
CHAPTER 20

An Empirically Based Prototype Diagnostic System for DSM-V and ICD-11

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Researchers and clinicians from a variety of theoretical and professional perspectives have written much about the strengths and weaknesses of the current polythetic or count/cutoff method of psychiatric diagnosis used in the *Diagnostic and Statistical Manual of Mental Disorders* fourth edition, and its text revision (DSM-IV-TR; American Psychiatric Association [APA], 2000). Although the changes initiated with DSM-III and DSM-III-R (APA, 1980, 1987) to move toward a more behaviorally descriptive and systematic diagnostic system have proved beneficial in many ways, the diagnostic system has been criticized for a number of shortcomings—including a lack of theoretical and empirical foundation, arbitrary symptom cutoffs and time frames, and unclear clinical utility for many differential diagnoses (see Andersson & Ghaderi, 2006; Beutler & Malik, 2002; Schmidt, Kotov, & Joiner, 2004).

Another problem with DSM-IV(-TR) diagnosis involves mixed, not otherwise specified (NOS), and subthreshold diagnoses. Numerous studies have documented the prevalence of subthreshold diagnoses among the anxiety

and mood disorders (e.g., Olfson, Weissman, Leon, Farber, & Sheehan, 1996; Zinbarg et al., 1994), which are unintended by-products of taxonomic refinements since DSM-III. A major advantage of DSM-III and its successors is the increased reliability of diagnosis made possible by operationalizable criteria and structured interviews (Feighner et al., 1972; Spitzer, Endicott, & Robins, 1978). However, refinement of virtually every Axis I category has brought with it identification of “border” cases that require new diagnoses, because strict adherence to a set of specific diagnostic algorithms inherently leads to nondiagnosis of subclinical or border syndromes.

A related problem is comorbidity. Along with the more systematic delineation of categories and criteria since DSM-III was published, there has come a virtual explosion of research on comorbidity. When, or to what extent, this research represents incremental knowledge about psychopathology is difficult to discern. The comorbidity of anxiety and mood disorders provides a good example (e.g., Kessler et al., 1996), because it probably reflects in part “the nature of things”

(i.e., the fact that the broad-band personality trait of negative affect is a diathesis for both sets of disorders; see, e.g., Barlow, 2002) as well as criterion overlap. One attempted resolution is to create mixed diagnoses, such as the mixed anxiety–depressive disorder included in a DSM-IV appendix as a diagnosis needing further study. Unfortunately, each similar addition to the DSM creates new and different subthreshold cases, which in turn require further specification (see Zinbarg et al., 1994).

Despite these criticisms of the current diagnostic procedures, the majority of research and work directed at refining successive editions of the DSM has focused not on the process through which disorders are diagnosed, but instead on which diagnostic categories should be included, excluded, or modified (e.g., Lichenthal, Cruess, & Prigerson, 2004; Mayou, Kirmayer, Simon, Kroenke, & Sharpe, 2005) and/or which specific criteria should be modified or added with respect to any given diagnostic category (e.g., Denton, 2007; Martin, Chung, & Langenbucher, 2008).

One exception has been a body of research established over the last several decades making a case for a dimensionalized approach to psychiatric diagnoses. Specifically, across disorders, researchers are increasingly calling for dimensional diagnosis, either as the primary method of diagnosis or as a secondary way of summarizing diagnostic information (Westen et al., 2002; Widiger & Clark, 1999). Proponents point out that a dimensionalized approach to diagnosis has the potential to address a number of problems inherent in a categorical diagnosis. Calls for dimensional diagnosis of Axis I disorders have extended from mood and anxiety disorders (e.g., Brown, Chorpita, & Barlow, 1998; Krueger & Finger, 2001; Krueger et al., 2002; Widiger & Clark, 1999) to schizophrenia and the other psychotic disorders (e.g., Lenzenweger, 1997; Tsuang, Stone, & Faraone, 2000; Van der Does, Linszen, Dingemans, Nugter, & Scholte, 1993). For example, Appendix B of the DSM-IV outlines a dimensional approach to diagnosis of psychosis, in which clinicians would rate the extent to which the patient has positive symptoms, disorganized symptoms, and negative symptoms, using a 4-point severity scale (from “absent” to “severe”).

As another example, most treatment research on depression uses a diagnosis of major depressive disorder as the primary inclusion criterion, but then largely relies on dimensional measures to assess outcome, because patients who fall just below the diagnostic threshold may not show clinically significant or lasting change. In classification research, researchers similarly rely almost exclusively on dimensional variables because they provide greater statistical power, tend to be truer to the underlying distributions in the population, and are more useful in data-analytic procedures.

Despite these benefits, dimensional approaches to diagnosis also have drawbacks in practical utility that mitigate their unreversed adoption as a diagnostic approach. As currently conceptualized, dimensionalized approaches to diagnosis lack a quick, parsimonious way to code disorders as present or absent, which limits their utility in medical, clinical, and insurance settings (First, 2005). Moreover, the plurality of dimensional models and lack of consensus hinder the ability to choose how and what should be dimensionalized (Frances, 1993). In this chapter, we propose a prototype-based approach to diagnosis as an alternative approach that combines the strengths of both categorical and dimensional diagnostic systems (Westen & Shedler, 2000; Westen et al., 2002; Westen, Shedler, & Bradley, 2006).

