

Capability:
A Distributive Justice Approach to Healthcare, Medicine, and Human Biology

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Epigraph

“... to live finely is not the same as the things without which living finely is impossible. And in the latter class of things some that are indispensable conditions of health and life are not peculiar to special people but common to practically all...”

- Aristotle, *Eudemian Ethics*

Table of Contents

<u>Introduction</u> : Health is the Ability to Act.....	4
<u>Chapter I</u> : Boorse's Biostatistical Theory.....	11
<u>Chapter II</u> : Human Goals Relevant to Health.....	57
<u>Chapter IV</u> : The Capability Approach.....	81
<u>Conclusion</u> : Future Directions for Research.....	113
Acknowledgements.....	117

Introduction

Health is the Ability to Act

This thesis is about what it means to be healthy. It proceeds from a relatively simple idea: that whether a person is healthy depends on whether they have certain characteristically human abilities, such as the ability to communicate with other people, or the ability to move from one place to another. This view contrasts with the traditional conception of “health” as a kind of physiological and mental state.¹ Rather than thinking of health as something that the body can have or not, then, I conceive of “health” as a set of abilities to act. When we want to determine whether a person is healthy, we look first at what they *can actually do*, and then examine how their anatomy and physiology contribute, instead of the other way around. In summary, *capability precedes physiology* in my account of health.

In reworking the concept of “health,” I hope to provide a new perspective for thinking about healthcare. In particular, I propose that healthcare should focus primarily on ensuring that each person meets a minimum level of ability for certain crucial day-to-day activities. I call these everyday abilities *basic bodily capabilities*. Some of the basic bodily capabilities, such as breathing, sleeping, and getting nourishment from food, are utterly essential to our survival. Other of the capabilities, such as imagination, planning, and cooperation, are not strictly necessary for survival, yet they serve a central role in virtually any self-sufficient human life. By orienting our clinicians and healthcare institutions towards promoting capabilities – rather than simply checking that the patient’s physiological variables fall within normal ranges, and reactively prescribing medicine and

¹ To cite the definition of health famously articulated in the preamble to the constitution of the World Health Organization (WHO), “health is a *state* of complete physical, social and mental well-being, and not merely the absence of disease or infirmity” (my emphasis; Preamble to the Constitution of the World Health Organization, 1946).

lifestyle changes when these variables deviate from the norm – I believe that we can improve the overall quality of healthcare.

Nowadays, the goals and objectives of healthcare are manifold and often opaque. Some healthcare professionals earnestly seek to promote their patients' wellbeing. Others seek simply to practice according to standards of care. Others yet work tirelessly to get patients *out* of their ER, office, or clinic. The motives of our healthcare institutions – medical and nursing schools, insurance companies, hospitals – are even more diverse, and sometimes more obscure. Yet, in this cacophony of competing interests, the goals and needs of patients are often lost or ignored. This patient-neglect is troublesome because the healthcare industry consists fundamentally of *providers of a service*. In exchange for money, healthcare institutions provide people with medical procedures, drugs, and expertise in order to help these people promote their health and ameliorate disease. According to our lay conceptions of economics, the providers of a service should be accountable to the desires, needs, and values of their customers, or else they should fail to make money and eventually cease to exist. In our current situation, however, healthcare providers can get away with ignoring or downplaying their customers' (i.e., their patients') wants and needs, because our healthcare institutions – medical schools, nursing schools, accrediting and licensing agencies, hospitals, professional organizations – have a monopoly on the knowledge, skill, and legal authorization necessary to provide medical treatment. Moreover, healthcare is not economically elastic: we cannot simply refuse to seek treatment when illness befalls us; our instinct for self-preservation spurs us to purchase healthcare services *from these particular providers*. Together, the inelasticity of healthcare and the intellectual and legal monopoly of our current healthcare institutions contribute to a system with the potential to exploit.

Of course, merely redefining “health” and “disease” will not solve the legal and economic aspects of these problems. Our healthcare institutions will not likely lose their monopoly on the

right and ability to provide healthcare in the near future: and, indeed, we would not want to allow just anyone to practice medicine, nor would we want to allow just any medical or nursing school to educate students. And the economic inelasticity of healthcare will never go away. It is the result of the fact that we are fragile, finite beings with a will to survive. However, we may be able to discourage or safeguard against exploitation by promoting medical concepts that *emphasize patients' goals and values*. I believe that my account of “health” as basic bodily capability accomplishes this task. I have aimed for my basic bodily capabilities to form an “*overlapping consensus* among people who have very different comprehensive conceptions of the good” (Nussbaum 2000, 5). That is to say, I have crafted a list of basic bodily capabilities that I believe virtually any adult would see as desirable, regardless of their unique values and life goals.

Ultimately, *patient goals and purposes* make up the normative backbone of my account of “health” and “disease.” As providers of a service, healthcare institutions have a responsibility to their customers', i.e., their patients' wants and needs. Perhaps more importantly, however, each individual's personal goals and values are what make life worth living for him or her, *what make anything worth doing*. Since “health” is that which enables us to use our bodies to do the things we want to do, and since purposes are what make these activities worthwhile, purposes are what make health worth having.

Philosophical Aims

I believe that any successful account of “health” and “disease” will attend to the practical issues of healthcare – that is, to healing people, to administering medical procedures – and not just the theoretical and conceptual problems. After all, healthcare fields such as medicine, nursing, public

health, clinical psychology, physical therapy, dentistry, pharmacy, and optometry are not primarily theoretical fields. On the contrary, as we have seen, their main purpose is to provide people with a particular kind of *service*: medical care.

One may object that I am overstepping the proper boundaries of philosophy by venturing into the territory of medical treatment. Healthcare professionals are most qualified to decide how healthcare should be conducted, one might claim, since they are the ones with the most experience and knowledge concerning medical treatment. Doctors, nurses, dentists, dental hygienists, optometrists, pharmacists, and others involved in administering medical care should be the ones that decide who provides which kinds of treatments and when, because they are the people providing the treatments in the first place. Philosophers, on the other hand, do not have the expertise and training required to make these kinds of edicts. As such, Boorse has done well by keeping his account of “health” in the realm of the ontological, while I make myself presumptuous by telling healthcare providers how to do their jobs.

In response to this criticism, I would reply that I do not wish to render exact, case-by-case judgments about how to treat individual patients. I do not have the training or qualification to make these kinds of judgments. As such, I leave the implementation of my theory to real healthcare professionals. Nor do I purport to furnish a comprehensive listing of which conditions are “healthy” and which are “diseased.” Whenever I mention specific diseases or kinds of cases, I mean simply to illustrate more general principles, rather than to make a statement about those particular cases. On the whole, I wish for my account of “health” and “disease” to provide general principles about what kinds of things are healthy, and therefore worth promoting, and what kinds of things are diseases, and therefore worth ameliorating.

Furthermore, I do not agree that healthcare providers should be the sole voice in setting the principal goals and tenets of healthcare. Healthcare concerns all of us. Our existence depends on the

structural integrity of our bodies, which are breakable and fragile; virtually all of us seek medical treatment at some time or another. We need our bodies to do the things we want to do. Moreover, healthcare is a complex field involving law, economics, business, ethics, social justice, ergonomics, religion, sociology, anthropology, and myriad other fields of study. It is intertwined with nearly every aspect of our lives, precisely because our bodily faculties are an indispensable part of living a happy and truly human life. As such, healthcare far transcends healthcare providers. In order for the healthcare system to work effectively, it requires everyone's input and cooperation: not only healthcare providers, but also lawmakers, clergy, economists, anthropologists, ethicists, and, not least, patients. To treat healthcare providers as the sole authorities on health and healthcare is akin to treating barbers as the sole authorities on hair fashion.

In summary, I wish to shift the focus in medicine from thinking about "health" as something a person's body can *have*, to a concept of "health" as a set of activities that a person *can do*. Following Nussbaum, I believe that health has less to do with whether people's physiological variables fall into certain ranges, and more with "what people are actually able to do and to be" (Nussbaum 2000, 5). Accordingly, I envision a healthcare system whose everyday procedures and goals are attentive to people's bodily capabilities: to those abilities that give people wherewithal to pursue purpose in life. People's baseline goal of *capability* will be the baseline goal of medical treatment.

Overview

In Chapter I, I outline Christopher Boorse's (1977) Biostatistical Theory (BST), which is the leading account of "health" in the philosophy of medicine literature. I examine a handful of the myriad criticisms leveled against the BST over the past four decades and draw some conclusions

about what a successful account of “health” must be able to do. Then, in Chapter II, I explain why I think the BST would be a poor guide to medical treatment. In Chapter III, I outline Martha Nussbaum’s (2000) capability approach to international justice, which I then use as a model for my account of “health.” I use the Conclusion to set future research objectives based upon my account of “health” as capability.

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Chapter I

Boorse's Biostatistical Theory

Christopher Boorse claims that “health” and “disease” are objective, “value-free” biological concepts (Boorse 1977, 542). The theoretical concepts of medicine, Boorse asserts, are rooted in physiology – that is, the subfield of biology concerned with how the parts of a multicellular organism work together to enable the organism’s survival and reproduction. The physiological function of some part of the body, as Boorse explains, is whatever that part does to contribute an individual’s survival and reproduction (hereby abbreviated “S & R”).

