
On the Value-Neutrality of the Concepts of Health and Disease: Unto the Breach Again

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ABSTRACT

A number of philosophers of medicine have attempted to provide analyses of health and disease in which the role that values play in those concepts is restricted. There are three ways in which values can be restricted in the concepts of health and disease. They can be: (i) eliminated, (ii) tamed or (iii) corralled. These three approaches correspond, respectively, to the work of Boorse, Lennox, and Wakefield. The concern of each of these authors is that if unrestricted values are allowed to infect our concepts of health and disease, then *anything* could be construed as healthy or diseased. They believe that, if at all possible, such a result should be avoided. Unfortunately, as I argue, this result is unavoidable and such attempts to limit values in these concepts are destined to fail. I argue for this position by showing how each of these three attempts to provide value-restricted analyses of health and disease fail as analyses of the concepts of health and disease and that they fail because of their attempts to restrict the role of values in their accounts. I also show how, despite their best efforts, each of these analyses are, themselves, value-driven and value-laden. This leads to the conclusion that values infect our concepts of health and disease at all levels.

Key words: Boorse, disease, Lennox, mental disorder, value neutrality, Wakefield

I. INTRODUCTION

The presence of *helicobacter pylori* (*h. pylori*) in one's gastro-intestinal tract can be cause for alarm because infection with *h. pylori* has been shown to cause gastric ulcers in humans. On the other hand, the presence of *escherichia coli* (*e. coli*) in the intestinal tract is generally not taken to be a cause for alarm because its presence is (for the most part) benign.¹ Gastric disease is rarely associated with the presence of *e. coli* and it would be, in general, wrong to speak of having an intestinal *e. coli* infection. In short, the presence of *h. pylori* in one's gastro-intestinal system

makes one diseased, while the presence of *e. coli* does not. On the face of it, the presence and activity of each bacterium is the same. Each species of bacteria has evolved to survive in the gastro-intestinal tract and interacts with the host body in clearly explicable and understandable ways. Yet to have one genus of bacteria present in one's body is to be diseased, while having the other is to be healthy.

Much of the philosophical literature, on the concepts of health and disease (and the related concept of mental disorder), attempts to provide a value-free method for distinguishing between states that are healthy (like having *e. coli* in one's GI tract) and states that are diseased (like having *h. pylori* in one's duodenum).² In this paper, I show that such approaches are inherently flawed. There is *no* way in which health and disease can be distinguished without taking the healthy or diseased person's interests into account. I also point out that it is impossible to provide a purely evaluative analysis of health and disease. In essence, the concepts of health and disease have both evaluative and value-neutral components that are individually necessary but only jointly sufficient for determining just what is a disease.

In order to argue for this position, I examine three analyses of health and disease in which the concepts of health and disease are taken to be either value-free and objective (Boorse, Lennox) or to contain a vital component that is value-free (Wakefield). Each of these analyses attempts to provide objective or value-free definitions of health and disease that rely on the notion of *proper* function. (Call this *functionalism*.) As I show, each of these accounts provides neither an adequate³ account of health and disease nor an objective/value-free account of these concepts. By examining how these accounts fail, I am able to bring out the inherently mixed (evaluative and value-neutral) nature of health and disease.

II. THE BIOSTATISTICAL THEORY

According to Christopher Boorse's Biostatistical theory (BST), someone or something is healthy if and only if that entity is functioning in a manner that is either at or above the statistically normal level of functioning for entities of that type. Similarly, an entity is diseased just in case it is functioning at a level that is below the statistically normal level of functioning of entities of that type. Boorse contends that these definitions of health and disease provide a *value-free* way of differentiating between healthy body-states⁴ and diseased body-states (Boorse, 1975; 1976; 1977; 1997). As I show below, both of these claims are incorrect. BST provides an inade-

quate account of health and disease and the concepts of health and disease that BST produces are value-laden.⁵

The Biostatistical theory takes a body-state in a particular organism to be diseased just in case that body-state is functioning in a way that is sufficiently below what is statistically normal for body-states of the same species, same sex, and same age (call this *the reference class*). A body-state has a function if and only if that body-state contributes, in some way, to the goals of the organism containing that body-state (Boorse, 1976, p. 77; 1977, pp. 555-556). Furthermore, the only relevant functions for determining health and disease are those that contribute to the organism's goals of reproduction and survival. These are called *physiological* functions and goals (Boorse, 1973, p. 84; 1977, p. 556; 1997, pp. 7-9). So, a body-state is diseased just in case it is functioning in a manner that contributes to the organism's physiological goals at a level that is sufficiently less than the contribution of related body-states in organisms of the same species, sex, and age to those goals (Boorse, 1977, p. 555; 1997, p. 7). Finally, health can be defined either (i) as having all body-states performing at or above a species-age-sex-typical level of efficiency (Boorse, 1977, p. 555) or (ii) as the absence of disease (Boorse, 1997, p. 8).

Holosystolic heart murmurs provide a good example of disease-states that conform to Boorse's view. A heart with a holosystolic murmur⁶ is diseased because (i) the way blood circulates through the heart contributes to the continued living of a person and (ii) the difference in the way that blood circulates in a holosystolic heart (blood is regurgitated back into the left atrium upon contraction) produces a negative impact on the life-span of persons who have holosystolic heart murmurs as compared to those persons who do not have holosystolic heart murmurs. Similarly, testicular varicocele⁷ can be a disease because it can produce lower fertility among men as compared to persons who have normal testicular vessels.

A. *Values and the BST*

Boorse contends that BST results in a value-free account of health and disease. As I show, this is false. BST produces a value-laden conception of health and disease. A concept is a structured way of thinking about the world that divides aspects of the world into those bits to which the concept applies and those bits to which the concept does not. This structuring requires that the concept be associated with a set of criteria that specify to what the concept applies. There are two levels at which values can "infect" a concept. First, when there are multiple sets of criteria that adequately divide the world into things to which the concept applies and things to which it does not (in essence, when there are multiple conceptions of the

same thing), we can choose one of these concepts as the “correct” or accepted concept. Values can enter at this choice-level. The second place where values can gain entry is at the level of the criteria themselves. Boorse’s concepts of health and disease are value-laden at both levels.

The first point at which Boorse’s view is value-laden is the choice level. When choosing his criteria for health and disease, Boorse adopts the criteria he attributes to physiologists. His reason for adopting the physiologist’s viewpoint is that physiology is the field upon which somatic medicine relies (1973, pp. 84-85; 1997, p. 9). The adoption of the physiologist’s goals is problematic in two ways. First, the choice of the goals and interests of physiologists is value-laden because physiologists define disease (or pathology) and normality on the basis of their subjective interests. Boorse readily admits to this and recognizes that the choice of goals to focus upon in any biological field is somewhat arbitrary and depends upon the interests of the investigator (1977, p. 556).

