

Mental Disorder as a Roschian Concept: A Critique of Wakefield's "Harmful Dysfunction" Analysis

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J. C. Wakefield (1992a, 1992b, 1993) recently proposed that mental disorder is best conceptualized as a "harmful dysfunction," whereby "harm" is a value judgment regarding the undesirability of a condition, and "dysfunction" is the failure of a system to function as designed by natural selection. The authors maintain, however, that (a) many mental functions are not direct evolutionary adaptations, but rather adaptively neutral by-products of adaptations, (b) Wakefield's concept of the evolutionarily designed response neglects the fact that natural selection almost invariably results in substantial variability across individuals, and (c) many consensual disorders represent evolutionarily adaptive reactions to danger or loss. The authors propose that mental disorder is a Roschian concept characterized by intrinsically fuzzy boundaries and that Wakefield's analysis may only prolong scientific debate on a fundamentally nonscientific issue.

The issue of the boundary between *normal* and *abnormal* behavior lies at the heart of many of the most contentious disputes in the field of psychopathology today (Gorenstein, 1984, 1992; Reznick, 1991; Wakefield, 1992a; Widiger & Trull, 1985). In the 1960s and early 1970s, for example, the question of whether homosexuality constitutes a mental disorder was the focus of intense and often acrimonious debate (Bieber, 1973; Spitzer, 1973). During the 1980s, controversies regarding whether such proposed diagnoses as self-defeating personality disorder, sadistic personality disorder, late luteal phase dysphoric disorder (premenstrual syndrome), and coercive paraphilic disorder should be included in the third revised edition of *Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R)* (American Psychiatric Association, 1987) received considerable attention from both the lay and scientific communities (Holden, 1986). Several of these disputes, particularly that regarding premenstrual syndrome (DeAngelis, 1993), recently resurfaced prior to the publication of the fourth edition of *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)* (American Psychiatric Association, 1994). Nonetheless, as was the case with a number of preceding controversies (Kirk & Kutchins, 1992), the resolution of many of these issues appeared to hinge as much, if not more, on sociopolitical as on scientific considerations. The intractability of these disagreements seems to stem largely from a failure to reach consensus on the definition of mental illness (Gorenstein, 1984).

In a recent article in this journal (Wakefield, 1993) and two companion articles in other journals (Wakefield, 1992a,

1992b), Wakefield presented a novel analysis of the concept of disorder, including mental disorder. Whereas most attempts to define disorder are predicated on either value (e.g., Sedgwick, 1982) or scientific (e.g., Kendell, 1975) criteria, Wakefield proposed that the proper analysis of disorder incorporates both value and scientific criteria. Specifically, he argued that disorder is best conceptualized as a "harmful dysfunction," whereby "harm" is a societal judgment regarding the undesirability of a condition (i.e., the value component), and "dysfunction" is a "failure of a mechanism in the person to perform a natural function for which the mechanism was designed by natural selection" (i.e., the scientific component; Wakefield, 1993, p. 165). Thus, a mental disorder is a "harmful mental dysfunction" (Wakefield, 1992a, p. 384). Wakefield (1992a) suggested that his analysis would help to shed light on controversies regarding the inclusion or exclusion of certain conditions in the diagnostic nomenclature. Moreover, he asserted that "The problem . . . is not with the viability of the concept of mental disorder but with the inadequacy and misdirectedness of our attempts to operationalize that concept" (Wakefield, 1993, p. 172). Wakefield's harmful dysfunction framework has already been used by several authors to examine the validity of a number of psychiatric disorders (e.g., see Richters & Cichetti, 1993, for an application of Wakefield's analysis to the *DSM-III-R* diagnosis of conduct disorder).

We find much to agree with in Wakefield's comments, including his critiques of most prior efforts to define disorder (Wakefield, 1992a, 1993) and his criticisms of *DSM-III-R*'s (American Psychiatric Association, 1987) emphasis on reliability at the expense of construct validity (Wakefield, 1992b). Nevertheless, we contend that Wakefield's analysis is problematic in three respects: (a) many mental functions are not direct evolutionary adaptations, but rather adaptively neutral by-products of adaptations, (b) Wakefield's concept of the evolutionarily designed response neglects the fact that natural selection almost invariably results in substantial variability across individuals, and (c) many consensual disorders represent evolutionarily adaptive

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reactions to danger or loss. In addition, we propose an alternative analysis of disorder, including mental disorder, as a Roschian concept lacking a clear-cut counterpart in nature, and argue that this analysis remedies many of the shortcomings of Wakefield's account and most other attempts to define disorder (e.g., Kendell, 1975).

Before proceeding, we should make our major assumptions explicit. First, our principal criticisms center around Wakefield's (1992a, 1992b, 1993) concept of dysfunction, rather than his concept of harm. Specifically, we take issue with his attempt to render a purely scientific account of dysfunction, but not with his claim that harm plays a key part in societal judgments of mental disorder. Thus, we concur with Wakefield that the boundaries of mental disorder are to some extent relative across cultures, as well as within cultures over time.

Second, like Wakefield (1992a, 1992b, 1993), our primary concern is with disorder, rather than with mental disorder per se. Thus, we freely borrow examples from both the psychological and medical domains (although we emphasize the former) in order to underscore the potential shortcomings of Wakefield's analysis.