According to Boorse’s Biostatistical Theory (BST), roughly speaking, a “disease” is an abnormally low contribution by part of an individual’s body to her S & R, as compared with some statistically normal range for the individual’s species, sex, and age. “Health” is the absence of disease (Boorse 1977, 555). In other words, “disease” occurs when a part or system of an individual’s body falls below species-normal levels of physiological functioning; and “health” is a state in which a person’s body performs all of its species-normal physiological functions at an average or above-average level.

In Section 1 of this chapter, I will explicate more thoroughly the concept of “physiological function” on which Boorse builds his concepts of “health” and “disease.” In Section 2, I will examine Boorse’s concept of health as species-normal functioning and why, according to Boorse, this concept is theoretical and scientific rather than normative. Then, in Section 3, I will examine some of the major existing criticisms the BST: in particular, those of Kingma (2007), Cooper (2002), Amundson (2000), Guerrero (2010), and Boorse himself (2014). These criticisms draw me towards a handful of general conclusions about health and disease:

(C1) Any theory of health as statistical normality will be value-laden, despite the BST's claims of being value-free. We cannot choose reference classes for our judgments of health and disease based upon empirical and scientific criteria alone. Rather, any choice of reference class will appeal to normative values, at least to some extent. As such, we should strive to identify a clear and prudent normative anchor for our theory of health and disease, instead of letting a thousand flowers bloom in the garden of medicine (Section 3.1.1).

(C2) If our account of health and disease is to do us any good, it cannot be merely "theoretical," as Boorse claims the BST is. Our account must also be practical: that is to say, it must give us definite recommendations about which medical treatments are appropriate, and under what circumstances (Sections 3.1.1 and 3.3).

(C3) Humans are not only physiologically diverse, but also genetically, epigenetically, developmentally, behaviorally, and anatomically varied. A theory of health and disease should take these kinds of variation into account. The BST fails to do so largely because physiological normality is far too narrow a basis to encompass all, or even most, kinds of human variation (Sections 3.1.2, 3.2.1, and 3.4).

(C4) Not all judgments of health and disease depend on an individual's sex and age. In general, age seems relatively important in distinguishing health from disease, but sex seems less important.

Therefore, our theory of health and disease should account for age differences in physiology on a fundamental level; but it will deal with sex differences in physiology on a case-by-case basis (Section 3.1.2).

(C5) Because of (C3) and (C4), no account of health as statistical normality can have whole-organism reference classes. There are simply too many kinds of whole-organism functional designs within the human species; people's functional makeup varies combinatorially with respect to

numerous different axes of variation. Thus, judgments of health and disease cannot be relative to some statistically normal organismal design (Section 3.1.2).

(C6) Moreover, we should re-frame talk of statistical normality in terms of *mode of function* – that is, the distinct manner in which a biological subsystem fulfills a particular kind of biological goal, e.g., “communication.” The notion of “mode of function” helps us to transcend Boorse’s discussion of health as a statistically typical contribution to survival and reproduction – which goals are much narrower than those medicine is concerned with – and to think about the different ways in which people achieve more immediate and concrete goals, such as moving from place to place; obtaining nourishment; and using reason, planning, and imagination (Section 3.2.1).

(C7) The BST would be medically and societally harmful as an account of medical treatment. At the very least, the notion of “normal function” on which it depends is socially fraught (Section 3.3).

(C8) Our account of health and disease must appeal to a concept of qualitative function that is somehow characteristic of human beings, but not statistically so (Section 3.2.2).

Ultimately, I hope for my account to modify several aspects of the BST, but to retain some of its core principles: namely, the goal-directedness of life, and the notion that health is the absence of disease. I will discuss these changes to the BST in detail in Chapter III and the Conclusion. To summarize these changes in a few words, I believe that health depends on an individual’s ability to perform certain characteristically human activities – I call them “basic bodily capabilities” – rather than on the contributions that the parts of her body make to her survival and reproduction.

1. Goal-Contribution Functions

Boorse uses the concept of “physiological function” as the foundation for his theory of health and disease. In order to understand what it means for some trait to have a physiological

function, we must investigate Boorse's account of what "functions" are in the first place. Boorse holds a *goal-contribution* view of function, according to which a "function" is a causal contribution to the goals of some goal-directed system (Boorse 1976, 77-78). "Functions," Boorse asserts, "are, purely and simply, contributions to goals" (ibid., 77). Boorse does not state explicitly what kinds of entities *have* goals, or what kinds of systems are goal-directed. He does, however, offer several examples of systems that are goal-directed – living organisms, thermostats, guided missiles – and systems that are not – pens, chairs, Bibles (ibid., 79-80). Moreover, he defines goal-directed behavior as such:

To say that an action or process *A* is directed to the goal *G* is to say... that within some range of environmental variation *A would have been modified* in whatever way was required for *G* (ibid., 78).

That is to say, goal-directed behaviors are those that tend towards some result or end state despite environmental perturbations. For example, we could call the behavior of a guided missile "goal-directed," since such a missile modifies its behavior in whatever way is necessary to hit a particular target. More specifically, the missile may adjust its speed, trajectory, or detonation time to account for environmental perturbations such as random gusts of wind, movement by the target, physical obstacles, etc. We could also consider goal-directed many of the intentional and non-intentional behaviors of living organisms.² A bacterium, to note an instance of non-intentional goal-direction, may use chemotaxis to propel itself towards higher concentrations of a particular nutrient (McShea 2012). Pens, chairs, and most other artifacts, by contrast, do not in themselves exhibit goal-directed behavior. For example, a pen has no way to keep its ink from freezing when the environment is very cold; to keep its ink from oozing when the environment is very hot, or when I chew the end of it; to escape when I am about to discard it; etc.

² I will use the word "intentional" to refer to the conscious goals of higher animals. Conversely, I will use "non-intentional" to refer to the non-conscious goals of plants, animals, bacteria, and goal-directed artifacts such as thermostats.

Presumably, Boorse means for “goal-directed systems” to be exactly those systems that exhibit goal-directed behavior.³ In light of this interpretation, let us consider Boorse’s formal definition of goal-contribution function:

X is performing the function *Z* in the *G*-ing of *S* at *t*, *means*:

At *t*, *X* is *Z*-ing and the *Z*-ing of *X* is making a causal contribution to the goal *G* of the goal-directed system *S* (Boorse 1976, 80).

Thus, an activity counts as a goal-contribution function just when it is causally contributing to a goal of some goal-directed system. As I understand, Boorse employs a more-or-less colloquial definition of “contributory cause:” an activity contributes causally to some goal just when it helps to bring that goal about. Boorse does not explore this notion of causal contribution at length, but rather gives it only cursory treatment:

This notion of a causal contribution, or contributory cause, has come to seem unnecessarily obscure since [Ernst] Nagel’s unhappy references to necessary and sufficient conditions. It is true that contributory causes are not only insufficient but need not even be necessary for their effects. The pumping of the heart may be a contributory cause to the circulation of the blood without being essential to it, since circulation can occur by artificial means... For purposes of discussing teleology, we are clear enough what it means to say that the heart is helping to cause the circulation of the blood, even if a heart-lung machine is ready to switch on at a moment’s notice... one may say that heart action is contributing to circulation when circulation is occurring by, or via, heart action, and let it go at that (ibid., 78).

Thus, Boorse’s drive-by characterization of “causal contribution” leaves the notion fairly vague. Nonetheless, we might suppose, based upon Boorse’s heart example, that item *X* contributes to goal *G* of system *S* just when *X* does *something* to *S*, or within *S*, that helps *S* attain or produce *G*. In the case of the heart, we may say that the heart (*X*) contributes to the individual organism’s (*S*) goal of pumping blood (*G*) by interacting with other parts of the organism in certain ways: e.g., propagating electrical potentials that allow heart muscle to contract in such a way as to expel the

³ Whether Boorse means for goal-directed systems to have some distinguishing ontological or structural feature is unclear; if he does, he does not say so explicitly.

blood into the aorta. So I will proceed by interpreting “causal contribution” in this broad manner, as some effect on or within a goal-directed system that helps the system to attain a goal.⁴

In addition to the notion of “causal contribution,” there are a few other important details to note about Boorse’s formal definition of function. First, X need not belong to system S in order to perform a function with respect to S ’s goals. Thus, even though atmospheric oxygen is not strictly a part of our body, yet it standardly performs the function of participating in the electron transport chain, since this activity contributes to our body’s goal of performing aerobic respiration.

Furthermore, an activity Z need not be goal-directed *itself* in order to count as a goal-contribution function. As such, we might say that the Earth’s gravity is performing the function of keeping us from floating into outer space, water is performing the function of undergoing hydrolysis reactions in our bodies, and needles perform the function of injecting vaccine into our bloodstreams. Even though none of these things are goal-directed in themselves – gravity, hydrolysis reactions, needle-injections – their effects in these cases contribute to goals of systems that *are* – namely, individual humans.