The second problem with connecting the physiologist’s interests with medical accounts of health and disease is that Boorse’s decision to use *the physiologist’s* interests instead of the interests of patients, practicing physicians, anatomists, evolutionary biologists, philosophers, etc., is inadequately supported. Boorse has provided no explanation for adopting the physiologist’s view, save for the claim that physiology forms the basis for medicine. But even if it is true that physiology forms the basis of medicine, it does not necessarily follow that medicine does, should, or must use the physiologist’s viewpoint in defining health and disease. Medicine could be based on physiology, but have goals and interests that differ from those of the physiologist. Medicine could, instead, rely upon the interests of patients, philosophers, or evolutionary biologists. Since Boorse has not provided a satisfactory defense of the view that health and disease *in the field of medicine* must be understood as the same as health and disease in the field of physiology, we have little reason to adopt Boorse’s physiological criteria. So the choice of the physiologist’s goals is inadequately supported by Boorse. In addition, BST is value-laden at the level of criteria-choice. We might think that because the choice of a criterion was made in a value-laden manner, the criterion (and the resultant concepts) must also be value-laden. But, as Boorse points out, it does not follow from the value-ladenness of the choice that the criterion itself is value-laden (1997, p. 27). While I agree with Boorse on this point of logic, it is, nonetheless, the case that Boorse’s criteria *are* value-laden.

According to Boorse, the criterion for a body-state being diseased is that having that body-state “moves” the organism’s life-span or fecundity a sufficient distance (and in the right direction) from the average life-span

and fecundity of organisms of the same species, gender, and age. This criterion is intended to be value-neutral and, on one level, it *is* value-neutral. We can tell, using statistics, whether having body-state *X* lowers the life-span or fecundity of organisms of type *O*. So, determining whether a body-state fits Boorse's definition of disease can be done in a value-free manner. But, that does not mean that the criterion itself is value-free.

One way that one might argue that the criterion Boorse uses is value-laden is by pointing out the value-laden nature of science. Some of Boorse's critics have argued that since science is value-laden and medicine is a part of science, it too must be value-laden. They conclude from this that the concepts used in medicine must also be value-laden (Agich, 1983). In responding, Boorse implies that achieving whatever level of value-freedom that scientific concepts achieve is sufficient for his concept of health and disease. "If health and disease are only as value-laden as astrophysics and inorganic chemistry, I am content" (Boorse, 1997, p. 56). Unfortunately, for Boorse, the concepts in his account of health and disease are value-laden in a way that the ordinary concepts of science are not.

The concepts of science, by themselves, are generally not value-laden. For example, the electron can be conceived of in terms of its charge, its spin, its relation to atoms, its mass, etc. An electron is something that has *x charge, y spin, z mass, etc.* These criteria for being an electron are themselves not value-laden. While we may like the features of the electron (after all electricity runs the world), the criteria for being an electron have nothing to do with our values or whether we value an object that carries a particular charge.

On the other hand, Boorse's concepts of health and disease do contain reference to goods: life and reproduction. Furthermore, they do so precisely because life and reproduction *are* goods. People, *ceteris paribus*, desire to live and to reproduce. These are things that are sought after because they are valued. So, Boorse's concepts of health and disease are value-laden in a way that scientific concepts, like the electron, are not.

Boorse might respond that while life and reproduction are values, they have not been incorporated into the concept *because they are valued*. In other words, features of the world that are valued can be incorporated into the concept of health and disease in a value-free manner. As he states:

Biologists study the physiology of all sorts of organisms that hardly anyone wants alive ... There is no reason to think that an insect physiologist must be committed even to the value of insect life in general, let alone his particular species. On the contrary, he might be funded by Orkin, studying how best to exterminate bugs. One could study human

physiology from the same viewpoint, if one were designing chemical or biological weapons. Plainly “the basic facts of physiology” would stay the same (Boorse, 1997, p. 57).

Boorse seems to be arguing that the results of physiological investigations are not influenced by the values of those person’s performing the investigation. Consequently, since his concepts of health and disease are based on physiology, values are irrelevant to those concepts.

But both of Boorse’s arguments show *precisely* the opposite of this conclusion. The insect physiologist is studying how to exterminate insects because killing insects is (sometimes) a good. Similarly, the chemical warfare researcher studies how to kill people with chemical weapons *because* (sometimes) killing people is valued.⁸ This is precisely the same situation as in the case of medicine. The reason medical researchers (including, but not limited to, physiologists) study the body-states they do is that the explanation for the occurrence of those body-states is of value. Such study enables medical researchers to produce a *good: practical* knowledge. That practical knowledge is a good because potentially, it enables medical practitioners to prevent the occurrence of disvalued body-states and to facilitate the occurrence of valued body-states. In essence, practical knowledge is valued and sought because it enables the knower to *produce* a particular good. Consequently, if a body-state’s impact on life and reproduction are the salient features of the concepts of health and disease because those are the states the physiologist studies, then they are so *only because* continued life and reproduction are valued.⁹ In essence, the criteria for being healthy or diseased has everything to do with our values.

Boorse chooses life and reproduction as his criteria because these are the aspects of human biology that are of interest to physiologists, and physiology plays a central role in somatic medicine. This is a value-laden move (injecting values into the concepts of health and disease at the first level, i.e., the level of choosing a concept). He also contends that by grounding medicine in physiology, he provides a value-free basis for medicine. But that assumes that the aspects of human functioning that interest physiologists (continued living and reproduction) are not value-laden themselves. While there are value-free facts about life-span and reproductive ability, the physiologist and those involved in medical research study these features because they are goods. Moreover, any concept that is based on a criterion that refers to goods is a value-laden concept. Since the concepts of science are not value-laden in this manner, we must reject Boorse’s contention that BST produces a value-free analysis of health and disease.

B. The Failure of BST

Now that we have established that BST is value-laden we can turn to an examination of Boorse's claim that BST provides an adequate account of health and disease. Boorse has argued that BST correctly distinguishes between body-states that are diseased and body-states that are healthy. On this view, body-states that are healthy are only those that maintain or surpass typical levels of reproductive ability and life-span, while body-states that are diseased are only those that result in less than average levels of reproductive ability or life-span. Boorse's focus solely on the goals of reproduction and continued living, I contend, leads to a mistaken view of health and disease. I argue for this position by pointing out a number of counter-intuitive and unacceptable consequences of adopting BST.

Boorse is correct in assuming that health care providers (and those receiving health care) are, in general, interested in body-states that support an average life-span and average fecundity. But life and reproduction by themselves do not specify *every* type of body-state that interests people or that falls under the category of diseases. People are also interested in maintaining quality of life. For example, patients with multiple sclerosis do not simply want to live longer. They want the spasticity of their bladders to be reduced so that they are not confined to a life of locating the nearest toilet. The eighty-seven-year-old bed-ridden man does not necessarily want the heart operation so that he will live to be eighty-eight. He wants to have the operation so that he can get out of bed. Finally, the patient blinded by glaucoma does not simply want to live for a long time; she wants to be able to see.