Third, we use Wakefield's (1992b, 1993) method of "conceptual analysis" in order to refute his arguments on his own terms. As Wakefield (1992b) noted, in this method "proposed accounts of a concept are tested against relatively uncontroversial and widely shared judgments about what does and does not fall under the concept" (p. 233). Conceptual analysis assumes, of course, that consensual judgments of disorder can be used as a criterion against which competing conceptualizations of disorder can be subjected to the risk of falsification. Wakefield (1992b, 1993) used this method to critically evaluate the validity of various proposed accounts of disorder, including those of *DSM-III-R* (American Psychiatric Association, 1987) and Spitzer and Endicott (1978). We in turn use this method to critically evaluate Wakefield's own account. In other words, we examine the extent to which Wakefield's analysis successfully accounts for consensual examples of both disorder and nondisorder.

We should also note that our objections to Wakefield's (1992a, 1992b, 1993) analysis are both epistemic and ontologic, although we place particular weight on the latter. In one case (see the section titled Adaptations Versus Adaptively Neutral Exaptations), we discuss whether the utility of Wakefield's formulation of mental disorder is compromised by our incomplete and perhaps intrinsically limited knowledge regarding the natural origins of mental and physical systems (see also Davison & Neale, 1994, p. 8, for a discussion of the epistemic limitations of Wakefield's analysis). In general, however, we concern ourselves with the question of whether Wakefield's account can in principle, rather than in practice, distinguish disorder from nondisorder. Thus, in most cases we focus on the internal logic underlying Wakefield's arguments, rather than on how readily these arguments can be applied to the resolution of controversies concerning the boundaries of mental disorder.

Finally, we feel somewhat uncomfortable with Wakefield's use of the term *design* to describe the process by which natural selection produces mental and physical systems equipped to meet specific problems posed by the natural environment. This term, although a succinct and convenient means of expressing

the consequences of natural selection, carries teleological implications that are potentially misleading. Natural selection is not a purposeful mechanism that designs systems to respond to environmental demands, but instead an ongoing alteration of the frequency of genes in the population predisposing toward behaviors leading to increased inclusive fitness. Although we would prefer to discuss dysfunction in terms of the failure of a system to perform in the fashion it was naturally selected (rather than designed) to perform, we use the term *design* in the remainder of this article to retain continuity with Wakefield's arguments.

Adaptations Versus Adaptively Neutral Exaptations

In contrast to Wakefield's (1992a, 1992b, 1993) assertions, many important mental and physical systems were probably not designed directly by evolution to perform a given function. As Gould (1991) and a number of other theorists (e.g., Piattelli-Palmarini, 1989; Williams, 1966) have suggested, a large number of such systems are not adaptations—features originally shaped by natural selection for increased fitness—but exaptations—features not originally shaped by natural selection, but that are by-products of adaptations that have since taken on functions different from their initial functions. For example, a number of paleontologists have argued that the feather system of birds evolved initially to assist in heat insulation and was only subsequently capitalized on as a vehicle for flight (Gould & Vrba, 1982; Lewin, 1982). Moreover, Calvin (1983) has suggested that human language may be an indirect consequence of natural selection for motor sequencing and timing.

Exaptations can be divided into two types: those that have enhanced fitness at some point subsequent to their emergence (referred to by Gould, 1991, as *secondary adaptations*) and those that have not (referred to here as *adaptively neutral exaptations*). Bird feathers clearly fall into the former category. Although they might have arisen initially for thermoregulatory purposes, bird feathers later assumed a different function that became evolutionarily adaptive (i.e., flight). Similarly, even if human language is a secondary result of natural selection for sequencing and timing (Calvin, 1983), it is very likely that language has itself become evolutionarily adaptive. Because Wakefield (1992a, pp. 383–384) appeared to define *dysfunction* as the failure of a system to perform as it was initially designed to perform, his original conceptualization of dysfunction cannot account for such secondary adaptations. Nonetheless, a modification of Wakefield's conceptualization of dysfunction to refer to present, rather than past, design could accommodate many secondary adaptations, namely, those that are currently adaptive (this modification, however, leads to problems of its own; see the section titled The Problem of Defining the Evolutionarily Designed Response).

Adaptively neutral exaptations—those that have not been shaped by natural selection—pose the most serious challenge to Wakefield's (1992a, 1992b, 1993) formulation of dysfunction, because they are not consequences of evolutionary design. Likely examples of adaptively neutral exaptations in humans include religion, political beliefs, arithmetic ability, music, art, literature, and specific athletic and motor skills. These psychological capacities are probably not direct products of natural

selection, but are largely or entirely indirect consequences of natural selection for both domain-specific capacities, such as verbal and spatial ability (Tooby & Cosmides, 1992), and domain-general capacities, such as general intelligence (Falk, 1992).¹ With regard to religion, for example, Maser and Gallup (1990) proposed that belief in God is an indirect result of direct selection for self-awareness, that is, the capacity to become cognizant of one's own existence (and thus nonexistence; see also Gould, 1991). They suggested that "In regard to theistic thought, it seems likely that for the species this capacity is a by-product of the evolution of mind (self-awareness) and the realization that one will someday cease to exist" (p. 530). Of equal importance, the exaptations cited earlier in this paragraph are unlikely to be relevant to inclusive fitness (Gould, 1991) and are thus probably not consequences of evolutionary design.