Moreover, X need not do activity Z regularly or characteristically. Indeed, as Boorse notes, “functions may be performed only once and by accident” (ibid. 80). For example, suppose that I accidentally tripped and fell over a fence in front of a huge cliff. Suppose further that my belt fortuitously got caught on the fence, preventing me from falling to my death and thereby

⁴ Coupled with Boorse’s definition of “function” as causal contribution to a goal, this broad articulation of “contributory cause” allows us to make some unusual function ascriptions. For example, the Big Bang has helped me in innumerable ways to achieve my goal of getting an “A” on the neurobiology exam, including causing the Earth and the Sun to form; causing Earth to have the right conditions so as to support living beings, including (eventually) me and my neurobiology instructor; etc. As such, we could say that the Big Bang has contributed causally to my getting an “A” grade on my neurobiology exam, and therefore that the Big Bang has performed such-and-such functions in helping me to get an “A.” While this function statement sounds outlandish – we virtually never attribute functions to large cosmic events such as the Big Bang – I think that the context-specificity of function ascription typically prevents us from making function statements of this kind, where the entities concerned are vastly separated in time, space, and scale (see below).

contributing to my goal of survival. In that moment – but in no others – my belt would be performing the function of keeping me from falling to the bottom of the cliff.

This feature of goal-contribution functions does not respect the so-called “function-accident distinction,” as proposed in Larry Wright’s influential “Functions” (1973). Writing in the tradition of ordinary language analysis, Wright notices two distinct ways in which we commonly use the word “function”: (1) to describe “the” functions of an object, the object’s supposedly characteristic or paradigm activities; and (2) to describe things that the object “functions as,” things the object just happens to do (Wright 1973, 141-142). For example, it seems right to say that “The function of the heart is pumping blood,” but it does not seem right to say that “The function of the heart is to make thumping sounds,” even though in practice the heart may “function as” a sound-maker. In fact, the heart may function as many different things: a diagnostic tool, a transplanted organ, a thing that gets hit by muons, etc. But these activities, according to Wright, are accidental effects rather than *the* functions of the heart.

Wright claims that “the” function of an object whatever effect the object has that explains why it exists in the first place. On the other hand, the things that an object merely “functions as” – the things the object does “accidentally” – are activities that do not explain the object’s existence (ibid., 161). According to this distinction, for example, the function of my belt is holding my pants up, but not saving me from falling to my death. Holding my pants up is what the belt does that explains why it exists: the manufacturer made the belt in order for people to use it as a device for holding up pants. The belt *exists in the first place* because it is supposed to hold pants up. On the other hand, the belt’s saving me from falling to my death does not explain why it exists. The manufacturer almost certainly did not make the belt with the function of saving Sam’s life in mind. Rather, the belt (fortuitously!) happened to function as such in the moment that I fell over the fence.

Contrary to Wright, however, Boorse asserts that there is no important conceptual distinction between “the function” and “functioning as.” “To accept our analysis of performing a function,” he expounds,

is to settle the question of what sort of thing a function is – namely, a contribution to a goal... what more is required for a function performed by X to be among ‘the functions’ of X is not any fixed general property but instead varies from context to context (Boorse 1976, 81).

Put differently, Boorse claims that in either kind of case – whether “the function” of X is Z , or whether X merely “functions as” a Z – X is unequivocally *performing the function* of Z by contributing to a goal. Whether or not we call some effect “the function” of an item depends not on the characteristics of the item or the effect, *per se*, but on the context of discourse (ibid., 81). More specifically,

“The function of X is Z ” means that in some contextually definite system S with contextually definite goal(s) G , during some contextually definite time interval t , the Z -ing of X is [a] member of a contextually circumscribed class of functions being performed during t by X in the G -ing of X – that is, causal contributions to G (Boorse 1977, 82).

In other words, ascriptions of goal-contribution function are relative to (a) a particular goal-directed system, or type of goal-directed system, (b) a particular goal of that system, (c) a particular time interval, and (d) a particular subset of functions that the item in question performs with respect to that goal, of that system, in that time interval. The relevant systems, goals, and timespans depend in turn upon the scope of inquiry. For example, relative to the human species’ (S) evolutionary persistence (G) over millennia (t), it seems wrong to say that “the” function of Sam’s belt (X) is keeping Sam from falling off a cliff (Z). On the other hand, Sam’s belt may have this function relative to Sam’s (S) survival (G) in the isolated times that he happens to fall off cliffs (t).⁵

Of course, there are myriad types of living systems that exist over dramatically different periods of time and pursue a diverse collection of goals – different kinds of cells, organisms,

⁵ Regardless of the context of discourse, though, Boorse’s account allows us to say that Sam’s belt is, in at least one dreadful instance, *performing the function* of keeping Sam from falling.

populations, species, lineages, etc. – and life scientists restrict the scope of their inquiries only to certain subsets of those goals, time periods, and systems. Indeed, Boorse posits that the different disciplines within the life sciences are distinguished by the systems, goals, and timespans with which they are concerned. “In physiology,” he propounds, “the goal-directed system S is the individual organism and the relevant goals its own survival and reproduction” (ibid. 84). On the other hand, an evolutionary biologist may be interested in the survival and reproduction of populations, lineages, and species over time courses ranging from several generations to several million years. An ecologist may study the maintenance of equilibrium in present-day ecosystems (ibid. 84-85). Healthcare professionals, as I will argue in Chapter III, are or should be interested in the maintenance of the basic capabilities of individual humans, e.g., communicating, moving from one place to another, and obtaining nourishment.

2. The Biostatistical Theory (BST) of Health and Disease

In order to build his theory of health and disease, Boorse begins by asserting that medicine derives its theoretical concepts from physiology:

... different subfields of biology (e.g., genetics and ecology) may use different goals as the focus of their function statements. But it is only the subfield of physiology whose functions seem relevant to health. On the basis of what appears in physiology texts, I suggest that these functions are, specifically, contributions to individual survival and reproduction (Boorse 1977, 556).

Thus, as we have seen in Section 1, physiological functions are a genus of goal-contribution functions for which the relevant system is an individual animal, the relevant stretch of time the animal’s lifespan, and the relevant goal that animal’s S & R. Moreover, as Boorse submits here, these physiological functions form the theoretical basis for the concepts “health” and “disease.”

In particular, “disease” is the failure of an individual’s body to perform some species-typical physiological function at a species-typical level of efficiency (ibid., 559). Put differently, a “disease” is

the failure of some part or system of an individual's body to contribute to that individual's S & R what it generally contributes in other members of the species. Health, on the other hand, is the absence of disease – that is, the normal physiological functioning of all the parts of an individual's body (ibid. 542, 562, 567). In order to fully understand these claims about health and disease, we must probe several of the concepts involved: (1) “species-typical function,” (2) “species-typical level of efficiency,” (3) health as the absence of disease, and (4) “normal physiological functioning.” I will address each of these notions in turn.

Although physiological functions are contributions to the S & R of individual animals, as Boorse observes, generalizations about animal physiology range over groups of organisms with similar functional organization (ibid., 556).⁶ When a physiology textbook explains, for example, that the function of the gallbladder in human is bile storage, the textbook does not mean that bile storage is the function of the gallbladder in one particular human; rather, it means the function of the gallbladder is bile storage in humans *generally*. As Boorse points out,

... physiological function statements are about a trait's *standard* contribution [to S & R] in some population or reference class, e.g. a species. A text may say that the function of the human lens is to focus light on the retina. This claim is not falsified by the existence of people with cataracts, or no lens at all... In general, function statements describe species or population characteristics, not any individual plant or animal” (ibid., 556-557).

So physiological function statements have to do with the “standard” – or statistically normal – contribution that a trait makes to the S & R of organisms of a particular reference class. Boorse proposes moreover that these generalizations apply primarily to species (ibid., 557). As evidence for this claim, Boorse notes that organisms within a given species usually share a common structural and functional arrangement: all of the individuals in a species possess essentially the same parts and processes, and these parts and processes interact in roughly the same spatiotemporal patterns. In short, organisms within a species share a similar “hierarchy of interlocking functional systems” (ibid.,

⁶ As we shall see, Boorse interprets ‘similar functional organization’ to be shared by members of the same species, sex, and age (ibid., 557-558).

557). Boorse calls the arrangement of parts and processes common to members of a given species the “species design”:

Our species and others are in fact highly uniform in structure and function; otherwise there would be no point to the extreme detail in textbooks of human physiology. This uniformity of functional organization I call the species design (ibid., 557).

To summarize, then, species are the reference classes for physiological generalizations, since the individuals of a given species are more or less the same in their composition and arrangement.⁷ The *species design* results from statistical abstraction over the individuals that make up a species. It consists of the parts and processes that are statistically normal for a member of the species to have, and the statistically normal physiological functions performed by each of these parts and processes (ibid., 557).

The physiological functions in a species design are the so-called “species-typical functions” mentioned above. To illustrate, we might say that one of the species-typical functions of the human pancreas is releasing glucagon when blood sugar levels are low. This claim is true because most human pancreases indeed release glucagon under levels of low blood sugar. Notice that the claim does not require that *all* human pancreases do so: indeed, some people’s pancreases may fail to release glucagon at all, or release it when blood sugar is not low. Thus, releasing glucagon is a species-typical function of the pancreas because it is statistically normal for that organ to release glucagon when blood glucose levels dip below a certain range; and this activity is one of the ways in which pancreases typically contribute to an individual’s S & R.

Boorse refines his initial definition of “species design” to accommodate three exceptions to the notion of species uniformity: polymorphic traits, sex differences, and age differences.⁸ Boorse

⁷ It is not entirely clear to me why a generalization about the function of a *particular trait* must be relative to a species, rather than to all of the organisms that possess that trait across several species – especially if that trait does basically the same things in all the species that possess it, as with, e.g., the nerve cord.