In addition, body-states like blindness, deafness, multiple sclerosis, and myocardial infarction are only diseases insofar as they either decrease reproductive ability or life-span. So, we can make people with these diseases *healthy* by improving *just* their life-span and reproductive ability. In essence, if blind people, in general, have the same life-span and reproductive ability as sighted people, then blindness (even if due to glaucoma) cannot be a disease. Similarly, if we could, through social programs or advances in science, bring the life-span and reproductive ability of patients with multiple sclerosis up to the average *without* ending the autoimmune aspects of multiple sclerosis (so the person continues to have all of the debilitating effects, except shortened life-span and decrease reproductive ability), then multiple sclerosis would no longer a disease – even if it resulted in the patient being unable to walk, hold a cup, speak, or maintain bladder control. In essence, if we adopt BST, then we can reject as diseased any state that does not decrease life-span or fecundity regardless

of its impact on the patient's life. But any notion of health and disease that allows persons with chronic pain, blindness, paralysis, etc., to be healthy must be mistaken. It is absurd to deny that health care providers, physiologists and patients are interested in maintaining or improving the quality of life of patients. Blindness is an important physiological and medical condition not because it decreases life-span or fecundity (even if it does), but because it can affect people's ability to achieve certain goals. In essence, the goals that interest people and medical professionals are not merely the goals of continued life and reproductive ability. So Boorse is wrong to attribute solely and precisely the goals of maintaining average reproduction and life-span to medicine.

Boorse's concept of health and disease also fails because of his association of being healthy with being statistically normal. In order to determine if a body-state is statistically normal, we have to choose a reference class. Boorse chooses a reference class based on same sex, same species, and roughly same age (1977, pp. 558-559). There are many other possible reference classes one could choose and, depending on what one chooses as a reference class, different body-states will be classified as healthy and diseased. For example, imagine that we have a population of 70-71-year-old women all of whom have osteoporosis. When these women fall they invariably break their hips. Are their bones functioning abnormally or normally? If we take Boorse's choice of reference class (species, age, sex), then they are all properly functioning. But if we instead remove (or broaden) the age restriction on the reference class, we get a different result. Looking at women between the ages of 13 and 85, we find that osteoporotic bones are not statistically normal. In addition, if we take the individual 70-year-old's life as the reference class, then osteoporotic bones are also not statistically (or historically) normal. Thus health and disease are dependent upon how we group individuals.

Finally, connecting health and disease to statistical normality makes what is healthy and what is diseased a contingent manner. Over the last 50 years life-span has increased by approximately 25 years and (in the West) reproductive output has decreased. So, a person who was 60 years old 50 years ago, an age beyond the average life-span of the time, and who had coronary artery disease that shortened her life-span from 70 years to 61 years was not diseased. But if that same person were to be examined today, she would be diseased. Similarly, if a person was only able to have 2 children 50 years ago, considerably below average for the time, she was diseased. But if that same person was only able to have 2 children today (quite close to the average) she would be well. These counter-intuitive results in conjunction with the counter-intuitive results described previ-

ously lead to the conclusion that BST does not provide an adequate conception of health and disease.

III. OBJECTIVISM

Unlike Boorse, Lennox believes that concepts of health and disease are value-laden. Lennox does not mind having values in his concepts of health and disease because he believes that they are *objective* values (Lennox, 1995, pp. 501-502). A value is objective, on this account, if it is true that one must always have that value. Lennox chooses “life” as an objective value because, he contends, if one values anything, then one must value life. Since life is valued by all, it can provide a basis for judging health and disease. Health is associated with “uncompromised” life-span and disease with compromised, or shortened, life-span. Thus, for the Objectivist,¹⁰ a body-state is diseased, if, on average, the individuals with that kind of body-state live a shorter time than individuals without that kind of body-state (Lennox, 1995, pp. 503-504). For example, having a holosystolic heart murmur is unhealthy because, *ceteris paribus*, a population of people with a holosystolic heart murmur will have an average life-span less than the life-span of a similar population of people who do not have heart murmurs. The problem with Lennox’s Objectivism is that the argument upon which Objectivism is based is invalid. In addition, his criterion for determining whether a body-state is healthy or diseased is not objective in the manner he contends.

A. The Objectivity in Objectivism

At first glance, the Objectivist’s move away from BST seems rather small. He seems to have simply eliminated BST’s reference to reproduction. Body-states that decrease reproductive ability are no longer to be considered disease-states unless they also decrease life-span. But, there is more to the Objectivist’s move away from BST than this. The real (and important) difference between the Objectivist and BST is that the Objectivist has provided what he believes to be an *objective* reason for keeping BST’s reference to life-span.

Lennox focuses *only* on those functions of body-states that support continued living (normal life-span) because, he claims, both the goals of those body-states and the explanation for the existence and structure of those body-states are to maintain the continued living of the organism. This view is objective, according to Lennox, because it picks out a fundamental feature of the universe that can be used to determine whether or not

a body-state is functioning successfully. We can divide the world into two broad classes: living things and non-living things. What differentiates living things from non-living things is that living things can die. This means that we can use life and death as measures, respectively, of successful functioning and failed functioning. This difference between living and non-living entities forms the basis for calling continued life an “objective value.” In essence, because we can naturally cleave the world into living and non-living things, and because all living things seek to continue to live and any body-state of a living thing also has the goal of functioning in a way that keeps the organism alive, we can use the contribution of a body-state to that goal (continuing to live) as an objective measure of the health of that body-state (Lennox, 1995, pp. 506-507).

Lennox takes as a basic premise that it is an essential feature of living things that they value life (that is their goal). This forms the basis for judging the successful functioning of living things and their body-states, where successful functioning is to be associated with health and unsuccessful functioning is to be associated with disease. So, in order for this account to be “objective” in the manner Lennox claims, it must be true that continued living is the goal of all living organisms and that supporting continued living is the goal of all body-states of living organisms. Otherwise, there will be occasions where “continuing to live” will not be a measure of the successful functioning of an organism or body-state.

Unfortunately for Lennox, the fundamental goal of living organisms is not, at all times, continued living. Organisms have many inter-related goals.¹¹ For example, a mother grizzly bear may attack a male grizzly bear that enters her territory. In so doing, the mother grizzly bear places herself at great risk of injury and death. At the same time, she also increases the probability that her offspring will survive to adulthood because she has defended them against a male who might harm or kill them.¹² Here the goal of protecting one’s offspring (i.e., the goal of successfully reproducing) takes precedence over the goal of continuing to live. In essence, the mother bear would rather die than allow her offspring to die. Similarly, many other living organisms engage in behavior where the goal of continued living is not in play. The male praying mantis is devoured by the female praying mantis during and after the act of copulation. The male praying mantis’s goal of reproducing *inherently* overwhelms its goal of continuing to live. (After all, if the goal of continued living were primary, it could be achieved, rather simply, by failing to engage in mating behavior.) In both of these situations (the mother bear and the male praying mantis), we see the goal of continued living being put aside and the goal of successfully reproducing taking its place and, consequently, *that* goal (reproduction) should be used as the

measure of the success of the behavior. For example, if the male praying mantis is eaten by the female before he has inseminated her eggs, then his mating behavior should be deemed unsuccessful.

We also see behavior in humans in which the goal of continued living is put aside. Patients who have extremely painful illnesses may opt to die rather than to continue to live. For example, a patient who is undergoing chemotherapy, as part of the treatment regimen for her cancer, may increase his life by a few months (as compared to no treatment). But the discomfort of treatment and the quality of life during that time (as well as the economic and emotional cost to the patient's family) may be so high that the patient drops the goal of continuing to live in favor of avoiding pain, saving money, or helping her family. Parents, children and siblings also engage in behavior that shows that maximizing continued living is not always of importance. We occasionally read of people who give up one of their kidneys to a parent, grandparent, child or sibling. In so doing, those persons decrease the likelihood that they will live their "maximal" life-span. For example, if a person who gives away their kidney begins to have kidney problems in the remaining kidney, that person cannot rely upon their original second kidney and may die "prematurely" as a result.