Pursuing this logic, such widely agreed-on neurological disorders as amusia and acalculia would probably not qualify as disorders according to Wakefield's (1992a, 1992b, 1993) criterion for dysfunction, because the functions impaired (musical ability and arithmetic calculation, respectively) in these conditions are unlikely to be products of evolutionary design. Similarly, a number of apraxias, such as construction apraxia and ideomotor apraxia (Berg, Franzen, & Wedding, 1987), involve a loss or disturbance of specific capacities (the ability to draw or build geometric figures and the ability to perform such discrete motor acts as using a pair of scissors, respectively) that probably are largely or entirely irrelevant to fitness and are instead consequences of more general cognitive abilities (e.g., spatial ability) that have themselves been selected for.

Wakefield's (1992a, 1992b, 1993) analysis thus suffers from many of the same questionable assumptions as the strict adaptationist program of evolutionary theorizing which, as noted by Lewontin (1979), "attempts to describe all aspects of living organisms as optimal solutions to problems set by the environment and by the biology of the species" (p. 5). Although Wakefield did not claim that all psychological features are consequences of natural selection, he implicitly assumed that all of the psychological systems relevant to mental disorder have been evolutionarily designed (e.g., see Wakefield, 1992b, p. 236).

In principle, Wakefield's (1992a, 1992b, 1993) concept of dysfunction could be amended to deal with the problem of exaptation in three ways. First, this concept could be broadened to include both adaptively neutral exaptations and adaptations. Thus, Wakefield's definition of *dysfunction* might be modified to "the failure of a system to perform in either the fashion that it was designed to perform or in the fashion that it has subsequently been modified to perform." This extension would introduce serious problems of overinclusiveness, however. For example, atheists who are persecuted and ostracized as a result of their beliefs (and thus experience harm) would in many cases be considered disordered according to Wakefield's criteria because, as noted earlier, religious beliefs are probably adaptively neutral exaptations rather than adaptations. In addition, musical performers and athletes whose livelihood depends on the maintenance of specialized skills that are lost as a consequence of bodily degeneration or wear-and-tear would be considered disordered according to Wakefield's revised definition of *dysfunction*. Specifically, such individuals have experienced harm

resulting from the loss of their livelihood and could be said to possess a dysfunction (according to the revised definition) because their systems are not functioning in the fashion in which they have been modified to perform.

Second, it could be argued that even though such mental functions as musical ability and arithmetic calculation were not themselves evolutionarily selected for, the brain systems (e.g., cortical areas specializing in sequencing and logical reasoning) underlying these capacities are products of natural selection. The difficulty with this argument, however, is that these brain systems were probably not designed directly to perform music or calculation, as necessitated by Wakefield's (1992a, 1992b, 1993) definition of dysfunction, but have instead assumed different and presumably more specialized functions. Because Wakefield conceptualized dysfunction as the failure of a system to function as it was designed to function, amusia, acalculia, and similar conditions would not be considered disorders according to his definition. Consequently, his formulation is unable to accommodate adaptively neutral exaptations.

Third and finally, Wakefield might contend that the distinction between the two types of exaptations is rarely clear-cut, because many exaptations have since taken on evolutionarily adaptive functions and can thus be regarded as secondary adaptations (Fernald, 1992). Nevertheless, as noted earlier, it seems implausible that all of the exaptations relevant to disorder, including musical ability, calculation, drawing, and specific constructional capacities, enhance fitness. Moreover, Wakefield's definition of dysfunction hinges on the precarious assumption that every mental capacity relevant to disorder increases the probability that an organism's genes will be represented in future generations. We should point out, however, that it may be difficult or impossible to determine conclusively whether musical ability and similar capacities are irrelevant to fitness. Of course, the problem of determining which exaptations have subsequently become adaptive and which have not poses as much of an epistemic dilemma for Wakefield's position as for ours. Thus, this difficulty underscores some of the limitations of Wakefield's formulation in clarifying controversies regarding the boundaries of disorder (see Wakefield, 1992a, p. 386).²

The Problem of Defining the Evolutionarily Designed Response

Wakefield (1992a, 1992b, 1993) appears to acknowledge that dysfunction does not necessarily involve an all-or-none break-

¹ Some evolutionary psychologists have been critical of the notion of domain-general capacities, instead preferring to conceptualize adaptations as domain-specific solutions to problems posed by the natural environment (e.g., Tooby & Cosmides, 1992). Nonetheless, domain specificity is not incompatible with domain generality, because various lower order capacities (e.g., verbal and spatial ability) often covary sufficiently to form meaningful higher order dimensions (e.g., general intelligence).

² A reviewer pointed out that at least some of the characteristics we have identified as adaptively neutral exaptations might be shaped by sexual selection, namely, selection resulting from the tendency of individuals to base their choice of mates on certain features (Buss & Schmitt, 1993). For example, it is not entirely outside the realm of possibility that mate choice is on average influenced slightly by a potential partner's musical ability. Nevertheless, applying this argument to the characteristics we have identified as adaptively neutral exaptations

down in the functioning of a physical or mental system. Such an acknowledgement is needed to avoid a number of counterexamples in the medical domain, such as essential hypertension, coronary artery disease, and diabetes mellitus, which apparently represent extremes of "normal" variation in a system's functioning or capacity to function (Kendell, 1975; Oldham, Pickering, Fraser Roberts, & Sowry, 1960). In the psychological domain, there is evidence from research using taxometric techniques (Meehl & Golden, 1982) that borderline personality disorder (Trull & Widiger, 1990), and perhaps a number of other personality disorders, may be dimensional, rather than categorical, in nature. Moreover, a number of researchers (e.g., Cloninger, 1986; Eysenck, 1981; Gray, 1982) have argued that many psychopathological syndromes, including mood and anxiety disorders, are the product of extreme levels of one or more personality dimensions.

