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Classification of Psychopathology: The Nature of Language

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This article criticizes the approach to language underlying the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV;* American Psychiatric Association, 1994). Concepts from the philosophy of language illuminate taxonomic problems that vex users of the *DSM* nosology: lack of coverage, comorbidity, and within-category heterogeneity. Exception is taken to the operationism that results in a highly artificial *DSM* nomenclature, raising the specter of non-referential criterion sets. A dimensional approach is recommended because it would better correspond to an objectively seamless reality.

What does it *mean* to claim that someone falls into one of the diagnostic categories by which we hope to understand abnormal behavior? The discussion that follows will show how issues in the philosophy of language bear upon the classification enterprise. It will argue that a categorical model of diagnosis based simply on operationism falls short of providing the understanding we seek in the important field of psychopathology, and that a better model would be a dimensional one deriving from the notion that psychodiagnostic concepts are matters of degree.

The upshot of this discussion will be that meanings do not exist in quite the way that the authors of the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV;* American Psychiatric Association, 1994) seem to think they do. The authors of the *DSM* subscribe to a philosophical approach known as criterion philosophy (Musgrave, 1993), the

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defining premise of which is that *the meaning of a word is identical to the criterion for applying it* (the assumption behind operationism). This assumption is what is at stake in the *DSM*'s categorical approach.

The arguments that follow urge the abandonment of the *DSM*'s criterion philosophy in favor of a kind of realism in which it is possible to talk about truth and progress. The present article focuses on truth and the *DSM*'s failure to show the correspondence to reality that truth requires; another article (Acton, 1998) focuses on progress, and the *DSM*'s methodological predilection for inhibiting it. In both cases the *DSM*'s operationism is found to be responsible for its defects.

Issues in the Philosophy of Language

Truth

Internal theories of truth. The *DSM*'s operationism entails that the meaning of a disorder is exhausted by the way of recognizing the disorder. The *DSM* itself is little more than a catalogue of ways of recognizing disorders as they occur in people. Klerman (1991) describes the philosophy underlying the *DSM*: "The criteria for assigning individuals to diagnostic categories [are] based on algorithms, which should be based, whenever possible, on operationally defined, observable manifestations of psychopathology, with minimal inferences as to presumed causation" (p. 75).

Because the *DSM* provides explicit ways of recognizing disorders, it is possible to categorize people as either having the "disorder" or not having it. However, this categorization is based on a criterion philosophy that fails to establish a correspondence between the classification system and the external world. It is possible to make up a categorical classification system about anything whatsoever — *if* one is willing to abide a certain arbitrariness and artificiality in one's conceptual scheme. Social constructionists would be right in arguing that such a scheme bears little correspondence to reality (Eisenberg, 1988; Rothbart and Taylor, 1992).

A correspondence theory of truth. Tarski (1944) shows that it is possible to have a correspondence theory of truth without giving an account of the nature of that correspondence as though there were some "essence" that all true statements have in common. Tarski's definition of "true" captures the common sense meaning of the term: the statement *S* is true if and only if *P*. *S* is the name of a sentence, and *P* is the sentence itself; the sentence itself is what is either true or false. Following this scheme, the statement, "Depression is categorical," is true if and only if depression is categorical.

Most versions of realism assume that there comes to be an agreement between concept and referent that reflects the actual state of the world.

Tarski's truth scheme does not necessarily favor realism over anti-realism. Rather, because Tarski develops a correspondence theory of truth, his truth scheme is perhaps the only one that does not prejudge the case against realism (Musgrave, 1993). The *DSM*'s criterion philosophy, in contrast, is based on an internal theory of truth that identifies what is true with a definition of truth. Therefore, the *DSM* prejudges the case in favor of anti-realism: truth regarding a disorder is *defined as* whatever is singled out by the *DSM* diagnostic criteria. This kind of definition obviously begs the question regarding the state of the world — specifically, the symptoms, disorders, and people in which we are interested.