⁸ *Polymorphic traits* are traits for which there are several different yet functionally equivalent variants in a population. Some prominent examples include eye color, blood type, and hair color. It is unclear, however,

reasons that we should include polymorphic traits in species designs disjunctively, because there may not be one statistically normal phenotype for a given polymorphic trait; on the contrary, a trait may have myriad variants, each possessed by only a few individuals. But even if one of the variants *were* statistically normal, we would not necessarily want to exclude all the others from the species design (ibid., 558). For example, suppose that it were statistically normal for humans to have brown eyes. Rather than banish all other eye colors from the species design – green, blue, hazel, etc. – we might say that it is statistically normal for humans to have brown or green or hazel or blue or ... eyes.

As Boorse points out, furthermore, the physiological traits of a species often vary significantly with sex and age. In fact, sex and age are usually associated with an entire suite of distinct physiological features – an entire “functional design” of their own (ibid., 558). Accordingly, it would be insensible to include age- and sex-based differences in traits in the species design disjunctively, as we have above with polymorphic traits:

Only a poor observer would be satisfied with noting that human beings typically have either ovaries or testicles, either wombs or penises, either large or small breasts, etc. The female characters occur together and constitute a single coherent functional design, as do the male's. Hence a disjunctive treatment of sex is inadequate (ibid., 558).

Thus, Boorse declares, each sex within a species has a unique functional arrangement. The same is true of individuals of different *ages* within a sex of a species. An infant, for example, has a manifestly different array of traits than, say, a young adult woman, who in turn has a different array of traits than an elderly man (ibid., 558). As Boorse illustrates, “...there are functions performed in the human infant and not in the adult, e.g. enlargement of the skeleton, and also the reverse, e.g. sperm production or ovulation” (ibid., 558). With these considerations in mind, Boorse amends his original concept of “species design” to encompass a slightly narrower type of reference class: namely, species, sex, and age (ibid., 558). As such, physiological generalizations apply to a particular

exactly what distinguishes a polymorphism from a disease, because the notion of “functional equivalence” is vague.

sex and age group of a species.

Now that I have explicated Boorse's notion of "species-typical function" and the concept of "species design" that underlies it, I will briefly outline what it means for a trait to contribute to S & R with a "species-typical level of efficiency." As we have seen, each organ in a given species has one or more species-typical functions, as dictated by the species design. In humans, for example, a species-typical function of the teeth is tearing and grinding food; of the outer ear, channeling sound to the tympanic membrane; of serum albumin, carrying nonpolar molecules in the bloodstream; etc. Moreover, each organ may perform its species-typical function with varying levels of success. For example, an Olympic swimmer's lungs may perform their species-typical function – i.e., breathing – with extremely high efficiency, whereas an elderly smoker's lungs may perform this function poorly. A young, healthy adolescent's liver may metabolize toxins quickly, whereas the cirrhotic liver of a chemical factory worker may do so more slowly. In summary, each organ contributes at a different level to an individual's S & R.

In fact, Boorse expounds, each part and process in the species design contributes to S & R within a statistically typical range of levels. For example, the human thyroid generally secretes thyroid hormone within some statistically typical range of concentrations. The statistically typical level of contribution of a trait to S & R is the "species-typical level of functional efficiency" mentioned above. So we have now elucidated more exactly what Boorse means when he says that "disease" is a failure of a particular part or process of the body to perform its species-typical function with a species-typical level of efficiency. We can reinterpret this definition as something like the following: Disease is a failure of some trait to contribute to individual S & R in the manner it normally does, and at the level of performance that it normally does, in others of the same species, sex, and age.

Boorse makes two further clarifications about what it means for a trait to “fail” to perform its species-typical function with species-typical efficiency. First, a trait only counts as diseased if it performs *below* the species-typical range of efficiency – that is, if it makes a significantly lower-than-average contribution to individual S & R. Put differently, a trait’s performing significantly above the species-typical range of efficiency is not a disease (ibid., 558-559). Second, performing above the species-typical range of efficiency is not necessarily the same as doing more than average of a particular process. As Boorse illustrates this point as such:

In one sense... a function is the concrete process that makes a physiological contribution, e.g. thyroid secretion. In this sense there can be too much thyroid function, i.e. hyperthyroidism. This is not our usage, since for us the function is the contribution to physiological goals, and too much thyroid secretion damages these goals as much as too little... the function of the thyroid is not merely to secrete hormones, but to secrete the right amount... For us there is no such thing as excessive function... What health allows is unusual efficiency of a process in serving physiological goals, not unusually much of the process itself (ibid., 559).

So performing a function with above-average efficiency means that a trait makes a greater-than-average contribution to individual S & R – not that the trait does the function more frequently or abundantly than average. To offer another example, one of the species-typical functions of the immune system is initiating an inflammatory response when particular antigens are detected. Intuitively, we would consider it a disease if the immune system continually failed to launch an appropriate response to invading bacteria and viruses, as may be the case, for instance, in individuals with AIDS. But on the BST, it is also a disease if the immune system responds to *too many* antigens, as may be the case in individuals with severe allergies. To respond to antigens with above-average efficiency would mean that an immune system is unusually precise in identifying and attacking potentially harmful species – bacteria, fungi, viruses – and leaving alone harmless particles – e.g., grass pollen, cat hair, one’s own cartilage.

To conclude our discussion of “disease,” I will highlight one more of Boorse’s terminological conventions. Clearly, the phrase “performing a species-typical function with species-

typical efficiency” is rather unwieldy. In order to streamline his discussion, Boorse abbreviates this phrase simply as “normal function” (ibid., 555). Thus, we may state compactly that “disease” is a failure of some part or process to perform its normal function.

As we have seen, then, Boorse maintains that “health” is the absence of disease. Now that we have investigated Boorse’s concept of “disease,” we are in a better position to understand what it means for an individual to be free of disease. Since “disease” is the failure of a trait to perform its normal function, “health” must be a state in which all of the parts and processes of an individual’s body perform their normal physiological functions – that is, in which all of an individual’s traits perform their typical functions at an average or above-average level of efficiency.

Although health involves an individual’s performing all the functions typical to her species, sex, and age, Boorse indicates astutely that health does not involve performing all species-typical functions at all possible times. Indeed, in a manner of speaking, health involves performing the right functions at the right times (ibid., 562). We would not want to consider it healthy, for instance, if an individual’s body continually performed all of the functions typical of childbirth. Conversely, a person’s body may perform all of the functions appropriate in her day-to-day life, yet fail to perform some functions that are particular to certain uncommon situations. For instance, one may appear perfectly healthy under most conditions yet lack the ability to exercise without risking death, as may be the case with some persons with sickle cell anemia. Boorse summarizes this aspect of health succinctly:

... biological functions are usually performed on appropriate occasions, not continuously. What occasions are appropriate is an empirical fact about the reference class. Thus vision occurs when the eyes are open, digestion when food is in the alimentary canal, adrenalin secretion under stress, sweating when temperature is rising, blood-clotting after a wound, and so on. At any one time an organism might be functioning normally with respect to its current situation, yet be incapacitated from doing so on occasions yet to arise... (ibid., 562).

Put differently, normal functions are situation-specific. Different functions and levels of performance are typical in different contexts. For instance, a heart rate of 180 beats per minute may

be typical during intense anaerobic exercise, but not while resting. It is normal to see clearly on dry land, but not underwater. As such, “health” requires more than normal physiological functioning at a given moment: it requires that all of the body’s parts and processes are prepared to function normally in every likely context (ibid., 562).⁹ In Boorse’s words, health requires “normal functional readiness” or “normal functional ability,” which consists in “the readiness of each internal part to perform all its normal functions on typical occasions with at least typical efficiency” (ibid., 562). In more basic terms, “normal functional readiness” involves the readiness of each part of the body to contribute to individual S & R what it does in most members of the species.¹⁰

Thus, we have expanded upon Boorse’s notions of “health” as the absence of disease, i.e., as normal physiological functioning by all the body’s parts. We can now interpret the BST from a birds-eye view, as it were, observing Boorse’s formal definitions of “health” and “disease”:

1. The *reference class* is a natural class of organisms of uniform functional design; specifically, an age group of a sex or species.
2. A *normal function* of a part or process within members of the reference class is a statistically typical contribution by it to their individual survival and reproduction.
3. *Health* in a member of the reference class is *normal functional ability*: the readiness of each internal part to perform all its normal functions on typical occasions with at least typical efficiency.
4. A *disease* is a type of internal state which impairs health, i.e., reduces one or more functional abilities below typical efficiency” (ibid., 562).

In the next section, I will address prominent criticisms of the BST’s notions of “health” and “disease,” paying special attention to those of Elselijn Kingma, whose 2007 paper addresses problems with (1) and whose 2010 paper focuses on (3); Rachel Cooper (2002), who targets (1); and Ron Amundson (2000), who scrutinizes (1) and (2), as well as the sociopolitical consequences of glorifying one mode of biological functioning over others.

⁹ It is not entirely clear which contexts a species design should account for, and which it should ignore; see Kingma’s (2010) criticisms and Boorse’s (2014) response in Section 3.

¹⁰ For the remainder of the thesis, I will use the term “normal physiological functioning” as shorthand for “normal functional readiness” unless stated otherwise.