In light of these considerations, Wakefield (1992a, 1992b, 1993) proposed that dysfunction can in some cases represent graded deviation from an evolutionarily designed level of natural functioning (e.g., Klein, 1978), rather than an all-or-none breakdown of a function. However, this dimensional analysis of dysfunction begs the question: How is the evolutionarily designed response to be defined? If Wakefield's formulation of dysfunction is to adequately distinguish disorder from nondisorder, it must provide a relatively precise definition of this response. Otherwise, the boundaries of dysfunction and therefore disorder become unclear.

If one defines the designed response by means of reference to a statistical norm (e.g., the designed response is one that is exhibited by the majority of the population), then Wakefield's analysis becomes subject to many of the same problems that he justifiably criticizes (Wakefield, 1992a, pp. 377-378). For example, if the majority of individuals in a society respond dysfunctionally to a stressor, does this make the individual who responds dysfunctionally nondisordered? Alternatively, one could define the designed response in terms of evolutionary criteria. Indeed, this is apparently the tack that Wakefield (1992b) adopted in explaining why posttraumatic stress disorder (PTSD) is a mental disorder: "The fact that in PTSD the person's coping mechanisms often fail to bring the person back to equilibrium months and even years after the danger is gone, and that PTSD reactions are dramatically out of proportion to the posttraumatic danger, suggests that the response is . . . a dysfunction" (p. 239).

However, evolution rarely designs universal set points across individuals for the functioning of biological systems; there is almost always considerable variability around the mean of the population distribution of a system's responses (Ehrman & Prober, 1983). This mean is not the designed or most adaptive response for any single individual's system, because the most evolutionarily adaptive response for each system necessarily differs across individuals. In part, this is almost certainly because biological and psychological systems do not operate in a vacuum: The most adaptive response of a given system fre-

quently depends on the functioning of other systems. (In the interests of space, we ignore the additional problem that the most adaptive response of a system *within* an individual often differs over time depending on the functioning of other systems.) For example, there is some evidence that individuals with poor coping resources are more prone to PTSD following a traumatic stressor compared with other individuals (Barlow, 1988), perhaps because they require more time to process the trauma.

Put somewhat differently, Wakefield's (1992a, 1992b, 1993) notion of dysfunction is often or almost always relative to the situational context, a point with which Wakefield appears to concur. A dysfunction can rarely if ever be defined simply as a failure or breakdown in a system. Instead, as Wakefield notes, many dysfunctions appear to involve the failure of a system to function outside of a specified range of situations. For example, he asserted that "a person with normal learning mechanisms can develop pathological behavioral dispositions that are outside the range that the learning mechanism was designed to produce" (Wakefield, 1992a, p. 386). Herein lies the problem with Wakefield's analysis, however: In many or most cases, the boundaries of this range are defined not by evolutionary criteria but by arbitrary human convention. In other words, because for many systems the range of evolutionarily selected responses is continuously distributed within the population, there tends to be no natural point of demarcation (e.g., a threshold, a step function) in the population separating "abnormal" functioning (i.e., a dysfunction in Wakefield's terms) from "normal" functioning in such a system.

Wakefield's (1992a, 1992b, 1993) concept of the evolutionarily designed response thus neglects the fact that natural selection almost always produces substantial variability across individuals. Because natural selection generally results in a range of values, rather than a single value, for a system's functioning, defining dysfunction and therefore disorder at the population level typically becomes impossible. In other words, because the boundaries of dysfunction and therefore disorder tend to be intrinsically unclear, Wakefield's definition of dysfunction implies that the diagnostic thresholds for many or most disorders would be different for different individuals. This state of affairs renders his conceptualization of disorder unworkable and incapable in many cases of resolving the question of the boundaries of disorder.

In the case of PTSD, for example, there is no objective standard to determine whether "months and even years" (Wakefield, 1993, p. 165) represents an excessive response to a stressor, because the most evolutionarily adaptive response to this stressor differs across individuals. In criticizing *DSM-III-R*'s (American Psychiatric Association, 1987) largely arbitrary 6-month duration criterion for conduct disorder, Wakefield (1992b) averred that "there is nothing about the passage of time in itself that transforms a nondisorder into a disorder" (p. 243). Yet it appears to be the very criterion of time that Wakefield invokes to support his claim that the prolonged response of PTSD patients to a trauma represents a dysfunction. Wakefield's use of the time criterion is arguably just as arbitrary as that of *DSM-III-R*, because the mean response resulting from selection pressure is not necessarily the most adaptive response for a given individual.

Although Wakefield (1992b) acknowledged that "discovering

again leads to problems of overinclusiveness for Wakefield's formulation. As noted earlier, for example, athletes whose skills have degenerated could in some cases be considered disordered.

what in fact is natural or dysfunctional may be extraordinarily difficult" (p. 236), we contend that this determination represents as much of an ontologic as an epistemic problem. That is, such a determination is often in principle impossible, because in many cases no single answer to the question of what constitutes an evolutionarily designed response across all individuals exists. Wakefield (1992b) hinted indirectly at this difficulty when he asserted that "our fear response is naturally designed to function so that fear is *roughly proportional* to the actual level of danger" (p. 243; emphasis added). Wakefield thus appeared to concede that no precise value for the designed fear response in the population exists, but did not elaborate on this point. In addition, although Wakefield acknowledged the existence of boundary conditions, that is, psychopathological conditions that may be difficult or impossible to categorize as disorders or nondisorders given our present ignorance regarding the designed functions of mental functions (e.g., Wakefield, 1992a, p. 383), he did not point out that the problem of fuzzy boundaries is present for many or most conditions. Specifically, because Wakefield's formulation of dysfunction is often intrinsically fuzzy, delineating which conditions are mental disorders would be problematic in many cases.