Finally, body-states may also not have the goal of continuing to live. The human fetus develops many more brain cells than it keeps as an infant. These cells undergo programmed cell death at some point during fetal development. So, continued living is not, at all times, the goal of organisms or of body-states. As such, it can not be an *objective* value in the sense that Boorse uses it. Measuring the success of the functioning of body-states requires determining the goal of those body-states and that goal is not always continued living.

B. Logical Problems with Objectivism

Lennox's objectivism is not only *not objective* in the sense that he claims, it is also based on an invalid argument. According to the Objectivist, all organisms have the goal of continuing to live and whether or not a body-state supports that goal determines whether or not that body-state is functioning in a successful manner. Even if we grant this basic premise, does it follow that if I have a body-state that decreases my life-span, then that body-state is diseased? No, precisely because having a body-state that shortens one's life-span (as compared to other individuals who lack that body-state) may be necessary for achieving one's goals. In addition, having a body-state that does not decrease life-span may interfere with achieving an organism's goals. To illustrate this point let us turn to a few examples.

My first example refers to what the Objectivist would call a genetic disease. If having a sequence of genetic code shortens your life-span as compared to other members of the population that do not have that genetic code, then, according to the Objectivist, to have that genetic code is to be unhealthy. This matches our intuitions in cases like Huntington's disease. But there is another sequence of genetic code that one could have (and that decreases life-span) that does not work out as well for the Objectivist. Men have one Y-chromosome and one X-chromosome while women have two X-chromosomes. Women also live longer than men. This is in no small measure due to the difference in chromosomes. So, having the Y-chromosome is having a body-state such that if one did not have that body-state (one had the X-chromosome instead) one would be in a class of persons who have a longer life-span. By the Objectivist conception of health and disease, being male is a (genetic) disease. But having individuals with the Y-chromosome is necessary for the continuation of the species and for any individual human being to achieve the goal of reproducing. Similarly, the class of pregnant women has on average a shorter life-span than the class of non-pregnant women (due to the chance of mortality from pregnancy). According to the Objectivist view of health, pregnancy is unhealthy.

These examples show that there are goals that one might want to achieve despite the resultant shortening of life-span. Being alive is necessary for achieving these goals, but having a "normal" life-span is not. But there are also cases in which one's life-span is not shortened (so one is healthy), but one's other goals are blocked. For example, imagine that I have a mild case of glaucoma in one eye that primarily presents itself in the form of mild headaches. These mild headaches do not decrease my longevity, they simply make my life unpleasant. According to the Objectivist, because all of my body-states are functioning in a way that support my continued uncompromised living, I am healthy. Yet my ability to achieve my goals has been affected by the glaucoma. Here life-span is not shortened, yet other goals are blocked.

While achieving one's goals requires being alive, achieving one's goals is not dependent on having a maximal (normal) life-span. Goals can be thwarted despite having a normal life-span and, more importantly, certain vital goals can only be achieved by having a shortened life-span. In essence, it does not follow from the premise "organisms have the goal of continuing to live" that "all body-states should be judged on the basis of whether they negatively impact one's life-span." So the Objectivist's claim to have found an objective value against which he can measure body-states to determine if they are healthy or diseased does not follow from the Objectivist's premises.

This result makes good sense when we recognize that Lennox considers proper function to be related to the achievement of some goal. Just as there are no values that universally apply to all people at all times, there are no goals that all organisms seek to achieve at all times. Life is a balancing act. In different situations different goals take precedence and the ordering and amount of importance attributed to achieving those goals will differ depending on the person affected.

C. Disability without Disease

Lennox's view also leads to some of the same counter-intuitive results as BST. On Lennox's account a body-state is diseased if and only if the way that it is functioning decreases the life-span of the organism that contains that body-state. Thus, debilitating but non-life-shortening conditions, like chronic back pain, deafness, blindness, etc., cannot be diseases. In addition, body-states that decrease life-span can become healthy simply by eliminating that body-state's negative impact on life-span. For example, persons who have multiple sclerosis should be construed as healthy at that moment where they have, on average, a life-span equal to that of people who do not have multiple sclerosis. Their health is not dependent upon fixing their abnormal auto-immune responses; rather, it is dependent upon increasing their life-span. In addition, any body-state, no matter how debilitating, can be healthy just in case it does not decrease life-span.

Lennox claims to have found an objective value that can be used to determine whether a body-state is healthy or diseased. As I have shown, this value (continued living) is not objective in the sense that Lennox intends it, because it is not always a useful measure of successful functioning. In addition, even if we grant Lennox his premise that continued living is an objective value, his criterion for determining whether a body-state is healthy or diseased is inadequate. Finally, the criterion also leads to the counter-intuitive result that debilitating body-states are not diseases if they do not decrease a person's life-span. As such, I contend we should reject Lennox's view of health and disease.

IV. THE EVOLUTIONARY ANALYSIS OF HEALTH AND DISEASE

Both Lennox and Boorse have attempted to provide analyses of health and disease that rely upon a *forward-looking* analysis of proper function. Boorse requires that a body-state not have the effect of either shortening life-span or reducing fecundity, while Lennox requires that a body-state merely not have the effect of shortening life-span. Both of these forward-looking

analyses of proper function have been shown to provide an inadequate basis for the concepts of health and disease. In the next few sections of this paper, I examine a *causal* or *backward-looking* analysis of proper function that is based on the theory of evolution.

Jerome Wakefield has argued that mental disorders should be understood to have two components: a harm component and a dysfunction component. On this harmful-dysfunctional analysis of mental disorder, a body-state (a mental mechanism) is a mental disorder just in case it is both harmful and dysfunctional. A body-state is harmful just in case the society or culture one dwells in believes it to be a harm to have that body-state. This harm component is expected to capture the evaluative aspects of the concept of mental disorder. In order for a body-state to be a mental disorder it must, in addition to being harmful, be dysfunctional. A body-state is dysfunctional just in case it is not performing in a manner that is consistent with the evolutionary explanation for the existence and structure of that body-state. This evolutionary conception of dysfunction is understood to be value-free (Wakefield, 1992a; 1992b; 1995). As I show below, Wakefield's analysis fails on two counts. First, his analysis of dysfunction is not value-free. Second, if we adopt his analysis of dysfunction, then we will be led to an account of mental disorder in which almost nothing is a mental disorder.

A. Wakefield's Account of Mental Disorder

According to Wakefield, a mental disorder is an effect of a dysfunctional mental mechanism, where that effect is harmful to the person who has that dysfunctional mental mechanism. The functioning of a mental mechanism imposes harm on a person just in case the effects of that way of functioning are considered to be harmful by the society in which one lives. The same type of functioning may be a harm in one society but not in another. For example, many Christians take homosexual behavior to be harmful because the consequence of such behavior is damnation. At the same time, many contemporary homosexuals do not take homosexual behavior to be harmful. They reject the claim that such behavior is a damnable offense. So, on Wakefield's account, mate-selection mechanisms (responsible for generating homosexual and heterosexual behavior) that produce homosexual behavior are candidates for being mental disorders within the context of a Christian community, but, those same mate-selection mechanisms are not candidates for being mental disorders within the context of a homosexual community.