3. Criticisms of the BST

In this section, I survey previous criticisms of several aspects of the BST, including Boorse's choice of reference classes and his justification thereof (3.1), and the notion of "statistical normality" (3.2). I also expand upon Boorse's assertion that the BST is not an account of medical *treatment*, or so-called "practical health," by demonstrating that the theory would lead to spurious medical judgments if it were adopted as such (3.3). Finally, I show why the BST's notion of theoretical health – independent of any notion of medical treatment – needs updating, despite Boorse's stubborn adherence to the theory as he articulated it in 1977. Namely, I note briefly some of the important advancements in biology in the past forty years that have rendered the BST outdated (3.4).

Before I begin my critique of the BST, I want make a quick note about the relationship between "reference classes" and "statistical normality." According to Boorse, "health" is statistical normality with respect to some reference class. So whether an individual is "statistically normal," i.e. healthy, depends on the reference class to which we compare her. In other words, the reference classes we choose will determine the exact meaning of "statistical normality" in the BST. For example, if the reference class includes species and sex but not age, our judgment of a 49-year-old woman's health will depend on average physiological functions among all women, from newborns to centenarians. On the other hand, if the reference class includes species, sex, and age, the woman's health will be relative to average physiological function among only middle-aged women. Accordingly, criticisms of the notion of "reference class" will overlap to some extent with the notion of "statistical normality," and vice versa.

3.1. Reference Class & Species Design

3.1.1. Kingma

In her 2007 “What Is It to Be Healthy?” Kingma contends that the BST is not “value-free” – contrary to Boorse’s advertisements – because there is no way to choose appropriate reference classes for claims about “health” and “disease” using empirical facts alone. Kingma begins her discussion by affirming one of the principal insights of the BST: that any account of “health” as “statistical normality” cannot make health relative to statistical normality among the *entire species*, but rather must consider reference classes smaller than the species in order to account for differences in overall functional design (Kingma 2007, 128). Because of these differences in overall functional design, as Kingma notes, “what is normal in one group can be abnormal in another” (*ibid.*, 128). Suppose, for example, that it is statistically normal for human beings to communicate using language, whether spoken, signed, read, or otherwise. We would not want therefore to call newborn infants “diseased” because they cannot do so. To offer a different example, children’s health cannot be relative to statistical normality among the elderly, or else most children would be severely diseased, yet children with progeria could be perfectly healthy. Thus, different sub-groups of the human species function differently, and the concepts of “health” and “disease” should reflect these differences. In other words, we do not want to designate a particular condition as “diseased” unless it constitutes a departure from an appropriate sub-species reference class (*ibid.*, 128).

As Kingma continues, however, it is unclear exactly which sub-species reference classes are the appropriate ones with which to define “health” and “disease.” On one hand, our reference classes cannot be too specific, or else our concepts of “health” and “disease” will yield bizarre and erroneous conclusions. For example,

If ... we were to allow a separate reference class for uncommonly heavy drinkers, then the statistically normal range for liver-functions in this group would include liver-functions normally

considered a disease. The BST... would then entail that these liver functions are normal and these heavy drinkers therefore are healthy (ibid., 128).

In general, an account of “health” and “disease” as statistical normality will lead us astray if we pick inappropriately small or irrelevant reference classes, such as “uncommonly heavy drinkers, ”women named Deborah, children with phenylketonuria, or residents of Huntsville, Alabama. On the other hand, we have already seen that overly inclusive reference classes – e.g., the whole human species, all mammals – also give the wrong results. Initially, then, there does not seem to be a straightforward way to determine the right reference classes for any concept of health as statistical normality.

With these complications in mind, Kingma interrogates the BST to find out how exactly Boorse has determined that species, sex, and age are the three relevant aspects of reference class. She begins by examining Boorse’s claim that a reference class is most basically “a natural class of organisms of uniform functional design” (Boorse 1977, 562). In particular, she analyzes this claim to uncover which part of it, if any, could allow Boorse a source of empirical justification for his designated reference classes: (1) naturalness, (2) uniformity, or (3) shared design (Kingma 2007, 129).

Boorse’s above claim about reference classes is particularly mysterious, as Kingma highlights, because it is unclear what Boorse means by “natural.” On one hand, he could simply mean for “natural” to mean something like “found in nature” or “naturally occurring” (ibid., 129). Kingma swiftly rejects this possibility. Myriad naturally occurring groups of organisms would constitute inappropriate reference classes: e.g., all of the organisms within three feet of me, all people that suffer from broken legs (ibid., 129). Perhaps, on the other hand, Boorse’s “natural” means “normal” or “statistically frequent.” Kingma also rejects this notion: there are many inappropriate reference classes that would include many or most human beings, such as the class containing all shortsighted persons, the class containing all persons with cuts and bruises, the class of all persons living in Asia, etc. (ibid., 129). Most plausibly, Boorse could consider “natural” to mean something like “natural

kind.” But this suggestion is also inadequate, as Kingma reasons – even “assuming that natural kinds exist” – because there is no clear reason why we should consider age and sex natural kinds, but not diseases (ibid., 129-130). To illustrate, it would seem dubious to consider as a natural kind the class “adult woman,” but not the classes “phenylketonuria” or “Tay-Sach’s disease” (ibid., 129-130). Thus, Kingma denies that Boorse can provide empirical justification for his reference classes using the notion of naturalness.

Kingma similarly dispenses with the possibility that either uniformity or shared functional design can serve as an empirical basis for the choice of reference classes. Uniformity is a poor basis for justifying reference classes, as she argues, because several genetic disorders – e.g., Down’s syndrome, Cushing’s disease – are associated with relatively uniform constellations of physiological features, just as are the classes “man” and “woman” (ibid., 130). There are several ways that we can interpret “shared design,” on the other hand; but none of them are adequate grounds for designating reference classes. We might suppose, in the first place, that a “designed” set of traits is one that is somehow “innate” or “inborn,” rather than acquired (ibid., 130). But numerous “innate” functional designs would be disastrous reference classes: for example, the class of all persons born with cystic fibrosis, or the class of all persons with the genetic mutations associated with Huntington’s disease. Perhaps, Kingma proposes, Boorse means for “designed” to refer to those body parts and processes selected in evolution – that is to say, “naturally designed,” or “evolutionarily designed.” Yet selective pressures maintain several genetic diseases in the human population: e.g., sickle cell anemia (ibid., 130-131). Thus, Kingma demonstrates that there are no obvious empirical grounds on which Boorse can justify his choice of reference classes. If Boorse cannot determine the appropriate reference classes using empirical notions alone, then the BST’s reference classes must be based on at least some extra-empirical – i.e., normative – considerations. This conclusion contradicts Boorse’s claim that the BST is value-free (ibid., 131).

Boorse defends against the accusation that the BST is value-laden in his “Second Rebuttal on Health” (2014). He begins by clarifying that the BST does not offer novel concepts of “health” and “disease,” but rather defines the concepts of “health” and “disease” currently used in medicine. As such, the BST aims merely to *identify* the reference classes implicit in our pre-existing medical concepts of “health” and “disease,” rather than choosing them (Boorse 2014, 693). Moreover, Boorse asserts,

A correct definition of concept H in terms of concepts C_1, C_2, \dots, C_n is value-laden precisely if one of the C_i is value-laden: that is, if a judgment of the form ‘x is C_i ’ is a value judgment. It does not matter at all how concept H was ‘chosen,’ only what it is... The BST analyzes health using the [value-free] concepts of statistical normality, survival, reproduction, organism, part, process, species, sex, age, and causation (ibid., 693).

In other words, a definition is value-laden only if it contains value-laden concepts. The BST’s definitions of “health” and “disease,” Boorse claims, do not use any value-laden terms. On the contrary, all of the concepts employed in the BST, including those involved in specifying reference classes – species, sex, age, statistical normality – are strictly empirical. Therefore, the BST’s definitions of “health” and “disease” must be value-free.

In fact, Kingma anticipates this rebuttal in her 2007 paper. “Boorse would, I suspect, have a reply to this,” she predicts – “he would contend that his proposed reference classes simply are the reference classes that are relevant for the distinction between health and disease” (Kingma 2007, 131). As she simulates Boorse,

Different reference classes would generate different distinctions, but those are not the distinctions between health and disease. Although medicine might have chosen to engage with other distinctions and other concepts, this is only to say that medicine might have concerned itself with things other than health and disease. This does not make the distinction between health and disease evaluative (ibid., 131).

Thus, Kingma preemptively pins down Boorse’s view that reference classes consisting of species, sex, and age are *constitutive* of “health” and “disease.” In response to this counterargument, she observes that there are several conditions – e.g., homosexuality – whose status as “healthy” or

“diseased” are currently disputed within the medical profession. Whether or not the BST considers homosexuality a disease, say, depends on which reference classes the BST includes. On Boorse’s original formulation of the BST, homosexuality would constitute a significantly subnormal contribution to reproduction among adult men and adult women, and so would count as a disease relative to either reference class. If we included sexual orientation in our reference classes, however, homosexuality would not be a disease (ibid., 131-132). Relative to the reference class of “gay adult men,” for example, an adult man’s sexual preference for other adult men would not count as a disease. Kingma calls this modified version of the BST the “XST” (ibid., 132).