Prototypes and Psychiatric Diagnosis

The development of a clinically effective approach to diagnosis requires an understanding of how people make judgments about the degree of similarity of one case (for our purposes, a psychiatric patient) to an abstract construct (for our purposes, a psychiatric diagnostic category). The current diagnostic system began under the assumption that such decisions are made according to what has been referred to as the “classical” view of decision making (Folstein & Van Petten, 2004; Medin, 1989). The classical view argues that categorizations are made via strict adherence to well-defined rules of membership. For example, in biology, species are classified as mammals if they are vertebrates, have mammary glands, have hair,

and give birth to live young. For psychiatric classifications, what became clear not long after implementation of DSM-III was that this “defining features” approach does not apply well to psychiatric diagnosis, leading to the current “Chinese menu” or “????” system, in which a patient can meet criteria for a disorder in multiple different ways (e.g., by having four or more of one kind of symptom and three or more of another).

Effective implementation of this approach still depends on clinicians’ ability and willingness to use this approach in a regular, reliable fashion. The problem is that people (in this case, diagnosing clinicians) tend to make decisions to categorize complex novel stimuli (in this case, patient presentations) through a decision-making process that uses a “probabilistic” assessment of degree of match to strong “exemplars” in their minds of the category (e.g., patients with “florid” manic symptoms they have seen) or to an abstract category—that is, a “prototype”—rather than through a classical approach to categorization (Folstein & Van Petten, 2004; Medin, 1989). Prototypes are mental models based on characteristics that are common in members of the group (“common features”) rather than “defining features” (i.e., necessary prerequisites for category membership) (Rosch & Mervis, 1975).

Numerous philosophers and psychologists (Rosch & Lloyd, 1978; Rosch & Mervis, 1975; Weber, 1949; Wittgenstein, 1953) have observed that most of the objects and concepts we encounter in daily life are not rapidly or easily categorized based on defining features. Rather, they belong to “fuzzy” categories, whose members share many features (likened to “family resemblance”) but do not share a set of necessary and sufficient features. Reliance on prototypes is especially likely in the domain of these so-called “fuzzy concepts,” within which psychiatric diagnoses and many other psychological constructs, like emotions, currently fall (Rosch, 1978; Rosch & Lloyd, 1978). It should be noted, though, that almost all fields run into “fuzziness”-related classification issues (e.g., the platypus is an animal so difficult to categorize that it was initially believed to be a hoax produced by a taxidermist who had sewn a duck’s beak onto a beaver). Other areas of psychology, such as research on social cognition (e.g., Has-

sebrauck & Aron, 2001; Lane & Gibbons, 2007; Niedenthal & Mordkoff, 1991), have effectively utilized prototype theory to clarify definitional arguments in the field (e.g., Kearns & Fincham, 2004). For example, because the ability to identify another person’s emotional state accurately requires quickly processing a large amount of information (e.g., situational information; socio-cultural context; demographic information, such as gender and age; facial expressions; etc.), a rule-based approach is much less effective than a prototype approach (Barrett, Mesquita, Ochsner, & Gross, 2007; Burch & Pishkin, 1984; Russell, 2003). Recent research further clarifies the limitations of rule-based categorization: It suggests that people with autism spectrum disorders have a tendency to focus on individual facial features rather than configurations when identifying emotions, and likewise tend to use rule-based rather than template-based approaches to identifying emotions (Rutherford & McIntosh, 2007). Likewise, developmental psychology research notes that as young children develop, they move from a tendency to making categorization judgments based on perceptual similarity (e.g., similar shapes) and shift toward making categorization judgments based on conceptual similarity (e.g., whether something serves a similar function) (Gentner & Namy, 1999).

Thus, given that clinical diagnosis is a specific form of categorization and decision making, it seems that clinicians are more likely inherently to invoke prototypes in their diagnostic decisions. To some degree, this prototype-based approach is acknowledged in the current DSM diagnostic system, as it has incorporated many of its elements. In fact, the DSM developers of the past recognized the utility of prototypes and even pictured DSM-III’s polythetic system as an operationalization of a prototype-based diagnostic system (Frances, 1982; Widiger & Frances, 1985). Instead of having a clinician make a decision based on an aggregated prototypical representation, though, the current system breaks the decision down into individual symptom criteria rated as present or absent. The whole is equal to the sum of its parts (plus or minus a few criteria). The current system for diagnosis has led to quantum leaps forward in the understanding of psychopathology. Nevertheless, clinicians do

not appear to make many of the fine-grained distinctions required for valid DSM-IV diagnosis (e.g., whether a patient with severe depression actually has had one of two primary symptoms and at least four additional symptoms for a minimum of 2 weeks). Clinical practice is an imperfect mechanism for assessing clinical utility, but it is likely to be a useful bellwether.

