 1996) provide a defensible means of distinguishing typological from dimensional constructs in the behavioral sciences.

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Appendix

Item Content of the Dissociative Experiences Scale—Taxon

Item numbers correspond to those of the Dissociative Experiences Scale.

3. Some people have the experience of finding themselves in a place and having no idea how they got there.

5. Some people have the experience of finding new things among their belongings that they do not remember buying.

7. Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something and they actually see themselves as if they were looking at another person.

8. Some people are told that they sometimes do not recognize friends or family members.

12. Some people have the experience of feeling that other people, objects, and the world around them are not real.

13. Some people have the experience of feeling that their body does not seem to belong to them.

22. Some people find that in one situation they may act so differently compared with another situation that they feel almost as if they were two different people.

27. Some people sometimes find that they hear voices inside their head that tell them to do things or comment on things that they are doing.

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