Once it has been established that the way someone's mental mechanisms are functioning causes them harm, we can ask whether that mental

mechanism is dysfunctional. If it is, then the person has a mental disorder. A mental mechanism (like a mate-selection mechanism) is dysfunctional if it fails to perform its *natural function*. A natural function, of a mental mechanism, “is an effect that is part of the evolutionary explanation of the existence and structure of the mental mechanism” (Wakefield, 1992, p. 385). In order for homosexuality to be a genuine mental disorder, even within the Christian community, the mental mechanisms that cause homosexual behavior must be functioning in a way that is not consistent with an evolutionary explanation for that kind of functioning. In essence, homosexual mate-selection mechanisms are not dysfunctional just in case homosexual behavior can be shown to be due to evolutionary (selective) pressure on mate-selection mechanisms to produce homosexual behavior. While I do not argue the point here, I contend that there is substantial evidence indicating that expressing the homosexuality phenotype is consistent with the evolutionary history of mate-selection mechanisms.¹³ Thus homosexuality cannot be a mental disorder even within those communities that consider it harmful.

B. Values and Dysfunction

Wakefield has argued that the concept of mental disorder is value-laden, but he isolates the influence of these values by placing them only in one criterion of his two-criterion conception of mental disorders. In essence, values are encapsulated in the harm component of Wakefield’s analysis. The harm component is evaluative because Wakefield considers a body-state to be harmful if and only if it produces effects that are disvalued by one’s culture or society. At the same time, Wakefield contends that the evolutionary dysfunction portion of his harmful-dysfunctional analysis of mental disorder is scientific, factual, and value-free (1992a, p. 383; 1995, pp. 233-234). But, as I show, Wakefield has not succeeded in completely isolating values in the harm component of his concept of health and disease. His evolutionary analysis of dysfunction is also value-laden.

The evolutionary analysis of dysfunction seems to be value-free because it is based upon a causal-historical account of proper function. On this view, a body-state is functioning properly just in case it is functioning in accord with the evolutionary explanation (i.e., causal history) for the existence of that body-state. Once we identify an evolutionary explanation, we establish a fact about the cause of the existence of the body-state under examination. These facts then provide the basis for determining whether or not a body-state is dysfunctional and since facts, *qua facts*, are not value-laden, we might think that the evolutionary analysis of dysfunction would also not be value-laden. But that conclusion is false.

Wakefield's evolutionary analysis of dysfunction is value-laden, at the level of choosing the criteria, because Wakefield brings values into play when he chooses evolutionary criteria rather than other (e.g., physiological) criteria as the basis for his analysis of dysfunction. We can see this when we examine how one can arrive at the judgment that "body-state X is dysfunctional" using an evolutionary analysis of dysfunction. Let us assume that we have determined what is the evolutionary history of body-state X . Thus, we know why body-states of type X evolved and what evolutionary function they have historically performed. But knowing this does not, by itself, entail that when some particular person has a particular body-state x which is not performing in a way that is consistent with the development of X (where x is a token of type X), that x is dysfunctional. In order to get that conclusion we must add the premise that failing to perform in a manner that is consistent with one's evolutionary history is dysfunctional. And that premise is implicitly evaluative.

This premise is evaluative because it entails that the only good explanation of a body-state functioning in a particular manner is an evolutionary explanation. But that need not be true. We can provide analyses of body-states on the biochemical level, at the social level (using social values like continued life, reproduction, quality of life, etc.), at the anatomical level, and so on. Our decision to use any of these types of definitions of functionality will be based, in part, upon what about the entity under study is of interest to the investigator. If the investigator is an evolutionary biologist, then gene transmission is what is of interest. But, if the investigator is a pathologist, then physiology or biochemistry may be what is of interest. In essence, the choice of any one of these notions of functionality must be made on the basis of what is of interest to the investigator. And, as such, the choice is value-laden.

C. Clarifying the View: An Example of Apparently, but not, the Same Natural Function

The value-ladenness of Wakefield's analysis of dysfunction does not necessarily lead to the conclusion that Wakefield's harmful-dysfunctional definition of mental disorder is wrong. Instead, Wakefield's harmful-dysfunctional analysis of mental disorder fails because adopting it would result in our taking almost nothing to be a mental disorder. In order to show why this is the case, I need to clarify Wakefield's view with a simple, non-medical example.

The problem with Wakefield's account is that we tend, mistakenly, to assume that because two entities appear to be the same kind of entity, they can be compared to each other. For example, if we have two fountain pens

we naturally assume that we can use the functioning of one as a measure of the functioning of the other. If one pen writes smoothly and rarely leaves large blobs of ink on the paper, while the other pen writes jerkily and frequently leaves blobs of ink on the paper, then we think that the first pen is functioning properly while the other pen is not functioning properly. But that may be a mistake.

If the first (the “good”) fountain pen is a very expensive fountain pen (say \$500) and the second (the “bad”) fountain pen is a very inexpensive fountain pen (say \$2), then it turns out that both fountain pens are functioning properly. Fountain pens that are expensive are designed to provide smooth, blotch-free writing. Inexpensive fountain pens are designed to provide a “fountain pen experience” at a low cost. In order to produce fountain pens at this low price, the designers need only to provide *sufficiently good* writing ability. (The designers balance quality against cost.) If these inexpensive pens occasionally (and more frequently than the expensive pens) leave large ink blotches on the paper then they are functioning well within *their* design parameters.

In other words, the design parameters of each type of pen are different. The cheap pen sacrifices writing quality for financial savings while the expensive pen sacrifices financial savings for writing quality. An expensive fountain pen is only dysfunctional within the context of expensive fountain pens. One that blotches a great deal *is* dysfunctional because expensive fountain pens are designed rarely to blotch. An inexpensive pen that always blotches is also dysfunctional because inexpensive pens are supposed to write well much of the time, and failing to write well ever is not in the design. But an inexpensive pen that blotches occasionally is not dysfunctional when it blotches, because blotching occasionally is well within the design parameters.

D. The Emptiness of the Wakefieldean Criteria

In order to understand whether the inexpensive fountain pen is functioning properly we need to look at its design, not at the functioning of other fountain pens. We need to determine what the pen was intended to do and how well it was intended to do it. This frequently requires us to analyze the balance of costs and benefits taken into account in the design of the pen. Similarly, in order to determine whether a person’s mental mechanisms are functioning properly, we need to look at the evolutionary development of *that kind* of person’s mental mechanisms. Once we do so, we find that very little of what is normally considered a mental disorder is dysfunctional and, as a consequence, practically nothing is a mental disorder. In essence, it is because we intuitively apply Wakefield’s analysis of dysfunc-

tion in this second manner, comparing functions of objects with different “designs” (evolutionary histories), that Wakefield’s approach has appeal. But once we move to the proper comparison, comparison of the functioning of mechanisms that have the same evolutionary history, we see that the analysis fails. (In precisely the way that thinking the inexpensive fountain pen is dysfunctional fails.)