Whether homosexuality is a disease, Kingma reasons, depends on which of these two alternative formulations of the BST is correct. But whether the BST or the XST is correct depends on which reference classes are the appropriate ones. And as Kingma has already shown, there are no empirical facts that can determine which reference classes are the appropriate ones. “Therefore,” she concludes, “there is no empirical fact that tells us whether the BST or the XST is correct” (ibid., 132). In essence, I think, this argument draws attention to the fact that *the discipline of medicine itself* is unsure of what the relevant reference classes are; that whether one choice of reference classes is superior to others depends partly on normative values; and that whichever reference classes we settle on, therefore, we will arrive at a theory of “health” and “disease” that appeals to normative considerations as well as empirical ones.

Boorse’s reply to this argument is puzzling. He begins by reiterating that he has constructed the BST as such not for evaluative reasons, but “to choose that analysis which best fits medical usage” (Boorse 2014, 693):

The medical concept of health that I seek to analyze already exists as a target. ‘Candidate concepts’ [such as the XST], by contrast, exist only in the minds of philosophers. So the only way to run an argument of this type is to claim that medicine—not the BST—has chosen one of many possible health concepts (ibid., 693).

There are several problems with this line of reasoning. For one, Boorse claims that the BST

is supposed to fit medical usage of the terms “health” and “disease;” yet the BST’s ruling that homosexuality is a disease contradicts the prevailing view of contemporary medicine (Boorse 1997, 99; see also Murphy 2006, 32). Moreover, Boorse asserts that there is one medical concept of “health” and “disease,” and that any alternatives to it are philosophical fictions. But the reality of medicine seems quite different: at any given moment, medicine may harbor a large and diverse collection of candidate concepts of health and disease. We may consider as evidence for this claim the robust literature on the definitions of “health” and “disease,” which includes contributions from both philosophers and clinicians (in addition to Boorse, see Wakefield 1992 and Lange 2007). Due in part to our dim understanding of the brain and how it engenders the mind, and in part to the volatile social implications of labeling particular states of mind as “diseased,” the field of psychiatry especially contains a jungle of competing health concepts (see, e.g., Murphy 2006, Horowitz and Wakefield 2007).

As Kingma’s “BST/XST” example suggests, the medical concept of “health” and “disease” is ambiguous, contested, and constantly shifting. Forty years ago, medicine generally considered homosexuality a psychiatric disorder; nowadays, it generally does not (Murphy 2006, 32). Regardless of medicine’s historical development, it is implausible to suppose that all the myriad sources that make up the medicine’s current knowledge base, with their myriad viewpoints and motivations – practitioners, academics, textbooks – mean the same thing when they mention “health” and “disease,” or even that all of these sources converge on the same definition. Thus, for Boorse to claim that there is only one theory of “health” and “disease,” and that the BST has tracked it, amounts to dismissing all competing accounts of “health” and “disease” without argument.

To summarize, Kingma demonstrates that no theory of health as statistical normality can justify a choice of reference classes on an empirical basis alone. Therefore, the BST’s choice of reference classes is not value-free. As a result of its normatively tainted choice of reference classes,

the BST must be a value-laden theory of “health” and “disease.”

As I have postponed mentioning until now, Kingma’s argument is not airtight. While Kingma dismisses the main three considerations on which Boorse bases his choice of reference classes – naturalness, uniformity, shared design – these notions are not necessarily the *only* empirical bases for justifying reference classes. There could be empirical bases of justification besides these three; but neither Kingma nor Boorse ventures to examine whether there really are. In other words, Kingma’s argument demonstrates that the BST is value-laden as articulated in Boorse’s 1977 paper, but not that it is inherently or irretrievably value-laden. Perhaps one could salvage the BST by finding some other empirical grounds for choosing species, sex, and age as the relevant determinants of reference class. I will leave this possibility to the side, however, partly because I myself cannot imagine what kinds of purely “naturalistic” or “empirical” criteria we could use to designate the appropriate reference classes, and partly because I am not, unlike Boorse, committed to the view that medicine’s theoretical concepts are devoid of value judgments. As we shall see, I hope to build an account of “health” and “disease” that uses biological terms and concepts, but that is openly normative at its core. Although I cannot for brevity’s sake comment more specifically on my positive account, I want to highlight three key takeaways from Kingma and Boorse’s exchange on reference class choice.

First, as we have seen, Kingma has shown that we probably cannot choose reference classes based upon purely empirical considerations. On the contrary, someone must *choose*, at some point down the line, which classes of organisms are suitable for mutual comparison. If we are to pursue any account of health as statistical normality, then, we must locate some kind of normative anchor or principle with which to decide on the right reference classes. I intend to do just this in Chapter III.

Second, Boorse’s indicates in his rebuttal to Kingma that the BST is supposed to reflect the

prevailing medical concepts of “health” and “disease.” Although we would think that the prevailing concept of “health” has changed dramatically over the past two centuries – which have seen the discovery of bacteria, viruses, and fungi as agents of disease, as well as the development of medications to combat them; the invention of countless medical procedures, technologies, and devices; the discovery that DNA is the genetic material, and that random alterations in it can cause cancer, among other maladies; etc. – Boorse oddly maintains that medicine’s theoretical concept of health is static, unchanging, and beyond the influence of human convention. “Neither individuals nor societies,” he proclaims, “have any power to decide what is a theoretically healthy human being” (Boorse 2014, 702). Thus, Boorse holds two conflicting views: (1) that the BST explicates the prevailing medical notion of “health,” which ostensibly depends on individual practitioners and academics (see, e.g., 693, 710), and (2) that the BST explicates a theoretical concept of “health” that does not depend on practitioners or academics, let alone anyone else (see, e.g., 701-702, 713). In addition to their internal inconsistency, these two views are also practically questionable. One of the characteristic jobs of medicine – perhaps *the* characteristic job – is providing physical treatment. If our theoretical concept of “health” is the same regardless of historical developments, scientific discoveries, or changes in medical and social convention, then the concept is meaningless as a guide to treatment. Moreover, as Kingma has hinted, and as the philosophical and clinical literatures attest, the concepts of “health” and “disease” are continually debated and contested. But Boorse denies the importance of this ongoing dialogue as such, reducing it instead to a quest for the one “true” medical concept of “health,” so to speak. As a result, the BST is rigid and does not allow for the possibility that medicine’s theoretical concepts will change in the future, as they apparently have in the past. If medicine does indeed change dramatically in the coming decades, the BST will eventually become outdated, a relic of an older era of medicine – i.e., that of the late 1970s, the era whose health concepts the BST seeks to define. In essence, the BST petrifies late-’70s concepts of “health”

and “disease,” taking those concepts as medicine’s timeless theoretical concepts, disregarding past and future changes in the field. Contrary to Boorse, I believe that an overarching account of “health” and “disease” should provide general principles and guidelines, but that the finer details should be left open to social and academic debate and interpretation: not only to parallel the ever-morphing and contested nature of our “health” and “disease” concepts, but also to provide a conceptual, sociopolitical, and moral compass with which to navigate these future changes.

Third, while Kingma argues convincingly that “naturalness” cannot provide adequate justification for our choice of reference classes, I think that she dismisses “uniformity” and “shared design” too hastily. True, these notions alone are too vague to establish reference classes – for example, how uniform must individuals be if they are to belong to the same class? in which aspects? with what kind of design? All the same, I suspect Boorse uncovers in uniformity and shared design two important, if incomplete, aspects of “health” and “disease” classifications. I will discuss the significance of these concepts briefly again in Section 3.2.1 and in the Conclusion.

3.1.2. Cooper

Whereas Kingma objects to Boorse’s *grounds* for choosing reference classes, Rachel Cooper objects to very the notion of *choosing reference classes*. Briefly, Cooper contends in her “Disease” (2002) that a “disease” is any condition that people generally consider (1) bad – i.e., painful, disabling – (2) unfortunate, and (3) medically treatable (Cooper 2002, 271). She rejects Boorse’s view that we can define “disease” in terms of conformity to, or statistical normality with respect to, some reference class. Cooper observes first of all that human physiology varies widely, and that sex and age do not capture all the relevant aspects of this variation. “What’s normal for an organism,” Cooper asserts, “depends not only on species, sex and age, but also on a host of other factors”:

Masai are naturally sensitive to growth hormone, pygmies are not. Athletes normally have a lower heart rate than other people. People who live at high altitude, or in hot climates, adapt in various ways. Thus the organisms in a reference class must not only be of the same species, sex and age as the organism under consideration, but must also be of the same race and must have undergone similar training and have lived in the same kind of environment. (ibid., 266).

In other words, Cooper claims that physiology varies widely based on differences in athletic training, ethnic background, and evolutionary environment of recent ancestors, among other factors.¹¹ As such, we cannot make accurate judgments of “health” and “disease” based on statistical normality with respect merely to one’s age, sex, and species: these reference classes are too broad.¹² For example, a particular level of lung capacity may be pathologically low among people from high-altitude societies but normal for people from low-altitude societies. A particular level of GHG sensitivity may be normal among pygmies but abnormally low among Masai. Accordingly, Cooper reasons, we must make our reference classes much narrower if we are to define “health” as statistical physiological normality with respect to a reference class (ibid., 266).