Not surprisingly, given its potential utility, a number of researchers have proposed dimensional modifications to DSM, including various prototype-related approaches, although most of these proposals focus on Axis I diagnosis. The simplest option retains the current or modified criteria and segments an individual's match to the prototype based on the number of criteria he or she meets (Oldham & Skodol, 2000; Widiger & Sanderson, 1995). One resulting system would allow labels of "prototypical" (all criteria met), "moderately present," "threshold," "subthreshold," "trait" (one to three criteria met), and "absent." Millon (Millon, 1969; Millon, Grossman, Millon, Meagher, & Ramnath, 2004; see also Millon, Grossman, & Tringone, Chapter 21, this volume) has also conceptualized personality disorders (PDs) in terms of prototypes and varying levels of severity. In addition, analyses of prototypes have been helpful for modifying criteria for specific disorders (e.g., Gude, Karterud, Pedersen, & Falkum, 2006; Helzer, Bucholz, & Gossop, 2007; Hummelen, Wilberg, Pedersen, & Karterud, 2008). For example in the case of the criteria for dependent PD, analyses testing the prototype in DSM-IV found that the criterion related to difficulties in expressing disagreement was more closely related to avoidant PD (Gude et al., 2006). Likewise, findings for obsessive-compulsive PD suggest that the current diagnosis is an incomplete prototype skewed toward work-related perfectionism, while missing theoretically related criteria about the need for predictability and the impact on relationships (Hummelen et al., 2008). Trait models including the five-factor model of personality (Derefinko & Lynam, 2007; Lynam & Widiger, 2001) have also been recruited for refining prototypes of PDs. Thus, although their application has varied, the utility of prototypes has been recognized by researchers from many theoretical perspectives.

One Approach to Operationalizing a Prototype Approach to Diagnosis

Over the last several years, our research team (Westen & Bradley, 2005; Westen, Heim, Morrison, Patterson, & Campbell, 2002; Westen & Shedler, 2000; Westen, Shedler, & Bradley, 2006) has been working on an alternative prototype-based diagnostic system whose format and brevity resemble DSM-II's paragraph-long, narrative descriptions of disorders; the systematic empirical selection of diagnostic criteria that was the goal of DSM-III through DSM-IV; and a combined dimensional-categorical approach to diagnosis characteristic of neither. A guiding assumption of this approach is that use of the diagnostic manual and reliability of clinical diagnosis are likely to increase if clinicians are not forced to make dichotomous (present-absent) decisions about either diagnoses treated as a whole (DSM-II) or "laundry lists" of conceptually unrelated diagnostic criteria treated individually and then combined via sometimes complex algorithms that vary across diagnoses and hence are difficult to learn (DSM-IV).

In the system we are proposing, the diagnostic task is to examine each diagnostic prototype *taken as a whole* and to gauge the extent to which a patient's symptom picture matches the prototype, resulting in a dimensional diagnosis (see Table 20.1). Once the researcher or clinician completes

TABLE 20.1. Sample Rating Scale for the Proposed Prototype Diagnostic System

Diagnosis	
5	Very good match (patient exemplifies this disorder; <i>prototypical</i> case)
4	Good match (patient has this disorder; <i>diagnosis</i> applies)
Features	
3	Significant match (patient has <i>significant features</i> of this disorder)
2	Slight match (patient has <i>minor features</i> of this disorder)
1	Little or no match (description does not apply)

an assessment, he or she rates the individual on a 5-point scale indicating the degree of match with the prototype description. This scale ranges from 1 for “Little or no match” to 5 for “Very good match (patient exemplifies this disorder; *prototypical* case).” Ratings of 4 and 5 correspond to categorical “caseness,” and a rating of 3 indicates “Significant match (patient has *significant features* of this disorder)” (much as physicians measure blood pressure treated as a continuous variable, but by convention refer to values in certain ranges as “borderline” or “high”). Thus a single rating yields both dimensional scores and a categorical score without relying on symptom counting, but instead allowing more complex similarity comparisons to occur. The default value for each diagnosis is 1 (“Little or no match”), so that clinicians only expend their time rating prototypes of disorders warranting a rating of 2 or higher; this allows rapid diagnosis. The ready translation of dimensional into categorical diagnosis (e.g., a 3 translating into “significant features”) is, empirically, of particular use for communication among professionals, who are unlikely to find it useful to describe a patient as “3 on major depressive disorder, 2 on panic disorder” (one of the major limitations of potential dimensional approaches to psychiatric diag-

nosis). Table 20.2 lists the potential benefits of the proposed prototype-based diagnostic system, in view of the limitations of the current diagnostic system (for more discussion of these, see Westen & Bradley, 2005; Westen et al., 2002; Westen & Shedler, 2000, 2006). Comparisons of this model with the current DSM system for both Axis I and Axis II disorders by several research teams have shown that two-thirds to three-fourths of clinicians prefer the prototype-matching system to the count/cutoff method across samples and disorders (Rottman, Ahn, Sanislow, & Kim, 2009; Spitzer, First, Shedler, Westen, & Skodol, 2008; Westen, Shedler, & Bradley, 2006).