*E. Schizophrenia*¹⁴

Schizophrenia is certainly one of the most devastating mental illnesses that people can have.¹⁵ As such, it clearly meets Wakefield’s first requirement that having it is considered harmful in one’s society. Schizophrenia also *seems* to meet Wakefield’s second “natural function” criterion. After all, schizophrenics have numerous and clearly specifiable deficits in functioning when compared to non-schizophrenics. In terms of cognitive abilities, schizophrenics have deficits in (at least) four areas: attention, executive functions, memory, and language processing (Gourovitch and Goldberg, 1996). Some of these deficits are thought to arise as a consequence of frontal and/or prefrontal lobe dysfunction, e.g., visual attentional deficits (Maruff and Currie, 1996).

But if we understand Wakefield’s analysis of dysfunction properly, then, because the evolutionary history of the mental mechanisms of schizophrenics differs from the evolutionary history of non-schizophrenics, the mental mechanisms of schizophrenics are not dysfunctional merely when they function differently from non-schizophrenics. This difference in evolutionary history could go something like the following. If we assume that non-schizophrenic genes pre-date schizophrenic genes, then at some time *t* a mutant arose in the non-schizophrenic population. This mutant had the precursors for the schizophrenia genes. Let us assume that this mutation created a range of attentional abilities for the mutant’s descendents that was (in total) lower than the range of attentional abilities of non-schizophrenics.¹⁶ If this is true, then the mutant and his descendents would have had lower survival abilities than the non-mutants. (Being able to attend to visual phenomena is a valuable trait and any loss in that ability could harm one’s survival ability.) In order for the schizophrenia genes to remain in the population, they must have provided the schizophrenic with some other advantage that compensated for the loss in attentional abilities (just like the cheap pens using low price to compensate for less-than-excellent writing quality).¹⁷

If this is so, then the evolutionary explanation for the structure of schizophrenic attentional abilities is different from the evolutionary explanation for the structure of non-schizophrenic attentional abilities. The schiz-

ophrenic genetic line gave away some of its attentional abilities and picked up some other (beneficial) trait. The non-schizophrenic genetic line kept its attentional abilities at the cost of the beneficial schizophrenic trait. What is interesting about all of this speculation is that there is evidence that schizophrenia genes confer a number of advantages to the schizophrenic genetic line. Erlenmeyer-Kimling (1968) found that the offspring of schizophrenic parents have a reduced mortality rate. Huxley *et al.* (1964) suggest that some carriers of the genes for schizophrenia may have higher than average fertility. This has been supported by the work of Erlenmeyer-Kimling and Paradowski (1966) and Erlenmeyer-Kimling *et al.* (1969). More recently, Fañanás and Bertranpetit (1995) and Srinivasan and Padmavati (1997) have found that family members of schizophrenic patients have higher fertility than the general population. Researchers have also argued that the schizophrenic personality provides psychological benefits to the schizophrenic's genetic relatives. Jarvik and Deckard (1977) have argued that schizophrenic and paranoid traits provided their bearers with an advantage over their more trusting competitors. In particular, they contend that in times of "war, persecution, and conquest" a survival advantage is conferred on those members of the population who are "suspicious and seclusive" (Jarvik and Deckard, 1977, p.185).

Let us assume that the correct evolutionary explanation for the persistence of schizophrenia is that the genes that cause schizophrenia increase the fertility of those genetic relatives of schizophrenics who do not develop full-blown schizophrenia.¹⁸ Then the evolutionary explanation for the structure of schizophrenic frontal lobes is that such frontal lobes are part of a spectrum of frontal lobes (phenotypic variation) that result due to schizophrenia genes (genotypic variation). The costs of having that spectrum of types of frontal lobes is compensated for by the benefits of having increased overall fertility among those persons who have the schizophrenia genes. Thus, in general, the frontal lobes of schizophrenics are functioning in a way that is compatible with the evolutionary explanation of their structure. They are *not* dysfunctional and as a result schizophrenia *can not* be a mental disorder.

F. Mixed Mood Disorders

Thus far we have eliminated schizophrenia from our list of mental disorders. That represents a problem for Wakefield, but it is even more problematic than it seems at first because this result can be generalized to other mental conditions. In essence, *any inheritable* mental disorder may fail to be a Wakefieldian mental disorder because inheritable mental disorders are likely to confer some advantage to genetic relatives of those who are

stricken with the mental disorder. For example, mixed-mood (manic-depressive) disorders, despite having serious and unfortunate consequences for those people who have them, are not mental disorders for *precisely* the same reason that schizophrenia is not a mental disorder: mixed mood disorders are genetic (Andreasen, 1987; Jamison, 1996; Reus and Freimer, 1997; Tsuang and Faraone, 1996) and provide a benefit (greater artistic imagination) to bearers of that gene (Andreasen, 1987; Jamison, 1996). Thus, the problems we associate with affective disorders are (evolutionarily) compensated for by the benefits (e.g., creativity) of affective disorders, and manic-depressives do not have a Wakefieldian mental disorder.

G. Environmental Problems

So far, I have shown that genetically caused mental illness (like schizophrenia and mixed-mood disorders) are not, on Wakefield's analysis, mental disorders. In this section, I turn away from disorders that are (essentially) caused by one's genetics and focus on disorders that are (essentially) a consequence of one's interaction with the world. In particular, I show that substance use disorders are not Wakefieldian mental disorders.

While there are numerous substance-related disorders listed in DSM-IV we need only examine one to show the problems substance related disorders raise for Wakefield's analysis of mental disorders. Let us begin with the mental disorder *alcohol intoxication delirium* which falls under the broader category *substance intoxication delirium*. A person has alcohol intoxication delirium if they experience a disturbance of consciousness with reduced ability to focus, sustain, or shift attention, a change in cognition or the development of a perceptual disturbance that develops over a short period of time and tends to fluctuate during the day, and these symptoms are due to alcohol intoxication (American Psychiatric Association, 1994, pp. 82, 116).

Alcohol intoxication delirium is certainly taken (at least has the potential) to be harmful in today's society; so, let us assume that it meets Wakefield's harm criterion. The next question we must ask is whether the mental mechanisms involved in alcohol-induced delirium are functioning in a way that is consistent with their natural function. I contend that when these mechanisms are exposed to large quantities of ingested alcohol, they are neither functional nor dysfunctional and that, therefore, alcohol intoxication delirium is not a mental disorder.

The reason alcohol intoxication delirium fails Wakefield's dysfunction criterion is that there is *no* evolutionary correct manner in which one's mental mechanisms should be functioning when a person has ingested large quantities of alcohol. The brain has evolved to function in a low-

alcohol environment. Once out of that environment all bets are off on whether it will function in a manner that we like. A brain “swimming” in alcohol is functioning in a novel environment, an environment in which and for which it has not evolved to function. In essence, there is no evolutionary (historical) explanation for the brain functioning in the manner that it does when exposed to large doses of ingested alcohol.

To clarify this point, let us return to our fountain pen example. Imagine that we take a \$500 Mont Blanc fountain pen and, instead of filling it with pure ink, we fill it with a mixture of ink and Rubber cement. At first the pen may write, but soon (as the cement thickens on the pen’s nib) it will stop writing. Is this non-writing writing implement functioning correctly? If we take “correct” to mean does it write, then the answer is no. But that is not what we mean by correct. In the current context, correct refers to whether the pen works in a way that is consistent with its design. But note, the pen was not designed to work with an ink-rubber cement combination. Depending on the amount of rubber cement in the mix, the pen may do what you want (write) or it may not. Regardless of what the pen does when exposed to this mixture, it is neither functioning in accord with its design nor is it failing to function in accord with its design. The pen is not functioning (it certainly does not write) but it is not dysfunctional (it was not designed to write with rubber cement).