Our arguments do not imply, however, that the mean levels of biological and psychological systems are arbitrary or meaningless from an evolutionary standpoint. The existence of long-term evolutionary processes such as stabilizing selection (Ehrman & Propper, 1983) suggests that intermediate values in the functioning of many biological and psychological systems are generally more adaptive than extreme values. Nevertheless, our reasoning implies that the boundaries of dysfunction (and thus disorder according to Wakefield's definition) will usually be intrinsically fuzzy and unclear, because variability surrounding the mean response is the rule rather than the exception. In the case of stabilizing selection, for example, substantial variability around the mean almost invariably persists even after countless generations. The ubiquity of such variability suggests that what is selected for is not a single value for a system's response, but rather a broad range of responses that tend to be adaptive across many individuals.

A further complication with Wakefield's (1992a, 1992b, 1993) definition of dysfunction is that at points he appears to treat natural selection as a finished, rather than as an ongoing, process. For example, Wakefield (1992a) asserted that "those mechanisms that happened to have effects on past organisms that contributed to the organisms' reproductive success over enough generations increased in frequency and hence were 'naturally selected' and exist in today's organisms" (p. 383). In the same article, he stated that "the natural functions of internal mechanisms were determined by the selective pressures that operated in environments that existed when the human species evolved" (p. 384). In fact, however, the natural functions of mental and physical systems are changing on a virtually constant basis, because natural selection is a dynamic, rather than a static, process. For example, such evolutionary processes as directional selection (Wilson, 1975) alter the mean of the distribution of a system's responses over time.³ Because of such processes, responses that are adaptive at one point in evolutionary history will often be nonadaptive at others. As a consequence, Wakefield's original formulation of dysfunction, which focuses

on design at one point in evolutionary history, implies that even if a response is currently adaptive, it would constitute a dysfunction if it involved the failure of a system to perform as it was initially designed to perform. Conversely, even if a response is currently maladaptive, it would not constitute a dysfunction if the relevant system performed as it was initially designed to perform.

In principle, the dynamic quality of natural selection is not incompatible with Wakefield's (1992a, 1992b, 1993) definition of dysfunction. To address this problem, Wakefield could modify his definition of dysfunction to refer to present, rather than past, evolutionary design. This alteration would lead to problems of its own, however. Specifically, a modification of dysfunction to refer to present design would render Wakefield's formulation incapable of accommodating breakdowns of systems (e.g., such organs as the appendix) that are products of natural selection but which no longer confer an evolutionary advantage. Consequently, such conditions as appendicitis would not qualify as disorders according to his revised definition of dysfunction.

Disorders as Failures of Systems to Perform Their Designed Functions

As noted earlier, Wakefield (1992, 1992b, 1993) conceptualized dysfunction as the failure of an evolutionarily selected system to perform its designed function. A number of widely agreed-on disorders, however, appear to be adaptive reactions of a system to threat or bodily insult, rather than failures of a system to execute an evolutionarily designed function. The primary characteristics of a flu (e.g., fever, coughing, sneezing), for example, represent adaptive efforts to expel an infectious agent, rather than failures of a system to exercise a natural function. In response, one might argue that the signs and symptoms of a flu typically interfere with the natural functioning of other systems (e.g., a flu usually results in a reduction in appetite and mobility). However, this argument misses the point: The systems of the organism are responding adaptively given the presence of a virus. The same can be said for the gastroenteritis associated with food poisoning. The vomiting typically resulting from such poisoning is an indication that the area postrema of the medulla is performing its evolved function of initiating the expulsion of toxins (the same holds for the diarrhea and gastric motility accompanying food poisoning). Indeed, in many cases the organism's failure to exhibit such responses as vomiting, diarrhea, and gastric motility following food poisoning would represent a dysfunction in Wakefield's terms. It is interesting that the inhibition of such responses as fever and diarrhea by medical interventions frequently results in a worsening and prolongation of illness (Nesse, 1991), suggesting that the absence, rather than presence, of these responses indicates maladaptive functioning.

³ An additional potential complication with Wakefield's analysis is that the responses of some psychological and biological systems may be shaped by disruptive selection (Wilson, 1975). Disruptive selection results in a bimodal distribution of phenotypic responses, indicating that two very different classes of responses have been evolutionarily favored.

Similarly, the features of a number of psychopathological conditions seem to represent biologically adaptive responses to danger or loss, rather than failures of evolutionarily designed functions. The characteristics of many anxiety disorders, for example, appear to be evolved responses to potentially harmful stimuli. Specific phobias of such stimuli as snakes, heights, water, and darkness are probably extreme variations of fears that have been evolutionarily prepared (Seligman, 1971; cf. McNally, 1987). The panic attacks observed in panic disorder have been hypothesized by a number of theorists to represent "a normal fear response firing inappropriately" (Barlow, 1991, p. 63) rather than the failure of a biological mechanism to execute its designed function, as implied by Wakefield's (1992a, 1992b, 1993) definition of *dysfunction*.⁴ Thus, the responses of individuals with specific phobias and those with panic disorder can be viewed as the outputs of systems performing their evolved functions, but in "inappropriate" situations. Many of the features of depression may similarly be evolutionarily selected reactions to loss. Nesse (1991) and Clark and Watson (1994), for example, have conjectured that depressive symptoms represent biologically adaptive responses accompanying the organism's sudden withdrawal from the environment and reallocation of energy and resources.