The authors of the *DSM* assume that truth regarding a disorder is completely defined by the means of recognizing whether someone has the disorder. This assumption is a simple application of criterion philosophy that underwrites operationism (Musgrave, 1993). To assume, as do the authors of the *DSM*, that the question, "What is true?" should have the same answer as the question, "What is truth?" — namely, truth is the way of recognizing what is true — carries semantics beyond acceptable limits. It is the job of science, not semantics, to tell us what is true.

Meaning

Proponents of criterion philosophy hold that, "If we knew what it would be for a given sentence to be found true then we could know what its meaning is" (Carnap, 1936, p. 420). Since medieval times, writers on the philosophy of language have purported to find an ambiguity in the notion of "meaning." On the one hand, it was said, "meaning" means intension, which is the concept associated with a word. The core intension is generally a criterion for use of the word in question (Morey and McNamara, 1987), so for example, the intension of the word *triangle* is "object having three connected sides." On the other hand, "meaning" means extension, which is the stable reference of the word, or the things in the world that fall into the category that the word singles out. Thus, red, black, or blue triangles, triangles with equal angles or unequal angles, are all part of the extension of the term triangle. The notion of extension is made quite precise relative to the fundamental logical notion of truth. The extension of a term is simply the set of things of which the term is true (Putnam, 1975).

Reference

Instantiation. According to a tradition that has been widely accepted since Carnap (1936, 1937), knowing the concept or intension of a term is just a matter of *instantiating* the term. Instantiation is similar to what Millon

(1991) terms *identification* — the process of assigning previously unallocated entities to their appropriate categories. Instantiation is essentially like giving a definition of a term by pointing to items to which it applies: the pointing is intended to secure an agreement between intension and extension (i.e., between concept and referent).

Instantiation is a fundamentally different process depending on the approach one takes to diagnostic terms. For the realist, instantiation is a matter of discovery, and it is appropriate to speak of there being a truth to the matter of whether an item correctly instantiates a category. For the social constructionist, by contrast, there is no truth involved, only a convention: *this* is how the language is used by speakers in this language community. Whereas truth is rather stable, conventions change over time and among linguistic groups. So do the diagnostic categories in the *DSM*, now in its fourth edition (Kirk and Kutchins, 1992).

Instantiating a class, for the scientific realist, is what happens when one *recognizes* something as a member of the class. To speak of recognition implies that there is, a priori, a truth to the matter. However, it does not imply that this truth is sharply defined: something may instantiate a category to a certain *degree*. It is important to note that different persons at different times may instantiate a psychodiagnostic category (defined in some way other than by the *DSM*) to a certain degree and only to a certain degree.

Matters of degree. Most terms in the natural language are what Engel (1989) calls *matters of degree*, terms having no clear-cut boundary between those items that instantiate them and those that do not. The notion that extension is the *set* of things of which a term is true is not quite adequate to the explication of matters of degree, because a set in the mathematical sense is itself an all-or-none predicate: any given item either definitely belongs to *S* or definitely does not belong to *S*, if *S* is a set. However, as Putnam (1975) says, "If one really wanted to formalize the notion of extension as applied to terms in a natural language, it would be necessary to employ 'fuzzy sets' or something similar rather than sets in the classical sense" (p. 217). A fuzzy set is a set that does not have crisp boundaries, such that a given item can be a member of the set to a certain degree and only to a certain degree. For example, should a foot race be considered a game? How about a crossword puzzle or a multiple choice examination? Most would consider these items to be games to a certain degree and only to a certain degree.

It is important to distinguish being a matter of degree from being vague. Being a matter of degree is enhanced by increased precision, whereas vagueness is diminished by increased precision. Something that is typically said to be not a matter of degree at all, an all-or-none predicate, such as being pregnant, has only two degrees. Something that has many degrees, on the other hand (and that is thus more precisely specifiable), such as height, is easily

recognized as a matter of degree. Most terms in the natural language are both vague predicates and matters of degree, but being a matter of degree is not dependent on vagueness.