Returning to the brain of the alcohol-intoxicated person: this person experiences a number of symptoms due to the way that his brain is functioning. But his brain is functioning in a high-alcohol environment. Since the brain (and its associated mechanisms) never evolved to function in that environment (just like the pen was not designed to write with an ink-glue mixture), it is neither functioning properly nor is it dysfunctional.¹⁹ In essence, the mental mechanisms of persons experiencing alcohol intoxication delirium are neither functional nor dysfunctional and alcohol intoxication delirium is not a mental disorder.

DSM-IV lists a number of other substances as the basis for various substance-related disorders. These include: amphetamines, caffeine, cannabis, cocaine, hallucinogenics, inhalants, nicotine, opioid, phencyclidine, sedatives, hypnotics, and anxiolytic disorders. Since our brains have not evolved to operate in environments high in these substances, then (as in the case of alcohol intoxication delirium) when exposed to high doses of nicotine or cannabis, for example, our brains neither function properly nor fail to function properly. Consequently, Wakefield’s account of mental disorder does not allow for *any* substance-abuse related disorders.

A final note on environmental factors. In the 1970s, when this author was growing up, there was considerable debate about removing lead from

gasoline, paint, and other substances that are, in some way, absorbed or ingested by children. The concern was that high levels of lead in children caused mental retardation. As a result of considerable lobbying efforts by concerned citizens, lead was removed from all of these common substances. Children who have stunted intelligence due to lead exposure can not, on Wakefield's account, be taken to have a mental disorder because their brains (their intelligence mechanisms) are not dysfunctional. In essence, the mechanisms that produce and govern childhood brain development have evolved in a lead free (or at least lead-low) environment. So, any functioning of those mechanisms in a high lead environment are neither dysfunctional nor functional in precisely the same manner that the functioning of the brain of the person undergoing alcohol intoxication delirium is neither functional nor dysfunctional. The general moral of this is that any substance that humans are exposed to, that they were not exposed to (or exposed to at that high a level) during their evolution, cannot result in mental disorders, no matter how severe the decrease in one's functioning that such exposure causes.²⁰

H. Emptying the Institutions

I have argued that genetically caused mental disorders, like schizophrenia and mixed-mood disorders and substance-abuse/modern-environmentally caused disorders are not Wakefieldian mental disorders. While this may be sufficient to cause the reader to reject Wakefield's analysis of mental disorder, it should be noted that many other mental disorders listed in DSM-IV are not Wakefieldian mental disorders. For example, many cases of mental retardation, all cases of mental disorders in the elderly, genetically caused attention deficit disorders, anxiety disorders, many personality disorders, medication-induced disorders, and problems related to abuse or neglect are not Wakefieldian mental disorders. They fail to be Wakefieldian disorders for the same types of reasons that schizophrenia and substance-abuse disorders are not Wakefieldian mental disorders: they are the result of mental mechanisms functioning in a way that is consistent with the evolutionary explanation for their existence and structure.²¹ Surely, such an "emptying of the institutions" is reason for rejecting Wakefield's analysis.

V. THE OBJECTIVITY IN THE CONCEPTS OF HEALTH AND DISEASE

The failure of these three accounts (Boorse, Lennox, and Wakefield) to provide value-free analyses of health and disease might lead one to con-

clude that the concepts of health and disease are completely value-laden. But such a conclusion is not warranted. These analyses of health and disease fail partially because they seek to find value-neutrality at too high a level and in the wrong places. Functional analyses attempt to answer the question “why do the members of a group have a particular trait?” by proposing that the trait is a good solution to some hypothetical problem.²² Because functional analyses attempt to provide answers to these “why” questions they will be, at least in part, inherently value-laden. Values enter because functional analyses need to specify what will be a “good” solution to the problem. Depending on the scope of good solutions, one limits the domain of possible functions.²³ In essence, our desire to explain the presence of the trait (heart valves that seal upon heart contraction) is satisfied only by certain explanations (e.g., it maximizes life expectancy, increases fitness, etc.). But our choice of which explanations will be satisfactory is based on our values.

Nonetheless, the intuition that our concepts of health and disease are, at some level, value-free is very strong. It *seems* right to say that duodenal ulceration is a disease and that people would be wrong to deny that it is a disease. But such a claim is mistaken. What is true is that we can, in a value-free manner, determine what is a case of duodenal ulceration, what causes duodenal ulceration, and the impact of duodenal ulceration on other biological systems (e.g., nervous, digestive). That is where the value-freedom lies.

For example, duodenal ulceration is defined as the perforation of the epithelium of the duodenum. Whether someone has this particular body-state can be inter-subjectively checked by using an endoscope to examine the duodenum. Furthermore, we know what the effect of having a duodenal ulcer will be because epidemiological studies have been performed that determine the effects of having a perforation of the epithelium of the duodenum. Finally, there is strong experimental evidence that tells us what causes (in many cases) duodenal ulcerations; e.g., *H. pylori* infection. If one understands the terms involved in describing duodenal ulceration, then it is impossible (for a rational individual or competent language user) to deny (i) that someone has a case of duodenal ulceration, (ii) that it will have certain likely effects on other biological systems, and (iii) that we know (much of the time) how we can go about removing/healing this perforation of the epithelium of the duodenum. So, at least on this level, the “disease” duodenal ulceration is value-free.

But notice, knowing these facts about the body does not tell us whether or not the body is diseased. The development of duodenal ulcerations due to the presence of *H. pylori* is a perfectly normal (although unpleasant)

way for the duodenal epithelium to respond to the presence of *h. pylori* or high acid secretion. Furthermore, the only difference in kind between the interaction of *h. pylori* and the duodenum, and *e. coli* and the intestines, is that we do not like the results of those interactions. Each species of bacterium takes nutrients from the body, seeks to avoid being destroyed by the body's immune system, releases wastes and toxins into the body, etc. The only difference is an evaluative one. We do not like the effects of *h. pylori* infestation, while, for the most part, we do not mind the effects of *e. coli* infestation. In essence (to paraphrase Hume), there is nothing vicious about the bacteria except how we feel about the bacteria.

Even though the value-free description of certain body-states is not sufficient to determine whether that body-state is a disease-state, they are necessary. We cannot, on any account, claim that something is a disease without including some descriptive account of the thing that is being called diseased. To say that "duodenal ulcer" is a disease is to say nothing unless you know precisely what "duodenal ulcer" means. The only way to know that is to provide a description of "duodenal ulcer" that is inter-subjectively understandable and observable. Only when we know that "duodenal ulcer" means perforated epithelium of the duodenum (and we know what each of these words mean) do we have any basis for calling something a disease.

VI. CONCLUSION

Boorse, Lennox, and Wakefield each provide inadequate accounts of health and disease. I contend that this failure rests upon their attempts to restrict the role that values play in their analyses. Boorse, in his attempt to eliminate values, is unable to deal with body-states of genuine medical importance that do not necessarily shorten one's life-span or decrease one's reproductive ability. Lennox, because he seeks to choose one set of values as primary, is also unable to incorporate into his view body-states of genuine medical importance. In addition, the argument he provides for his view is invalid. Finally, Wakefield tries to sequester values in one component of his concept of mental disorder. In so doing, he ends up with an account of mental disorder where almost nothing is a mental disorder. The lesson to be learned is that a failure to embrace rampant values in the concepts of health and disease leads to a sick and unacceptable analysis of health and disease.