In response, Wakefield could perhaps argue that although anxiety, depression, and other emotions are evolutionarily adaptive, their expression in a biologically inappropriate situation constitutes a dysfunction. For example, he might maintain that organisms evolved to exhibit fear reactions only in situations that pose a direct physical threat to the organism, and that fear reactions in inappropriate (i.e., nonthreatening) situations constitute dysfunctions. Panic disorder, for example, could be conceived of as the repeated occurrence of alarm reactions in situations different from those in which such reactions were designed to be elicited. The difficulty with Wakefield's analysis in such cases is that the definition of an inappropriate situation for the expression of a response tends to be intrinsically fuzzy. In the case of fear reactions, for example, what level of physical threat should be considered inappropriate for these reactions to be regarded as dysfunctional? Wakefield's analysis cannot provide a clear-cut answer to this and similar questions because, as noted in the previous section, there is typically no clear point of demarcation separating dysfunction from normal functioning. Moreover, because dysfunction tends to be relative to the situational context, there is typically no clear point of demarcation separating inappropriate from appropriate situations for the expression of a response. There are no scientific criteria for determining, for example, what level of threat must be present before a fear of snakes becomes dysfunctional.

Finally, it could be argued that the symptoms of some psychopathological conditions, such as specific phobias of blood or injury, are inappropriate because they are less adaptive in modern society than in the situations for which these fears were initially designed (Barlow, 1988; Clark & Watson, 1994). These phobias involve autonomic responses (e.g., decreases in heart rate and blood pressure) apparently designed to minimize blood loss. Because the pace of certain technological developments, such as bandages, tourniquets, and coagulants, has outstripped the pace of evolutionary change, individuals have less reason to fear blood loss than they did thousands of years ago.

From this perspective, a specific phobia of blood in a technologically advanced society might be viewed as resulting from the activation of evolutionarily selected mechanisms that were better suited for past than for present dangers. Thus, contrary to Wakefield's formulation of dysfunction, some phobias may actually be the product of fear systems performing too similarly to the way they were designed.

Beck and Freeman (1990) have advanced somewhat similar arguments for certain personality disorders. For example, many of the features of antisocial personality disorder, such as manipulateness, aggressiveness, and deceptiveness, might best be thought of as predatory strategies that were more adaptive in past competitive and hostile environments than they are in present society. Beck and Freeman's reasoning implies that some personality disorders may result from the failure to modify previously adaptive strategies to the altered contingences of current environments.

Mental Disorder as a Roschian Concept

As noted earlier, Wakefield's method of conceptual analysis involves the comparison of potential examples and counterexamples of disorder with "widely shared judgments" (Wakefield, 1992b, p. 233) of disorder. By using consensual judgments as a criterion for disorder, Wakefield is in effect comparing the extent to which potential examples or counterexamples of disorder match a commonly held conception of disorder. The critical question becomes whether this conception corresponds (i.e., correctly detects) an entity in nature, as Wakefield implies in his evolutionary account of dysfunction, or whether it possesses no clear-cut counterpart in nature. It is conceivable that consensual judgments of disorder are an imperfect reflection of a clearly demarcated category in nature, and that researchers will eventually succeed in identifying an explicit scientific basis for disorder (Widiger & Trull, 1985). Nevertheless, given the repeated lack of success that highly capable individuals have had in delimiting the natural boundary between normality and abnormality (for reviews, see Gorenstein, 1984; Kendell, 1975; Wakefield, 1992a), we believe that it is reasonable to propose that the concept of disorder, including mental disorder, lacks any clear-cut natural counterpart.

In contrast to others (e.g., Kendell, 1975) who have attempted to identify an explicit natural or scientific basis for disorder (or, in Wakefield's [1992a, 1992b, 1993] case, the dysfunction component of disorder), we propose that disorder, including mental disorder, is best conceived of as a Roschian concept (Rosch, 1973; Rosch & Mervis, 1975). Roschian concepts, which are mental constructions that are typically used to categorize entities in the natural environment (e.g., bird, fruit, mountain), are characterized by unclear boundaries and an absence of defining (i.e., criterial) features (see Neisser, 1979, for an analysis of intelligence as a Roschian concept). Our Roschian formulation of disorder is consistent with our earlier arguments suggesting that

⁴ Even Klein's (1993) suffocation signal alarm theory of panic disorder, which conceptualizes panic disorder as resulting from a dysfunction in a brain suffocation alarm monitor, regards the panic response as an evolutionarily adaptive reaction that is manifested in inappropriate situations.

the boundaries of dysfunction tend to be inherently fuzzy, as well as with the role of subjective values in many definitions of disorder (Reznek, 1991; Szasz, 1960; Wakefield, 1992a).⁵

Roschian concepts are organized around an ideal mental prototype that contains all of the features constituting the category. Consequently, such concepts consist of both clear-cut (i.e., prototypical) and marginal examples. In the case of mental disorder, certain conditions (e.g., schizophrenia, major depression) are relatively prototypical examples for most individuals, whereas other conditions are relatively marginal examples for most individuals. The ongoing controversy regarding whether such conditions as self-defeating personality disorder, sadistic personality disorder, attention-deficit/hyperactivity disorder, and premenstrual phase dysphoric disorder (premenstrual syndrome) are disorders lies not, we contend, in the failure to adequately define disorder (cf. Wakefield, 1992a, p. 373), but in the fact that certain conditions will inevitably fall at the fuzzy boundaries of most individuals' Roschian concepts of disorder. Moreover, because individuals' Roschian concepts of disorder almost certainly exhibit less than perfect overlap, intractable disagreements regarding which conditions constitute disorders are essentially unavoidable.