Criterion philosophy and operationism. For logical positivists like Carnap (1936, 1937), who accept the verifiability theory of meaning, "the concept corresponding to a term provide[s] . . . a *criterion* for belonging to the extension (not just in the sense of 'necessary and sufficient condition', but in the strong sense of *way of recognizing* if a given thing falls into the extension or not)" [Putnam, 1975, p. 219]. This assumption underlies operationism, a brand of criterion philosophy that reflects the lingering influence of logical positivism. Operationism is the methodological dictum that a concept must be completely defined in terms of the operations or measurements used to recognize its instantiation (Hull, 1968).

Some philosophers and scientists have attempted to eliminate vagueness and make meanings strictly empirical by the use of atheoretical operational definitions. The first to do so was Watson (1913) in psychology, followed independently by Bridgman (1927) in physics. Watson held that, in order to be scientifically acceptable, a mentalistic term like "thirst" must be operationally defined by an objective index like time-lapsed-since-drinking, and a mentalistic term like "intelligence" must be operationally defined by an intelligence test (Hull, 1968). According to this conception, intelligence just is what I.Q. tests measure. A similar approach is taken by the authors of the *DSM*, for whom schizophrenia just is what the *DSM* criteria single out as schizophrenia, although this category of persons is famously more heterogeneous than that of persons considered "normal." That the *DSM* falls into the use of operational definitions can be seen by its use of such minor threshold features as "during a 1-month period" and "two (or more) of the following" (APA, 1994, p. 285).

Applications in the Classification of Psychopathology

To see how distinctions drawn in the philosophy of language can be applied to the classification of psychopathology, consider three major problems that vex theorists and researchers who employ the *DSM* nosology: lack of coverage, comorbidity, and within-category heterogeneity. In this section, it is argued that these problems are theoretically tractable using insights gained from the foregoing considerations on the nature of language.

Lack of Coverage: Overly Rigid Intensions

The coverage of a diagnostic scheme is the extent to which it includes diagnoses for every existing type of disorder. Coverage is theoretically inter-

esting because it raises the question of how we "stretch" our given diagnostic vocabulary to include extensions that were not originally included in our given repertoire of intensions. Without some stretching we would end up with informationally impoverished "not otherwise specified" (NOS) diagnoses, the psychodiagnostician's wastebasket categories.

Coverage problems result from the rigid application of operational definitions. As noted above, operational definitions are often employed in hopes of eliminating vagueness. However, the front-runners in the competition for most vague diagnoses are none other than the various NOS diagnoses — the very diagnoses that operational definitions make so prevalent. Operational definitions are problematic because they cannot be "stretched" to increase coverage — instead, they require a one-to-one correspondence that objectively may not exist.

Comorbidity: One Extension, Multiple Intensions

It is possible for multiple intensions (concepts associated with a term) to correspond to a single extension (the things in the world to which a term refers). Take the following example: the clinical term "patients" shares exactly the same extension as its counterpart, "clients." However, the intensions of these two terms differ subtly — "patients" is avoided by some clinicians because its intension includes an evaluative component that is somewhat more negative than "clients." A similar point can be made about the terms "subjects" versus "participants," or "schizophrenics" versus "persons with schizophrenia" — whereas their extensions are identical, their intensions differ evaluatively.[1]

The idea that diverse intensions can correspond to the same extension can be illustrated further as follows. The term "Irish Pope" shares the same extension as the term "chaste prostitute" — namely, the empty set. Nevertheless, the intension (or conceptual meaning) of an Irish Pope differs dramatically from that of a chaste prostitute.[2]

In the domain of psychopathology, the concepts of intension and extension can be applied to gain an improved understanding of the phenomenon of comorbidity that arises frequently from the use of *DSM* diagnoses.