In research just completed to test the construct validity of a prototype matching approach to diagnosis, we conducted two studies. In the first, clinicians made both DSM-IV categorical and prototype diagnoses of a patient on several common Axis I diagnoses (mood, anxiety, and eating disorders), and patients self-reported symptoms for the same disorders. In the second, independent interviewers made prototype diagnoses using a systematic clinical interview (see Westen & Muderrisoglu, 2003, 2006) and the SCID-I/P. Patients were seen at outpatient university clinics (in Study 1) and primary care clinics (in Study 2). Clini-

TABLE 20.2. Benefits of Proposed Prototype Diagnostic System in Relation to Limitations of Current Diagnostic System

Current DSM system (<i>count/cutoff method</i>)	Proposed prototype diagnostic system (<i>5-point similarity rating</i>)
Relatively time-consuming; lack of consistency in format and diagnostic requirements across diagnoses	Takes less time; quick, efficient, and consistent format across diagnoses
Categorical judgments only	Dimensional and categorical diagnoses
Artificial diagnostic comorbidity	Profile of elevations on relevant diagnoses
Relatively high rates of mixed and not otherwise specified (NOS) diagnoses	No need for NOS diagnoses
Method of diagnosis (criterion counting) and efforts to avoid elimination of comorbidity may lead to core diagnostic criteria for a disorder	Potentially more comprehensive and clinically rich descriptions of associated features of each disorder
Discordant with the way the human mind naturally classifies (and thus in current disuse)	Congruent with human cognitive processes and consistently rated by clinicians as superior in clinical utility and user-friendliness

cians' prototype diagnoses in the first study showed moderate to high correlations with self-reports and performed as well or better than categorical DSM-IV diagnoses of the same disorders. Prototype diagnosis in the two independent interviews in the second study (one using a systematic clinical interview similar to interviewing practices by skilled clinical interviewers in everyday clinical practice) correlated $r = .50$ with each other on average and showed substantial incremental validity over categorical DSM-IV diagnoses in predicting adaptive functioning. These data suggested that prototype diagnoses made by one clinically skilled informant correlate with dimensional diagnosis of the same disorder or symptomatology (whether prototype or otherwise) as made by another informant, with both blind to each other's data.

The content of the prototype descriptions can be derived in a number of ways. For example, descriptions can come from the current or modified DSM descriptions of criteria, or using empirical methods applied to various assessment devices. In the case of personality diagnosis, we have focused on work using the Shedler–Westen Assessment Procedure (SWAP), a 200-item clinician report measure of personality pathology that requires a ranking of the patient's most important personality characteristics, based on either extensive clinical knowledge of a patient or a systematic clinical interview (e.g., Shedler & Westen, 2004; Westen & Shedler, 2007). Relatively less work has been conducted with respect to establishing prototypical descriptions of Axis I disorders. To date, our work in this area (see below) has begun at the level of using the DSM criteria as the foundation for prototypical descriptions. However, we have also conducted some preliminary work focused on empirically deriving Axis I prototypes for which we also present initial results below. In addition, although our work and the work of others has thus far used the current DSM distinction between Axis I and Axis II disorders, a prototype-based diagnostic system would benefit greatly by rethinking the distinction between Axis I and Axis II disorders, as well as by including a description of healthy functioning that would allow clinicians to code adaptive functioning and strengths (see Westen et al., 2006).

Preliminary Research on the Prototype-Based Approach to Diagnosis

Eating Disorders

One of the first diagnostic classes we have studied using a prototype approach is the DSM-IV eating disorders section, which includes two diagnoses with two subtypes each—anorexia nervosa, with restricting and binge–purging subtypes, and bulimia nervosa, with purging and nonpurging subtypes—and an NOS diagnosis, for a total of five categories. Recently, there has even been discussion of adding a sixth diagnosis, binge-eating disorder, a residual category created by the requirement of both bingeing and purging for a bulimia diagnosis (see Fichter, Quadflieg, & Hedlund, 2008; Pope et al., 2006). Recent research suggests (1) that this system relegates 40–50% of patients with clinically significant eating pathology to a nondescript NOS category; and (2) that patients with both anorexic and bulimic symptoms, who are no more like patients with restricting anorexia than they are like patients with bulimia, are arbitrarily classified as having a subtype of anorexia (Morrison & Westen, 2002).

A prototype system, in contrast, would include only two prototypes, one for anorexia nervosa and one for bulimia nervosa (see Tables 20.3 and 20.4). Rather than counting symptoms and deciding whether a patient meets arbitrary severity and duration requirements (e.g., bingeing and purging at least twice a week for a minimum of 3 months), the clinician would simply rate the extent to which the patient's condition matches each prototype taken as a whole. A score of 4 or 5 on the bulimia prototype would mean that the patient's symptom picture strongly enough matches the diagnostic prototype to warrant a categorical diagnosis. A score of 3 on the anorexia prototype would mean that the patient's symptom picture resembles the prototype, but not enough to warrant a categorical diagnosis. The patient would thus receive a categorical diagnosis of “bulimia nervosa with anorexic features.” Preliminary data (unpublished) suggest that these two simple prototypes carry as much or more information than DSM-IV categorical diagnoses of all eating

TABLE 20.3. Prototype Description of Anorexia NervosaAnorexia nervosa

Patients who match this prototype refuse to maintain their body weight at or above a minimally normal weight for their age and height. They have an intense fear of gaining weight or becoming fat, even though they are, or are in danger of becoming, substantially underweight. They tend to have a disturbance in the way they experience their body weight or shape, and may deny the seriousness of their low body weight. Their body weight or shape exerts undue influence on their views of and feelings about themselves. Patients who match this prototype may develop amenorrhea (i.e., cessation of menstruation) when their weight is low.