We maintain that Wakefield's (1992a, 1992b, 1993) harmful dysfunction account of disorder is often (although, as we have seen, not always) "correct" (i.e., consonant with our intuitive judgments of disorder), simply because harm and dysfunction are two of the most salient features of conditions that we categorize as disorders. His harmful dysfunction analysis may thus help us to understand how individuals think about disorder, but sheds little light on the underlying state of nature. It is important to note, however, that the features of Roschian concepts do not arise from thin air: Such concepts emerge largely from repeated experience with real-world entities (Neisser, 1979). Thus, the question of what experiences shape our Roschian concepts of disorder remains an important area for research. For example, are our concepts molded in part by repeated exposure to conditions that are perceived as necessitating medical intervention (e.g., Kräupl Taylor, 1971; Reznick, 1991)?

We should also point out that prototypicality effects and other findings consistent with a Roschian structure do not preclude the existence of a category possessing defining features. For example, odd numbers exhibit prototypicality effects, with certain odd numbers (e.g., 3) being perceived by most individuals as "better" exemplars of the category of odd numbers than others (e.g., 109; Armstrong, Gleitman, & Gleitman, 1983). That a mental concept demonstrates prototypical characteristics thus does not demonstrate that this concept possesses fuzzy boundaries in reality. On the basis of the repeated failure of Wakefield and numerous others to provide a satisfactory formulation of disorder in terms of scientific criteria, however, we hypothesize that disorder is a nonscientific concept lacking clear-cut natural boundaries. This hypothesis is potentially falsifiable, however, and would require the discovery of a natural point of demarcation (e.g., a different definition of dysfunction than Wakefield's) separating all or virtually all consensual disorders from nondisorders.

Conclusions and Implications

Wakefield's (1992a, 1992b, 1993) harmful dysfunction analysis fails as a comprehensive account of disorder, including

mental disorder, primarily because his concept of dysfunction does not correspond to a clear-cut phenomenon in nature. According to our Roschian analysis of disorder, it is in principle impossible to explicitly define *mental disorder*, because *disorder* is a mental construction that lacks a clear point of demarcation in the real world and possesses no criterial attributes. From this perspective, controversies regarding the inclusion or exclusion of specific conditions in the DSM result not from a failure to adequately define mental disorder (cf. Wakefield, 1992a), but rather from a failure to recognize that the question of whether a given condition constitutes a mental disorder cannot be answered by means of scientific criteria.

We mention two important caveats to our conclusions. First, as Gorenstein (1984) pointed out, acknowledging that there is no unambiguous natural boundary between normality and abnormality in no way gainsays the reality or importance of the psychopathological entities that are currently subsumed under the label of *mental disorder*. To take a similar example, the concept of *drug* has no clearly demarcated boundaries in nature (Gorenstein, 1992). The question of whether caffeine or nicotine are drugs, for example, cannot be answered by recourse to scientific criteria. Nevertheless, this fact does not call into question the reality of caffeine, nicotine, or widely agreed-on drugs, or imply that the discipline of pharmacology has been engaged in the study of mythical entities. Similarly, the principal entities of our current psychiatric classification systems, such as schizophrenia, bipolar disorder, and panic disorder, lie within the proper purview of scientific approaches to psychopathology, but the question of whether they are disorders does not.

Second, our analysis does not imply that the natural boundaries of specific mental disorders themselves are necessarily unclear (e.g., Cantor, Smith, French, & Mezzich, 1980). As Meehl (1977, 1986) noted, most mental disorders can be conceptualized as "open" concepts characterized by fuzzy boundaries, an absence of pathognomonic (i.e., defining or criterial) indicators, and an unknown inner nature. Indeed, many mental disorders, such as schizophrenia, appear to conform to an open or Roschian structure (Cantor et al., 1980). Nevertheless, such a structure is not incompatible with the presence of a latent diagnostic entity possessing criterial attributes (i.e., a taxon; Meehl & Golden, 1982). A condition possessing a Roschian structure can be produced by unsystematic environmental influences, measurement error, and other factors acting on a "closed" concept (i.e., an entity with clear-cut boundaries, defining features, and a well-understood inner nature), leading to imperfect correlations among its diagnostic indicators (see also Grove & Tellegen, 1991).

In a related vein, Meehl (1986) pointed out that open concepts can subsequently become closed if investigators succeed in uncovering their inner nature. In the case of specific mental disorders, this inner nature can be thought of as their etiology, pathology, or both (Lilienfeld, Waldman, & Israel, 1994). General paresis, for example, was an open concept until researchers identified the spirochete responsible for syphilis (Meehl &

⁵ Subjective values cannot, however, account for all cases of consensual disorders (Wakefield, 1992a). Extreme laziness, rudeness, and slovenliness, for example, are negatively valued in most or all cultures but are not by themselves considered disorders.

Golden, 1982). Because our analysis, however, suggests that the metaconcept of disorder lacks criterial attributes in nature, it implies that this concept will remain permanently open.