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[1]This problem extends beyond the realm of psychopathology. Type nouns that refer to people tend to be deprecatory (Wierzbicka, 1986). Therefore, people generally dislike being described using type nouns. For example, one might hear, "My friend is not a dimwit, he is just a little slow!" Although negative type nouns ("jerk," "creep") greatly outnumber the positive ("angel," "saint"), both positive and negative adjectives exist in abundance. Research has been conducted on the descriptive and evaluative aspects of personality-relevant adjectives in English and German (Saucier, Ostendorf, and Peabody, 1998).

[2]I extend my thanks to David L. Hull for suggesting this example.

Comorbidity is sharing by two disorders of the same extension. Assume hypothetically for a moment that all and only persons diagnosed with depression are diagnosed with anxiety as well. This is exactly what we would mean if we were to claim that these two disorders are completely comorbid, or that they are one-for-one concomitants of each other. In that case, the extension of the two terms is exactly the same.

Here is where the ambiguity in the meaning of meaning (as Putnam [1975] calls it) comes in: the terms "person with anxiety" and "person with depression" are not synonyms just because they share the same extension. The two terms have different meanings in exactly this sense: they have different intensions.

Comorbidity becomes a problem when the "comorbid" disorders are actually the same. For example, "avoidant personality and early onset generalized social phobia are often impossible to distinguish and really are more identical than they are comorbid" (Frances, Widiger, and Fyer, 1990, p. 44). Furthermore,

> it is rarely clear, when a given symptom serves as a defining feature of two different categories, whether the resulting overlap between them reflects the true state of the relationship or is an unnecessary artifact based on the choice of the identical definitional items in both sets. For example, the criteria set for borderline personality disorder includes items that tap affective symptomatology. It is unclear whether the frequently reported comorbidity between borderline personality disorder and affective disorder is the result of some underlying true affinity between the two syndromes or reflects a superficial similarity creating a definitional overlap . . . . We will be stuck with these questions until our diagnostic system goes beyond the descriptive level. (Frances, Widiger, and Fyer, 1990, pp. 47–48)

Within-Category Heterogeneity: One Intension, Multiple Extensions

The *DSM* approach attempts to establish a rigid connection of concepts like depression and schizophrenia with their extension, which is people in the world who have these disorders (or who instantiate the categories). However, in many cases a single intension in fact refers to a panoply of extensions, leading to the problem of within-category heterogeneity.

Within-category heterogeneity is not always a problem in classification. In biology, members of a single biological species may exhibit very diverse characteristics. However, the category (a species) is defined according to a very powerful theory, the theory of evolution. Most *DSM* disorders, by contrast, are intended to be atheoretical and purely descriptive. Therefore, these categories have little going for them other than their purported descriptive homogeneity. Two *DSM* categories that show a marked lack of such homogeneity (intended only as illustrations, not as an exhaustive list) are depression and schizophrenia.

According to the *DSM*, major depression is a disorder that is defined by a single intension, namely the occurrence of one or more episodes of depression (defined as "at least 2 weeks during which there is either depressed mood or the loss of interest or pleasure in nearly all activities" [APA, 1994, p. 320]) in the absence of certain other features, such as mania. However, we might readily identify two subsets of persons, both labeled "depressed" and both having comparable scores on a measure of depression, whose extensions show near-zero overlap. Persons who express a vegetative depression purely in somatic form (poor appetite, hypersomnia, low libido, bodily aches) might show very little overlap with a comparable group of persons who express their depression mainly through emotions (guilt, discouragement) and thoughts (self-criticism, hopelessness, rumination on negative events). Nevertheless, we would consider both groups of persons depressed.[3]

Similarly, the term schizophrenia applies to a number of widely divergent symptom presentations, from schizoaffective disorder, in which a person shows signs of depressed mood as well as disorganized thought, to catatonic schizophrenia, in which a person maintains a rigid posture like a statue and refuses to move for long periods of time. If such widely divergent symptoms covaried with one another, then that would be impressive evidence that a valid category of psychopathology had been discovered. However, these divergent symptoms do not covary with one another: they are generally seen in completely different populations (Carson and Sanislow, 1993; for schizotypy, see also Claridge, McCreery, Mason, Bentall, Boyle, Slade, and Popplewell, 1996).