Diagnosis

- 5 Very good match (patient exemplifies this disorder; *prototypical* case)
- 4 Good match (patient *has* this disorder; *diagnosis* applies)

Features

- 3 Moderate match (patient has *significant features* of this disorder)
- 2 Slight match (patient has *minor features* of this disorder)
- 1 Little or no match (description does not apply)

disorder diagnoses combined and are rated by clinicians as substantially higher in clinical utility and useability.

Posttraumatic Stress Disorder

Both the criteria for and the diagnosis of posttraumatic stress disorder (PTSD) itself have been criticized for problems with comorbidity, specificity of symptoms, and lack of clarity and agreement regarding what constitutes a traumatic experience (Rosen & Lilienfeld, 2008; Rosen, Spitzer, & McHugh, 2008). In regard to the criteria, a number of factor analyses have been conducted on PTSD symptomatology to assess the underlying factor structure; however, little consensus has been reached about whether a three-factor (e.g., intrusion/avoidance, dysphoria, and hyperarousal; Lancaster, Melka, & Rodriguez, 2009) or a four-factor (e.g., re-experiencing, effortful avoidance, emotional

TABLE 20.4. Prototype Description of Bulimia NervosaBulimia nervosa

Patients who match this prototype engage in recurrent episodes of binge eating and purging. During binges, they eat, in a discrete period of time, an amount of food that is clearly larger than most people would eat during a similar period of time and under similar circumstances. Binges are typically accompanied by a sense of lack of control (e.g., a feeling that they cannot stop eating or control what or how much they are eating). Patients who match this prototype exhibit recurrent inappropriate compensatory behavior in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting; or excessive exercise. Their views of and feelings about themselves are also unduly influenced by body shape and weight. *Note:* For patients who match features of this prototype but only binge or only purge, score 3.

Diagnosis

- 5 Very good match (patient exemplifies this disorder; *prototypical* case)
- 4 Good match (patient *has* this disorder; *diagnosis* applies)

Features

- 3 Moderate match (patient has *significant features* of this disorder)
- 2 Slight match (patient has *minor features* of this disorder)
- 1 Little or no match (description does not apply)

numbing, and hyperarousal; King, Leskin, King, & Weathers, 1998) solution is most fitting. High comorbidity rates are also a problem with mood disorders (Campbell et al., 2007; Franklin & Zimmerman, 2001; Oquendo et al., 2005), substance use disorders (Chilcoat & Breslau, 1998; Mills, Teesson, Ross, & Peters, 2006), and other disorders (Abram et al., 2007; Deering, Glover, Ready, Eddleman, & Alarcón, 1996; Kilpatrick et al., 2003; Zlotnick, 1997). The current diagnostic system for PTSD, which requires at least one symptom of reexperiencing, three of avoidance/numbing, and two of hyperarousal, is cumbersome and difficult to remember. In fact, one of us (Bekh Bradley) has been working in the area of PTSD research for several years and still had to refer back

to DSM-IV-TR for the preceding sentence. Moreover, evidence exists that this lack of parsimony does not lead to good clinical work. Levels of PTSD symptoms that would be subthreshold in the current diagnostic system (e.g., one symptom in each of the three symptom categories) are associated with significant problems in adaptive functioning as well as with increased suicidal ideation, even after comorbid depression is controlled for (Marshall et al., 2001).

A prototype approach to diagnosing PTSD addresses the three issues with PTSD raised above. First, the question about factor structure of PTSD symptoms would become irrelevant in a prototype approach, because by definition the core clinical features of PTSD are presented together as part of an overall symptom picture rather than being divided into clusters of dubious validity and reliability (although we have experimented with prototype approaches in which clinicians make secondary ratings of severity of symptom clusters within the diagnosis, generally derived empirically through factor analysis). Second, if a prototype approach were used for PTSD as well as for other comorbid disorders, areas of symptom overlap could be attributed to the diagnosis with which they are most likely to be associated. For example, dysphoria related to anhedonia and general hopelessness about the future would most appropriately “belong” to a depression prototype, whereas dysphoria associated with persistent thoughts of a traumatic event would most appropriately “belong” to a PTSD prototype. Finally, a prototype approach allows clinicians and researchers to attend to and accurately code for PTSD-related symptoms that are currently classified as “subthreshold.”

Initial data on a prototype approach to PTSD diagnosis were collected as part of a larger study funded by the National Institute of Mental Health (NIMH) and based at Grady Memorial Hospital, a publicly funded, not-for-profit health care system in Atlanta, Georgia. The broader project’s purpose has been to examine the correlates of the development of PTSD in a low-income, urban, primarily African American population. Participants were recruited while they were waiting in the primary care and obstetrics-gynecology clinics, and were invited to participate in a research project about stress and coping. Participants completed a series

of structured and semistructured assessment interviews over 4 days; these included 1 day’s worth of structured interviews, including the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1997) and the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; Gibbon & Williams, 2002), in addition to a number of self report instruments. Study methods are described more thoroughly elsewhere (Binder et al., 2008; Schwartz et al., 2006). In addition, the participants were rated on a prototype description of PTSD derived from the current DSM-IV PTSD criteria (see Table 20.5). A total of 169 individuals were both interviewed with the CAPS and rated on the prototype system for PTSD. CAPS-based and prototype-based categorical diagnoses overlapped 91.7% of the time. Both methods correlated positively with self-reported PTSD symptom frequency in general and by symptom cluster, based on the PTSD Symptom Scale (PSS; Foa, Riggs, Dancu, & Rothbaum, 1993).