If we are correct, why is the belief that the concept of disorder possesses clear-cut boundaries in the real world so intuitively compelling and persistent? Medin (1989) and his colleagues (Medin & Ortony, 1989) have recently discussed what they term *psychological essentialism* and its implications for individuals' thinking about categories. According to Medin (1989), psychological essentialism is the widely held belief that many categories possess a deep, underlying essence, even when no such essence is present. As Rothbart and Taylor (1992) noted, "One can think of essence as part of the objective physical world waiting to be discovered" (p. 17). Rothbart and Taylor (1992) extended Medin's reasoning to the distinction between artifactual (e.g., chair, house) and natural kind (e.g., fruit, animal) categories and argued that psychological essentialism is especially likely with the latter categories. According to Rothbart and Taylor, this is because individuals tend to invoke underlying physical attributes that are relatively invariant (e.g., biological structures, genes) when thinking about natural kind categories. We suggest that attempts, such as Wakefield's (1992a, 1992b, 1993), to identify an explicit natural basis for disorder reflect a form of psychological essentialism characterized by a persistence in the belief that disorder possesses an underlying natural essence (in Wakefield's case, a malfunction of a physical or psychological system). Moreover, such attempts appeal to our intuitions largely because they conform to our conviction that the concept of disorder possesses a latent essence in the real world.

Although the proposal that the concept of mental disorder cannot be explicitly defined is not new (e.g., Dawes, 1994; Gorenstein, 1984; Guze, 1978, p. 106, quoted in Spitzer & Klein, 1978; Reznick, 1991), our Roschian analysis may help to explain why debates concerning whether certain psychopathological conditions are mental disorders have been so longstanding. The fact that certain conditions tend to be prototypical examples of mental disorder may foster a consensus among researchers regarding such conditions. This consensus may in turn lead to the erroneous impression that a "real" entity called *mental disorder* exists in nature, because such consensus is often mistakenly attributed to the shared perception of a genuine essence in the physical world. Conversely, the fact that certain conditions are marginal examples of mental disorder for most individuals may lead to intractable controversies regarding whether such conditions lie inside or outside the fuzzy boundaries of disorder.

From this perspective, Wakefield's conceptualization of disorder may actually prolong scientific debate on a fundamentally nonscientific issue. With each succeeding edition of the *DSM*, a considerable amount of time and effort is expended on the question of whether certain conditions are mental disorders. Moreover, although such debate has typically involved a consideration of the scientific research on these conditions, social value judgments have often played a pivotal role in the ultimate decisions [e.g., see Spitzer, 1981, for a discussion of the role of values in the debate regarding the status of homosexuality in the second and third editions of *Diagnostic and Statistical Manual of Mental Disorders (DSM-II*, American Psychiatric Association, 1968, and *DSM-III*, American Psychiatric Association, 1980, respectively)]. According to the view advanced here, future edi-

tions of the *DSM* (and similar diagnostic manuals) should refrain from classifying psychopathological conditions as either disorders or nondisorders. Instead, the *DSM* should have the more pragmatic goal of providing a compilation of well-validated conditions that are currently deemed to require intervention (i.e., treatment, prevention, or both) by mental health professionals. In part, the decisions regarding the content of the *DSM* would almost certainly involve a careful consideration of the harmfulness of each condition to the affected individual, society, or both. As Wakefield (1992a) noted, harmfulness or impairment has been a major criterion in most definitions of mental disorder, and it seems likely that harmfulness would remain a crucial criterion in deciding which conditions necessitate intervention. In many respects, our views are similar to those of Gorenstein (1984), who suggested that we shift our attention away from questions concerning the existence of mental illness and toward those concerning society's proper role vis-à-vis the treatment and disposition of individuals exhibiting problematic behavior.

Some might respond that this view of the *DSM* revision process invites a cynical manipulation of the decision-making process for political and societal ends, because decisions concerning the inclusion and exclusion of specific conditions would often depend on highly subjective value judgments. On the other hand, it could be argued that such manipulation has occurred repeatedly in the past (e.g., Kirk & Kutchins, 1992; Tavris, 1992) and that removing the imprimatur of science from the process of deciding the content of the *DSM* would simply make the value judgments underlying these decisions more explicit and open to criticism.

This view does not imply that psychopathology researchers would serve no role in the *DSM* revision process. To the contrary, researchers would continue to play an integral role in such tasks as examining the construct validity of psychopathological conditions, finding the optimal means of operationalizing them, ascertaining their boundaries and interrelations, and determining whether they are categorical or dimensional in nature. This view of the *DSM* decision-making process also would help to liberate researchers from protracted, and in our view ultimately unproductive, scientific debates concerning the inclusion of conditions in the diagnostic manual, and instead encourage them to focus their efforts on questions of more critical importance—and scientific relevance—to abnormal psychology, such as those regarding the etiology, assessment, treatment, and prevention of psychopathological syndromes. Moreover, this view might encourage investigators to conduct further research on scientifically promising syndromes not listed in the *DSM* (e.g., the traditional construct of psychopathic personality; Cleckley, 1941/1982), because their absence from the diagnostic manual would not be interpreted as implying a lack of adequate evidence for their validity.

Finally, we harbor no illusions that the *DSM* revision process envisioned here would be free of controversy or debate. In fact, in some respects this process could become even more contentious than it is presently, because heated disputes would almost surely arise concerning which conditions are deserving of attention from mental health professionals. Such disputes, however, would at least be settled on the legitimate basis of soci-

etal values and exigencies, rather than on the basis of ill-defined criteria of doubtful scientific status.

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