Correspondence Theory and a Dimensional Approach

The foregoing considerations have laid the groundwork for the argument in this section that the artificial "categories" of psychopathology found in the *DSM* should be replaced by dimensions, because dimensions would better correspond to an objectively seamless reality. Criterion philosophy might be thought to buttress the *DSM*'s categorical approach through the assumption that the concept corresponding to a term provides a *criterion* for belonging to a category. This assumption is explicitly espoused in operationism: "Two operations are said to define the same concept if the results are the same, otherwise not" (Hull, 1968, p. 439). Two consequences of this assumption are the following: (a) there exist classical, discrete sets of items (such as symptoms, disorders, or people); and (b) therefore, it is impossible for multiple extensions (things in the world to which a term refers) to correspond to a single intension (conceptual meaning of a term).

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[3]I extend my thanks to Leonard M. Horowitz for suggesting this example.

In the domain of psychopathology the second consequence can be shown to be false (see the discussion of depression and schizophrenia in the previous section, and the discussion of two hostile persons in the following section). Its falsity makes the existence of classical, discrete sets problematic as well.

If we abandon criterion philosophy and embrace a correspondence theory of truth, then we are free also to abandon the classical, discrete sets entailed by criterion philosophy. Fuzzy sets do not entail the consequence that multiple extensions cannot correspond to a single intension. Rather, fuzzy sets allow the mapping of matters of degree. Therefore fuzzy sets, and a dimensional approach based on fuzzy sets, are to be recommended.

Extensions in Psychopathology Are Dimensional

It is possible to look at the various forms of psychopathology as existing along interrelated spectra of disorder. In this way, two terms that have the same intension can be shown to differ in extension along continuous dimensions of disorder. For example, two persons who are both hostile may differ along a dimension of rigidity, one being hostile only in specific situations, and the other being hostile across every situation. Other dimensional approaches are also possible (Acton, 1998).

Meehl (1992) states, "It is widely agreed by historians and philosophers of science that one of the respects in which post-Galilean science was superior to medieval science was the replacement of categorical, 'essentialist' ways of conceptualizing the world by quantitative, dimensional modes of thought" (p. 118; see also Carson, 1996a, 1996b; Eysenck, 1986; Hull, 1965a, 1965b; Lewin, 1931). The idea that the "categories" of psychopathology have extensions that in fact blend imperceptibly into one another follows a progressive shift in understanding and observation within science at large.

Many experts agree that the time has come to embrace a dimensional approach to personality disorders (Costa and Widiger, 1994; Frances and Widiger, 1986; Pincus and Wiggins, 1990). This same idea could be expanded to include the *DSM* Axis I disorders (such as anxiety, depression, and schizophrenia), in which we again see a continuous blending of disorders one into the other. Schizoaffective disorder is a case in point: it seems to exist midway between schizophrenia and the mood disorders. One author makes this point with vehemence:

> For the last 20 years I have been dismayed by the widespread assumption that schizophrenia and manic-depressive illness are distinct diseases simply because we have given them different names . . . . I have therefore tried again and again to convince my students and colleagues that these assumptions are unjustified and that we must be prepared to consider other possibilities, and to think in dimensional terms. (Kendell, 1991, p. 13)

Similarly, depression and anxiety share many overlapping features, leading to the proposal of a new category, mixed anxiety and depression (Clark and Watson, 1991), that might be better accounted for by abandoning the categorical assumption altogether and dealing with these disorders dimensionally.