We also examined the association between PTSD as rated by both diagnostic approaches with exposure to childhood abuse and with overall level of exposure to traumatic events across the lifespan. Prototype ratings had slightly higher correlations for the childhood variables, although diagnoses using both methods positively correlated with childhood emotional, sexual, and physical abuse frequency, as measured by the Early Trauma Inventory (ETI; Bremner, Vermetten, & Mazure, 2000), and with total types of trauma experienced with and without childhood trauma included, as measured by the Traumatic Events Inventory (TEI; Rothbaum & Davidson, n.d.).

We assessed adaptive functioning across multiple areas, including items from the Life Base interview (Keller et al., 1987), the SCID-I (Gibbon & Williams, 2002), and the clinician-rated Clinical Data Form (CDF; Westen & Shedler, 1999; Westen, Shedler, Durrett, Glass, & Martens, 2003). We aggregated standardized adaptive functioning variables from the Life Base (self-reported and interviewer-assessed life satisfaction in past month and best 6-month period of past 2 years), CDF (personality functioning, quality of romantic relationships, friendships, employment functioning, number of close relationships, and physical health), and interviewer ratings (DSM-based Global Assessment of Functioning [GAF], two in-

TABLE 20.5. Prototype Description of Posttraumatic Stress DisorderPosttraumatic Stress Disorder

Patients who match this prototype have experienced or witnessed a traumatic event—that is, an event that involved actual or threatened death or serious injury to the self or others—that elicited intense feelings of fear, helplessness, or horror. They persistently reexperience the event, which may haunt them in numerous forms: They may have intrusive thoughts, mental images, or dreams related to the trauma; they may feel as if they are reliving the event, through flashbacks, illusions, hallucinatory images, or a sense that the event is occurring again; or they may experience intense psychological distress or physiological arousal when “triggered” by cues that resemble or symbolize the event. Patients who match this prototype try to avoid stimuli, thoughts, feelings, places, people, or conversations that might remind them of the event, and are often unable to recall important aspects of it. They may also “shut down,” experiencing an emotional numbing that leaves them with a restricted range of emotion, a sense of a foreshortened future (e.g., not expecting to have a career, marriage, children, or normal lifespan), feelings of detachment or estrangement from others, or diminished interest or participation in significant activities that once excited them. Patients who match this prototype have persistent symptoms of physiological arousal, such as difficulty falling or staying asleep, difficulty concentrating, exaggerated startle response, hypersensitivity to possible signs of danger, or irritability or outbursts of anger.

Diagnosis

- 5 Very good match (patient exemplifies this disorder; *prototypical* case)
- 4 Good match (patient has this disorder; *diagnosis* applies)

Features

- 3 Moderate match (patient has *significant features* of this disorder)
- 2 Slight match (patient has *minor features* of this disorder)
- 1 Little or no match (description does not apply)

interviewer ratings of match to a health prototype; see Westen et al., 2006). (This aggregated variable had high internal consistency, Cronbach's $\alpha = .84$.) Both diagnostic methods correlated with the aggregated adaptive functioning variable to the same degree ($r = -.28$), and hierarchical regressions confirmed that CAPS-based diagnosis did not predict adaptive functioning above prototype diagnosis and vice versa.

In summary, our initial data using a prototype-based approach to PTSD diagnosis indicate that the pattern of PTSD prevalence and distribution of dimensional ratings were comparable between diagnostic methods, as was the pattern of external validity. These findings provide another example of how prototype-based diagnosis can enhance the efficiency of the diagnostic process, while not sacrificing the validity of decisions.

Mood Disorders

In addition to using current DSM criteria as the foundation for deriving prototype descriptions of Axis I disorders, we have begun working on using psychometric instruments designed for use by expert informants (clinically experienced observers) in large clinical samples to develop empirically derived prototypes. As part of our ongoing research on the classification of PDs, a subsample of clinicians ($N = 120$) from a National Institute of Mental Health–funded study completed a 79-item clinician report instrument for assessing mood disorders, the Mood Disorders Questionnaire, to describe a randomly selected patient in their practice. We derived the items for this questionnaire from the items from DSM-III, DSM-III-R, and DSM-IV criteria for mood disorders; relevant research and clinical literature; examination of the item sets from all major interviews and self-report inventories assessing the domain; and our clinical experience with inpatients and outpatients. Each item is scored on a 7-point scale (1, “not true at all”; 4, “somewhat true”; 7, “very true”). Our goal was to see whether we could simplify the mood disorder categories in the DSM-IV by identifying a small number of mood dimensions. As can be seen in Table 20.6, an exploratory factor analysis produced three clear factors (major depression, mania, and dysthymia). The major depression factor was marked by

TABLE 20.6. Exploratory Factor Analysis of the Clinician Report Mood Disorders Questionnaire