In one sense, Boorse, Lennox, and Wakefield are right. Life and reproduction are important components of the concepts of health and disease.

But they are also wrong. More than life and reproduction are important to the concepts of health and disease, and *what* is important will depend upon the interests of people. In the end, because making people healthy really turns out to be making people better (and the “better” is a subjective and value-laden matter), the concepts of health and disease must be intrinsically value-laden.

NOTES

1. *E. coli* may spread from the gastro-intestinal tract if the normal anatomical barriers are broken down, e.g., as occurs in appendiceal perforation. In addition, *E. coli* can become a dangerous infectious agent when immune response is compromised. Since we are focusing on the gastro-intestinal tract, we can for the moment ignore these facts.
2. It should be noted that there is a considerable body of literature that argues for the opposing point of view (that the concepts of health and disease are inherently and essentially value-laden). See, for example, Engelhardt (1974; 1975; 1976; 1996), King (1954), Pörn (1984), and Whitbeck (1977; 1978).
3. These accounts are inadequate primarily because they incorrectly ascribe the term “diseased” to healthy states and the term “healthy” to disease states. It follows from this that these accounts fail accurately to capture the vital explanatory component of the terms “healthy” and “diseased.” The ascription of the terms “healthy” and “diseased” to particular states places those states within an explanatory context, where this explanatory context enables medicine to attempt to treat or prevent the occurrence of those states. For example, when we state that someone has the disease duodenal ulceration, we are able to explain, treat, and prevent that person’s pain and discomfort through our knowledge of pathology and anatomy. If our theory of health and disease misapplies the terms, as the three theories under consideration here do, then they will not be able to explain those features of the world that we consider healthy or diseased. If duodenal ulceration is not a disease, then we have no *medical* explanation for that person’s discomfort. Duodenal ulceration will not be considered a state addressable within the medical model. Such a result is unacceptable and incompatible with our understanding of the terms “healthy” and “diseased.” For a discussion of this aspect of the “languages of medicalization” see Engelhardt (1996, pp. 208-217) and for an excellent example of the role of explanation in medical language see King (1975) and Kamppinen (1989, pp. 74-87).
4. I take body-states to be those aspects of organisms that can be distinguished and considered to be healthy or diseased. In humans, body-states include cells, membranes, bones, organs, entire human beings, etc.
5. Boorse has conceded the point that all science may be value-laden and that medicine may be value-laden in the same way as science (1997, pp. 56-57). As such, the complaint that BST is value-laden might be considered superfluous. But, as I show, BST is value-laden to a greater degree and in a different way than the rest of science.
6. Many body-states (including rupture of the ventricular septum, mitral stenosis, aortic stenosis, and ventricular septal defect) can cause holosystolic murmurs. For the present, I focus on just mitral stenosis.
7. A varicocele is an engorgement of the internal spermatic veins above the testes. In certain cases, this engorgement can lead to an increase in the temperature of the testes

- (due to increased blood flow) which decreases the viability of the sperm and can lead to decreased fertility.
8. I do not assume here that killing in war is an intrinsic good or that war is intrinsically good. All that is necessary for the current context is that the reason we study chemical warfare is that it produces something we value (even if we *ought* not value it).
 9. Boorse might complain that many things are valued or disvalued that are not considered candidates for disease and, as such, health and disease cannot be about value. For example, shortness is disvalued but not a disease. While it is true that many disvalued body-states are not candidates for being diseases, it is also not relevant in the current context. All that I have argued for above is that only those criteria that contain reference to things that people value are candidates for being part of our concepts of health and disease. I have not argued that *everything* that is valued must be part of our concepts of health and disease and I have also not argued that *anything* that is valued can be part of our concepts of health and disease. Values simply are *necessary* components of any health/disease criterion.
 10. Lennox basis his Objectivist analysis of health and disease on Ayn Rand's objectivism. In particular, he focuses on Rand's "The Objectivist Ethics" (Rand, 1965).
 11. Lennox seems to be well aware of the fact that living organisms have more values than mere continued living (Lennox, 1995, p. 510). Unfortunately, he does not provide any discussion of the impact of these additional values on the objectivity of the objective value "continued living."
 12. The killing of offspring of other animals is somewhat common in the animal world. In terms of evolutionary theory, doing so makes sense. For example, a mother bear whose offspring are killed will be available for mating more quickly than the mother bear who continues to rear her offspring. In addition, dead offspring of other animals can not compete for scarce resources with the offspring of the animal that did the killing.
 13. The gist of the argument is that homosexuality can increase one's inclusive fitness in times of resource scarcity or that it can increase group-level fitness. (For a current discussion of group-level selection see Sober and Wilson (1998)). I do not include the argument here for reasons of space and because it is not entirely relevant to the current discussion.
 14. In this paper, when discussing Wakefield, I focus solely on mental illness because that is Wakefield's focus. As I show, his analysis of mental illness fails because applying it leads to the conclusion that almost nothing is a mental disorder. It should also be noted that *precisely* the same problems arise if we attempt to use Wakefield's analysis of mental disorder to define somatic disease. Doing so would lead us to conclude that practically no body-state is a somatic disease.
 15. The diagnostic standards for schizophrenia can be found in DSM IV, p. 147.
 16. Having attentional deficits is one of the consequences of having schizophrenia (Gourovitch and Goldberg, 1996; Maruff and Currie, 1996).
 17. The percentage of schizophrenics in the population is fairly constant at about 1% (Jablensky, 1993).
 18. The true explanation for this persistence is likely to be fairly complex.
 19. It should be noted that it is possible that alcohol consumption has shaped the evolution of certain human populations during the course of the last few thousand years. In particular, the genetic deficit in alcohol dehydrogenase found in many Asians could be due to selective pressure exerted on Asian populations in which alcohol was widely available (Nesse, 1997, p. 64).
 20. While I do not discuss this point in depth here, it should also be noted that if substances that one's genes/body "expects" to be present in the environment (those substances

were always in abundance in the evolved environment) are lacking and that lack results in mental injury, then the mental injury cannot, on Wakefield's view, be considered a mental disorder. In such a case, the body is performing in as novel an environment as the brain when it is awash in ingested alcohol and can not be construed as dysfunctional.

21. I fail to argue that these disorders are not Wakefieldian disorders in the present context for reasons of space and because such arguments would tend to repeat the arguments already given.
22. Although Boorse would say that the trait is present because it is a good way of achieving some goal (Boorse, 1976). But because, for the present purpose, talk of goals and problems is fairly analogous, I ignore the differences.
23. This is true even of causal answers to 'why' questions. When one seeks to give a causal solution to a 'why' question one must ask what kinds of causes are appropriate answers to the question. We see this in the debate between the Biopsychosocial model of disease and the straight Biomedical model of disease. The Biopsychosocial model allows biological factors, psychological factors and social factors to be *causal* factors of disease, while the Biomedical model only takes biological factors to be causal factors. The causal answer to "why is patient X sick?" is essentially different in each model.

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