But if we tighten our reference classes by incorporating all of the major determinants of physiological function in addition to those mentioned in the BST – level of athletic training, ethnicity, recent evolutionary background, current environmental conditions, etc. – Cooper claims that we will end up with reference classes that contain only one or a handful of members, e.g. “elderly female Masai mountain-bikers, Asian male teenagers who have been brought up in Wales, and half-Chinese, half-Eskimo boy toddlers” (ibid., 266). Clearly, these reference classes would be too small to render sensible judgments of health and disease. To illustrate, suppose we had a reference class containing only one person: the world’s lone middle-aged female Bantu mixed martial artist born and raised in Tibet. (Grant that such a person exists, and that there is only one.) This woman, then, *is* the reference class to which we would compare her physiological functioning. She

¹¹ The idea that different races and ethnicities possess unique physiological features is both socially fraught and scientifically dubious. Although I would like to refute this troubled notion, I do not have the space to do so here.

¹² Amundson (2000) makes a parallel point about the heterogeneity of human physiology. See Section 3.2.1.

constitutes the entirety of her own reference class. As such, anything that happens to this woman is statistically normal in her reference class. Therefore, the woman must always be, by definition, perfectly healthy, whether she falls and breaks her leg, suffers a concussion in a mixed martial arts competition, contracts cancer, or lives *sans* complication to age 105. Similarly, suppose we had a class with only four members: namely, the four elderly female Masai mountain-bikers. (Again, grant that four and only four such persons exist.) If three of the four happened to contract strep throat at a given point in time, then having strep throat would be statistically normal in the reference class, and therefore healthy. Thus, Cooper demonstrates that any theory of “health” as statistical normality will fail because its reference classes either will be (a) too small to give stable and sensible verdicts on health and disease, or (b) too inclusive to accommodate healthy diversity in human physiology.

In addition to demonstrating that the BST’s reference classes are too broad and inclusive, Cooper’s criticisms also draw attention to the fact that the BST’s reference classes do not divide people up *in the right sort of way*. For the sake of brevity, I will not be able to address this point fully here. However, I suggest in the Conclusion that we can address the BST’s problems with reference classes by modeling different modes of performing basic bodily capabilities as causal role mechanisms, in the style of Cummins (1975) and Craver (2001).

3.2. Statistical normality

3.2.1 Amundson

In his “Against Normal Function” (2000), Ron Amundson refutes the BST using both scientific considerations, which I will examine in this subsection, and social and practical considerations, which I address in Section 3.3 below. As we have seen, Boorse theorizes that a

“disease” is a significantly below-average contribution to individual S & R by some part or process of the body, as compared to that in others of the same species, sex, and age (Boorse 1977, 562). As Boorse acknowledges, this approach to “disease” works neatly only if the members of a species are relatively uniform in their physiological makeup – that is, if physiological variation is relatively narrow for each trait type in the species. Fortunately, Boorse claims, human physiological variation is indeed relatively narrow:

It would be a mistake to think that this notion of a species design [see Section 2 above] is inconsistent with evolutionary biology, which emphasizes constant variation. The typical result of evolution is precisely a trait's becoming established in a species, only rarely showing major variations under individual inheritance and environment. On all but evolutionary time scales, biological designs have a massive constancy vigorously maintained by normalizing selection. It is this short-term constancy on which the theory and practice of medicine rely (ibid., 557).

In other words, normalizing selection ensures that the qualitative and quantitative variations in physiological function within a species are small. Because most physiological functions fall within a narrow statistical distribution, we can identify sub-average functional performances, dramatic departures from the species design, with relatively little complication. Therefore, we can sensibly and profitably define “disease” as sub-average functioning (ibid., 557-558).

Amundson does not dispute that some kinds of bodily variation are healthy and others are not. He does, however, challenge Boorse’s claim that human variation falls within a narrow range for most trait types. Amundson terms this claim – “this statistical claim about functional diversity within species” – *functional determinism* (Amundson 2000, 35). In agreement with Cooper (see Section 3.1.2), he points out that the human species is home to a dizzying assortment of anatomical and physiological makeups (ibid., 39-45). Moreover, he asserts that many of these bodily makeups are viable even though they are dramatically different from one another. Just because an individual’s body is not “normal” or “statistically typical” does not mean that it is unhealthy, *per se*: many atypical bodies and functional styles can be healthy, e.g., getting around using a wheelchair if one has lost use of their legs (ibid., 47-51). Amundson acknowledges that he cannot refute Boorse’s

functional determinism directly, since its veracity depends on empirical facts rather than conceptual analysis (ibid., 37). Nonetheless, he refutes it indirectly using some key observations from two subfields of biology besides physiology: evolutionary biology and developmental biology (ibid., 36).

For one, Amundson notes, “current evolutionary theory considers natural species to contain very large amounts of heritable variation” (ibid., 36). In other words, organisms of the same species are often genetically diverse. The human species in particular harbors a huge amount of genetic diversity: as Amundson observes, there is more genetic variation within the human species than there is within (and even between) many other species. As an example, he cites the fact that there is more genetic variation among humans than there is among the more than four hundred species of cichlid fishes in Lake Victoria, even though these cichlids possess a wide range of functional and genetic variety (ibid., 38). Human genetic heterogeneity does not directly contradict functional determinism, since genes are not the sole determinants of functional makeup. Indeed, the relationship between genes and actual functional makeup is highly variable and contingent upon environmental influences. But there are *some* connections between genes and functional design, since our genes code for all the proteins that make up our bodies. In summary, even if it *were* the case that humans are more or less physiologically uniform, this uniformity could not have resulted from genetic uniformity; humans are far from genetically uniform (ibid., 38).

Regardless of any human genetic diversity, even a single genome can give rise to an indefinite number of different functional designs, since organisms develop through plastic rather than fixed processes. Amundson remarks that developmental processes

... are remarkably plastic and resilient to perturbation. If the genome actually were a set of blueprints or instructions for building a body, as some modern metaphors have it, the slightest perturbation would throw off the end result. Any embryo that could not be built to fit the determinate design would be non-viable. But in fact functioning adults can develop in an indefinitely large number of ways. The goal-directedness seen in developmental plasticity renders the concept of species design highly suspect. Development yields adults that function, but not adults that function identically. Functional diversity is a product of developmental plasticity (38-39).

In other words, developmental processes are apparently directed towards certain goals or ends. In order to attain these goals, development can proceed in any of a huge array of ways, depending on internal and environmental circumstances. As such, developmental processes allow for any given genome to give rise to myriad functional makeups. This developmental plasticity applies both to the processes of ontogeny – that is, the processes by which an organism first takes form, e.g., as in embryonic development – and to the processes by which an organism adapts to its environment within its lifetime (ibid., 39). For example, an individual may compensate for a double leg amputation by developing a robust and muscular upper body in response to wheelchair use. An individual’s lung capacity may increase in response to repeated aerobic exercise. The optic vesicle in the human embryo usually induces tissue near it to differentiate into the lens of the eye; yet a functioning human lens can develop even if the optic vesicle is located at an unusual position on the head (ibid., 39).¹³ In short, human development does not tend towards one pre-determined “blueprint” (ibid., 38). Rather, it occurs plastically, allowing a person’s physiological makeup to change dynamically in response to environmental inputs in order to achieve certain ontogenic and adaptive goals. These goals – e.g., inducing the development of the lens of the eye, ensuring that the muscles are strong enough to do the things they need to do – are apparently more specific and smaller in scale than whole-organism design. We might think of developmental processes as a conglomeration of smaller goal-directed processes that are partly independent, partly interdependent upon one another, and partly responsive to environmental influences.¹⁴ Thus, the goal-directedness of life, one of the biological foundations of the BST, actually serves to refute Boorse’s theory.

Considering the goal-directedness of organismal development, Amundson introduces a new

¹³ Amundson discusses six other notable examples of developmental plasticity (pp. 39-43), but I will not comment on them here for brevity’s sake.

¹⁴ In the tradition of Bechtel and Richardson, we might say that developmental processes are partly decomposable (Bechtel and Richardson 1993, Introduction p. xxix). Note that this footnote reflects my view of human development and not Amundson’s *per se*.

term to re-frame discussion of biological functions: “mode of function.” A *mode of function* is the exact physiological, molecular, or behavioral manner in which an organism achieves some biological goal, where “goals” are construed broadly to include not only individual S & R but also more specific goals such as obtaining food, fighting off threats, and maintaining homeostasis (ibid., 36). To clarify, “mode of function” is different from the BST’s notions of quantitative and qualitative function (see Section 3.1.2). “Qualitative function” has to do with the manner in which a trait contributes to individual S & R, and “quantitative function” has to do with the level or rate at which the trait makes that contribution to S & R. “Mode of function,” on the other hand, has to do with contributions to *any* organismal goal – not just individual S & R. This term helps us to make sense of the many ways in which a viable human can develop. As we have seen, developmental processes generate body parts and systems that allow organisms to achieve the same biological goals in qualitatively and quantitatively different ways, depending on the organism’s environment, gross anatomy, life experiences, etc. We may say that these different manners of achieving the same biological goal constitute different *modes* of functioning. In short, development gives rise to different modes of functioning with respect to the same (or nearly the same) goals.