Items	Factor loadings		
	1	2	3
<u>Factor 1: Major depression</u>			
Mood is consistently depressed; does not respond to efforts to “cheer him/her up”	.90		
Has trouble enjoying him-herself; derives little pleasure from life	.87		
Is unable to enjoy usual interests and activities, etc.	.85		
Is fatigued, tired, or lacking in energy; everyday activities require enormous effort	.83		
Feels helpless; believes nothing s/he can do will make things all right, better, etc.	.83		
Feels life is not worth living	.82		
Feels hopeless about the future	.78		
Depressed mood has a serious impact on ability to function at work, school, etc.	.74		
Wishes s/he were dead or feels would be better off dead	.72		
Seems slowed down in thought, speech, movement, etc.	.68		
Depression or agitation interferes with ability to concentrate; has trouble reading, sustaining a conversation, etc.	.66		
Has flat or blunted affect; shows little emotion even with matters of import	.62		
Depressed mood seems qualitatively different from prior mood states (even ordinary sadness), as if a cloud or fog has descended	.58		
Is emotionally paralyzed; has trouble making everyday decisions	.58		
Feels lonely or painfully alone	.58		
Has diminished appetite	.56		
Views self as loathsome, evil, contaminating, or totally bad; has global self-hatred for who s/he is	.55		
Is consumed by suicidal thoughts	.55		
Depression is noticeably worse in the morning	.52		
Believes his/her depression is punishment for who s/he is or what s/he has done	.51		
<u>Factor 2: Mania</u>			
Mood cycles rapidly between high, irritable, or manic states and depressed or mixed states over a relatively brief period (e.g., weeks or months)	.80		
Has boundless energy, in a way that differs from his/her usual functioning	.63		
Abnormally elevated, expansive, or irritable mood leads to impairment in usual occupational functioning, social activities, or relationships, or necessitates hospitalization	.62		
Takes undue risks (e.g., financial ventures, reckless driving, illegal activities) with minimal concern for consequences, in a way that differs from his/her usual functioning	.61		
Jumps rapidly from idea to idea in a way that can make communication difficult to follow	.61		
Speech is rapid, nonstop, or pressured, in a way that differs from his/her usual functioning	.57		
Engages in thrill-seeking or otherwise “high-gain,” reward-driven behavior (e.g., gambling, spending, indiscriminate sexual encounters), in a way that differs from his/her usual functioning	.52		
Is grandiose or unduly self-confident (e.g., believes s/he can “do anything”), in a way that differs from his/her usual functioning	.50		
Gets angry or irritable more easily than usual; has a “short fuse”	.50		
Experiences thoughts as racing or coming “a mile a minute,” in a way that differs from his/her usual functioning; may feel like thoughts come to mind so quickly that s/he cannot keep up with them	.49		
Is hypersexual, in a way that differs from his/her usual functioning	.48		
Is unusually driven or goal-directed (socially, at work or school, etc.), in a way that differs from his/her usual functioning	.47		
Is restless, fidgety, or unable to sit still; has psychomotor agitation	.47		
Is explosive or flies into rages, in a way that differs from his/her usual functioning	.44		

(cont.)

TABLE 20.6. (cont.)

Items	Factor loadings		
	1	2	3
Factor 3: Dysthymia			
Derives sense of self-worth from others' appraisals; needs approval, assurance, etc.			.79
Feels guilty			.73
Tends to blame self for bad things that happen; attributes misfortunes to own enduring psychological traits or attributes			.67
Worries about disappointing significant others			.65
Tends to ruminate over perceived past errors, bad deeds, etc.			.62
Tends to fear rejection or abandonment by significant others			.61
Is self-critical; sets high standards for self and chronically fears s/he is not living up to them			.58
Derives sense of self-worth from achievements and accomplishments			.53
Has low self-esteem	.50		
Feels inferior, inadequate, incompetent, or a failure	.49		

items describing discrete episodes of illness strongly resembling DSM-IV criteria, whereas the dysthymia factor was marked by items describing enduring depressive phenomenology. We will soon be exploring whether these three prototypes alone can capture all of the information provided by the multiple mood disorder diagnoses that currently take up dozens of pages in DSM-IV, by capturing spectrum disorders dimensionally rather than categorically.

Cautions and Concerns about Clinical/Human Thought

Although the available theory and research suggest that a prototype approach to psychiatric diagnosis would be beneficial in a number of ways, we also recognize that such an approach is no panacea. The benefits of moving toward the proposed prototype-matching diagnostic system include decreased artificial comorbidity, increased ease of use, and diagnostic descriptions of disorders that are both clinically richer than DSM-IV criteria and empirically derived (as in the mood disorder prototypes just described) (Westen et al., 2006). Nevertheless, such a diagnostic system is not immune to possible errors of human thought that can affect clinical decision making (Garb, 1998). Cognitive heuristics will always play a role in making social judgments, and although these are helpful for the most part, they can also lead to bias. The representativeness and availability heuristics (Tversky & Kahn-

man, 1974) may be particularly prone to result in errors when clinicians are matching individuals to prototypes, because they can be biased if not calibrated to the *right* prototype (or exemplars). For example, a clinician's first (or most memorable) clinical experience of working with a patient diagnosed with any given psychiatric disorder may become the template against which future patients are diagnosed. Other errors that need to be addressed include illusory correlations in the prototype description or a clinician's assessment of a case (Lueger & Petzel, 1979) and the influence of expectations and self-fulfilling prophecies (Harris, 1994).