Intensions in Psychopathology Should Also Be Dimensional

Given that there can be multiple extensions (or referents) corresponding to a single intension (or concept) in psychopathology, perhaps another approach should be instituted in place of the *DSM*'s assumption of a categorical model: namely, that extensions are arranged along continuous dimensions with fuzzy boundaries (i.e., as matters of degree, or fuzzy sets; Horowitz, French, Lapid, and Weckler, 1982; Horowitz and Malle, 1993; Horowitz, Post, French, Wallis, and Siegelman, 1981; Horowitz, Wright, Lowenstein, and Parad, 1981).

If we assume that extensions are arranged along continuous dimensions with fuzzy boundaries, then perhaps our conceptual framework would work better at reflecting these extensions if it were arranged the same way. This conjecture seems quite reasonable based on a semantic definition of truth — such as Tarski's (1944) — as an agreement between intension and extension that reflects the actual state of the world.

Tarski (1944) has shown theoretically that science is separate from semantics: whereas semantics describes "truth" as agreement between concepts and referents, science describes whether such agreement exists. Science, freed from an unnecessary conflation with semantics, can show that concepts are non-referential, and thus that hypotheses are mistaken. In the case of the *DSM*, for example, a science freed from semantics could show that "categories" such as depression and schizophrenia are not categories at all, but are better considered dimensions. Surely there must be a truth to the matter. Social constructionists have argued that the categories of the *DSM* are little more than conveniences (Rothbart and Taylor, 1992), and this point is well-taken—but it is not the most devastating criticism that could be levelled at the *DSM*. Rather, a more devastating criticism would be that the *DSM* is simply wrong, that its categories are non-referential. This is a question for science, not semantics, and must be regarded as among the most important questions for the science of psychopathology to answer.

Epilogue: On the Possibility of Non-Referential Criterion Sets

The intensions that comprise *DSM* diagnoses could, of course, be mistaken. But the application of criterion philosophy in the form of operationism makes this difficult to see because it results in treating diagnostic

categories as socially constructed entities, and social constructions (unlike classifications that aspire to empirical testability) are not ordinarily viewed as scientifically corrigible. Reasons that could be marshalled in favor of abandoning social constructions are more in the nature of fashion and convenience than of science.

Another way of saying this is that social constructions are not *fallible* in the same way as empirical classification schemes. Somewhat paradoxically, fallibility is not only a good thing, it is also a critical feature of any scientific activity. So long as diagnostic criterion sets are fallible, the theories that incorporate them are still falsifiable. This, according to Popper, is what differentiates science from such other pursuits as logic, metaphysics, religion, ideology, and pseudo-science (Bartley, 1984; Lakatos, 1970; Popper, 1959). When criterion philosophy and operationism preclude the possibility that a diagnostic criterion set can be nonreferential, then we are no longer dealing with a classification scheme susceptible of scientific investigation.

There is something artificial about the *DSM* diagnostic criteria that makes *DSM* disorders less like discoveries and more like inventions. It is possible that in fact what are called out by such purely semantic relations do not exist, or have no extensions such as we would expect natural kind terms to have. Perhaps the category of schizophrenia, for example, when conceived as a single unitary construct, does not have any independent existence beyond its intension (Carson, 1991; Carson and Sanislow, 1993). This possibility can at least be articulated as an empirical hypothesis once we abandon the assumption of operationism. Increasing our ability to articulate falsifiable empirical hypotheses that enable an increasingly greater understanding of the real world beyond our conceptual structure is one of the principal goals of science.

Millon (1991) observes, "The language we use, and the assumptions it reflects, are very much a part of our scientific disagreements" (p. 245). The burden of this article has been to show that language is indeed important in our scientific efforts, but that the assumptions it reflects need to be brought to light and carefully examined if we are to avoid using language in ways that may not reflect extralinguistic realities. Although correspondence to reality is not all that is required of a diagnostic scheme (as discussed in Acton, 1998), correspondence to reality is the bare minimum that must be required of any diagnostic scheme, and this requirement is one area in which the *DSM* falls short.

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