These problems are inherent to human cognition and thus to any diagnostic system. However, care can be taken in using research to derive the disorders empirically, in creating the prototype descriptions for each resultant diagnosis, and in studying the effects of stereotypes and other biases. Blaming clinical errors on "just being human" is not enough if one can demonstrate that attention to common cognitive and diagnostic mistakes can increase the reliability and validity of diagnosis. Prototype diagnosis will probably prove to work best when these concerns are addressed thoughtfully and empirically.

Conclusion and Future Research

In sum, categorical thinking may be easier, and dimensional data may be more precise, but prototype diagnosis may offer the best

of both worlds. Clearly, however, more research needs to be conducted with respect to the relative merits and problems associated with prototype-based diagnosis. The prototype-based rating system we have described can be implemented in combination with the current set of diagnoses (i.e., changing only the method of diagnosis, from symptom counting to prototype matching). However, as described here, we can also apply this approach in combination with empirically refined diagnostic groupings (i.e., changing both the taxonomy and the method of diagnosis). Such an approach could utilize empirically derived prototypes and lead to fewer diagnostic categories, more distinct diagnoses, or a hierarchical system in which broad diagnoses can be further broken down into subgroups (e.g., fragile narcissism as a subtype of narcissistic PD; Russ, Shedler, Bradley, & Westen, 2008). Our data on subtypes of Axis I disorders (Thompson-Brenner, Eddy, Satir, Boisseau, & Westen, 2008) also suggest that an empirically derived prototype classification of psychopathology could rework the current model of personality as diagnostically orthogonal to Axis I disorders.

We have also described here the simplest approach to prototype diagnosis, with a single rating per disorder. As noted earlier, however, it is possible that more complex approaches will prove clinically or empirically useful. For example, patients who receive a rating of 3 or higher (on a 1–5 scale) of PTSD could then receive a series of additional, clinically relevant ratings, such as age of onset, duration of illness, and the extent to which intrusive versus avoidance behaviors characterize the clinical profile. This type of clarification might allow a better match of treatment to patient within diagnosis. For example, we have found that when avoidance is more predominant than intrusive symptoms in PTSD, an early focus on *in vivo* exposure therapy can at times help the patient establish the ability to recover more quickly from other PTSD symptoms (e.g., intrusive memories) outside of treatment. The inclusion of a psychological health prototype could also prove useful in rating global adaptive functioning in a more meaningful manner than the current GAF scale in DSM. An NIMH-funded study is now underway to address many of these questions and to compare the most viable categorical, di-

mensional, and prototype-based approaches vying for inclusion in Axis II of DSM-V. This multi-informant, longitudinal grant will address the benefits and costs of each approach in convergent, discriminant, and predictive validity.

In conclusion, clinicians, like all other information processors, try to elicit the information they need to solve problems. If clinicians of all theoretical orientations and disciplines gravitate toward diagnostic methods other than those prescribed in the diagnostic manual (e.g., see Westen & Arkowitz-Westen, 1998), it may be that the manual as configured is not optimally serving their purposes. The classification system that laid the foundation for diagnosis in psychiatry since DSM-III was derived directly from a research manual, the *Research Diagnostic Criteria* (Spitzer et al., 1978). Although the goals of clinical and research diagnosis overlap substantially, they diverge in some important respects (Westen, 1997, 1998). The most common explanation for the unreliability of clinical diagnosis since DSM-III (a document explicitly designed to address such unreliability through carefully specified criteria and cutoffs) is that the problem lies with clinicians, who need to follow the procedures in the manual more closely. Although there is little doubt that clinical interviewing in everyday practice should be much more systematic, it is unlikely to become so if the official diagnostic method relies on an approach to decision making different from the ones clinicians find clinically relevant and useful in practice.

Research in cognitive science suggests that in everyday judgment and decision making, people tend to “satisfice” (a cross between “satisfy” and “suffice”)—that is, to make a “good enough” assessment for their purposes, and to make more precise determinations based on explicit decision rules if the need arises (Gigerenzer & Goldstein, 1996; Simon, 1978). Rather than expending the time and effort required to diagnose panic disorder formally, for example, a clinician may be content to diagnose that the patient suffers from moderate, clinically significant panic symptoms once or twice a week. In light of the dearth of research on the treatment implications of clinical versus subthreshold symptoms (and in light of data suggesting that subthreshold variants often produce similar or substantial functional

impairments; e.g., Fava, 1999; Fava & Mangelli, 2001; Marshall et al., 2001), satisficing may not be an irrational diagnostic strategy in clinical practice, particularly in initial interviews.

Accurate clinical diagnosis is essential for translation of all research on classification, etiology, and treatment into clinical practice. No matter how carefully researchers make diagnoses in clinical trials, for example, such efforts will fall short of their intended goals if clinicians cannot make reliable diagnostic judgments in everyday practice that allow them to identify cases to which research findings are likely to apply. It is our hope that the approach to diagnosis proposed in this chapter may allow for closer connection between the approach to diagnosis used in clinical settings and the data gathered in research on psychopathology, treatment, risk, and resilience.

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