Amundson illustrates a handful of cases in which people achieve characteristically human biological goals using atypical modes of function. For example, many people attain average or above-average levels of intellectual and emotional functioning even though they possess less than 10% the average amount of brain tissue (ibid., 40-41). Some people with severe neuromuscular injury undergo surgery to take nerve endings from one set of muscles and connect them to another set. Many of these patients eventually adapt to the mixed-up neuromuscular connections, thereby regaining normal levels of physical functioning through an atypical mode (ibid., 41). People who cannot hear or speak achieve normal levels of interpersonal functioning by using sign language (ibid., 42-43). In other words, people with atypical levels of brain tissue can think and feel; people

with atypical neuromuscular connections can move their bodies in the way they need to; and people without speech can communicate using nonverbal language. These observations support Amundson's claim that human development tends towards certain goals more specific than individual S & R. Moreover, they call into question Boorse's claim that statistically normal function is necessary for health, or at least for happy and self-sufficient living.

Thus, Amundson shows (1) that Boorse's claims about functional determinism are doubtful, and (2) that statistically normal function is not necessary for high levels of day-to-day functioning or a fulfilled life. Human physiology is too diverse for the BST to make neat distinctions between normal functioning and sub-normal functioning: considering the multitude of genetic and developmental makeups that a person can inhabit, it seems dubious that any tidy model of statistically normal physiology will capture most members of the human population, or, if it does, that it will be coherent or illuminating. Furthermore, people can function adequately (or even unusually well) in day-to-day life using atypical modes of physiological and behavioral functioning.¹⁵ Therefore, the BST's notion of statistically normal physiology does not seem to capture an intuitive meaning of "health," nor does it provide a serviceable or biologically accurate set of criteria for distinguishing unhealthy conditions from healthy ones.

Boorse may cede that statistically normal physiological functioning does not perfectly capture "happy and self-sufficient living" or "adequate day-to-day functioning." However, he would counter that these ideas are distinct from medicine's theoretical concept of "health." Boorse seeks to

¹⁵ It is important to note that Amundson uses the word "function" in two different ways (indeed, I have used both of them in the footnoted sentence): (1) in reference to biological functioning, and (2) in reference to one's, "personal functioning," or her ability to get by in her everyday life (e.g., "She seems to be functioning just fine in her new assisted living environment"). When Amundson talks about "mode of function," he apparently means to talk about biological functions, broadly conceived – from the small-scale functions of enzymes and hormones, to the functions of organs and organ systems, to the functions of gross anatomical shapes and behaviors (see Section 1). When he talks about "level of function," on the other hand, he generally seems to be talking about how well one can do the things she needs to do to get through the day – how self-sufficiently, efficiently, and painlessly a person can live. This dual usage of the word "function" does not seem to cause any great conceptual confusion.

pin down the theoretical definition of “health” as used by academic physicians and pathologists to classify states of the body as “diseased” or not (Boorse 2014, 711-712). As such, Boorse maintains that a successful definition of “health” will categorize as diseases all or nearly all the conditions that pathologists consider pathological, and will categorize as “healthy” all or nearly all the conditions that pathologists consider healthy. Moreover, many of the conditions that are widely considered pathological do not affect people’s self-sufficiency or day-to-day functioning. For one, some ostensibly pathological conditions do not usually create large enough disturbances to affect an individual’s everyday life: e.g., plantar warts, eczema (Boorse 1977, 564). Some supposedly pathological conditions may not *yet* affect a person’s daily living, but *will* eventually if they are allowed to linger: e.g., intestinal polyps, skin cancer (ibid., 564). Indeed, Boorse believes that one of the strengths of the BST is its ability to recognize “latent asymptomatic diseases” such as these (ibid., 564). According to this desideratum, neither “practical self-sufficiency” nor “adequate day-to-day functioning” matches exactly with the theoretical definition of “health,” since a person can be perfectly self-sufficient even if she has apparently pathological conditions such as warts or asymptomatic cancers. Furthermore, Boorse might reason, just because an individual can live happily and self-sufficiently with nonfunctional legs or autism does not mean that these conditions are not diseases. We might say that people can live good lives *in spite of* having autism or nonfunctional legs. Thus, even though statistically normal physiology does not encompass practical self-sufficiency or day-to-day functioning, yet this criticism does not mean that it fails to capture the definition of “health.”

To respond to this objection requires more conceptual resources than Amundson (2000) has provided us. In fact, this objection gets to the heart of my disagreements with Boorse’s philosophical approach to “health” and “disease.” In Chapters II and III, I will develop the tools we need to combat this objection; these concepts will become part of the core of my own account of

“health” and “disease.”

All in all, I believe that Amundson’s most damning criticisms concern the BST’s social implications (see Section 3 below), rather than its biological worldview. For now, though, we will simply recall that Amundson has demonstrated that Boorse’s claims about functional determinism are implausible: human physiology is far from uniform, owing to genetic variation and developmental plasticity. By circumscribing “health” within a narrow range of physiological makeups, the BST fails to capture the diversity of viable human variation. Amundson summarizes this misconception about biology:

...the goal-directed processes of biological development are not finely tuned towards the production of functionally identical species members. Their inherent flexibility can be expected to generate a rich diversity of functional modes” (43).

I hope for my account of health and disease to accommodate this diversity of functional modes, rather than to relegate all atypical modes of function to the realm of “disease.”

3.2.2 Statistically Typical Diseases & Cambridge Changes

Briefly, Boorse acknowledges in his second rebuttal paper that the BST does not have a good way of handling “typical diseases” – that is, diseases that are statistically typical in the human population (Boorse 2014, 705-707). For example, suppose that there were a pandemic in which more than half the world’s population was afflicted by an infection that significantly depressed kidney and liver function. Suddenly, levels of kidney and liver function that were once “abnormally low” would now be statistically normal, and therefore “healthy” – even if they greatly reduced an individual’s chances of S & R as compared to what was statistically normal before the pandemic struck!

J. David Guerrero observes that such a swing in statistically normal levels of function would cause so-called “Cambridge changes” in the BST’s health and disease designations: that is, changes in a person’s status as “healthy” or “diseased” due to changes in what is statistically normal (and, therefore, what is by definition “healthy” on the BST) rather than to any changes in the person’s actual physiology (Guerrero 2010, 272). Thus, our pandemic might cause the kidneys of an individual with chronic kidney failure to change from “diseased” to “healthy” solely because of changes in what is statistically normal. This result is manifestly erroneous. We would not want to call an individual with chronic kidney failure “healthy” merely because there has been a catastrophic spread of kidney dysfunction. On the contrary, we would want to say that this individual has a kidney disease, and that now most others do too!

Ultimately, Boorse is flatly unable to contrive a response to these problems with the BST. “To the problem of typical disease,” he admits, “I see no solution but to retreat to a concept of ideal design which, so far, I am unable to define” (Boorse 2014, 707). In other words, Boorse guesses that the only way to avoid the problem of statistically typical diseases and Cambridge changes in disease status is to define “health” in terms of some ideal or theoretical model of human physiology. This kind of “ideal” model of physiology would not change in response to changes in what is statistically normal for humans. Ostensibly, then, it would prevent us from deeming “healthy” conditions that strike us as textbook cases of disease simply because most people happen to have them – e.g., high blood pressure, tooth decay, and minor lung inflammation (Boorse 1977, 567).

In fact, my solution to these problems will involve something resembling a design specification. In particular, my notion of “health” will depend on a definite set of normative principles about the kinds of day-to-day functions that are characteristically human, and my reference classes will be fixed in part by these normative values. However, my approach will differ in many ways from what Boorse probably has in mind. As we have seen, it seems that Boorse’s

provisional notion of “ideal design” entails some kind of model physiological design that is impervious to short-term trends in human physiological function. On the contrary, my account of health and disease will hold as constant certain abstract functions that I believe are foundational to living a fully human life – e.g., communicating with other people. I call these abstract functions “basic physical capabilities.” I believe that “health” permits of several different ways of fulfilling these basic physical capabilities. As we have seen, we can fulfill the capability of “communicating with other people” by talking, signing, feeling braille, reading text, etc. All these various modes of fulfilling this abstract function are equally “healthy” in themselves.¹⁶ An individual cannot be healthier solely in virtue of the fact that she communicates via talking rather than, say, signing. Similarly, an individual cannot be “diseased” solely in virtue of the fact that he moves around using a wheelchair instead of his legs.

I will explore these ideas more fully in Chapter III. For now, we will be content with noting that the problem of statistically typical diseases demonstrates that a successful theory of health will have to appeal to some notion of human functioning beyond statistical typicality.

3.3. Not Viable in Practice

3.3.1. Not a Viable Model for Treatment

If it were implemented as a model for medical practice, the BST would have harmful effects on individual health and quality of life, both at the physiological and the societal level. Many

¹⁶ Thus, my idea of basic human capabilities makes use of Amundson’s notion of “mode of function”: human functioning should be judged in terms not of physiology, but rather in terms of whether an individual has certain abstract, day-to-day capabilities. An individual’s exact mode of functioning – that is, the precise physiological systems that she uses to perform each capability – does not make her intrinsically more or less healthy.

treatments that attempt to restore normal function actually make people's lives unnecessarily difficult. Amundson presents several cases exemplifying this fact. Autistic children, for instance, are often discouraged from "stimming" – that is, performing "small repetitive self-stimulations like rocking while sitting, tapping one's face, or flipping fingers in front of one's eyes" – ostensibly because it is an abnormal behavior (Amundson 2000, 50). For many autistic people, however, stimming can be highly beneficial. Autism characteristically involves experiences of "sensory overload," or of being overwhelmed by sensory input in "normal" environments. Stimming allows autistic persons to focus their attention when they are inundated by sensory information, thereby helping them to function more effectively in their day-to-day lives (ibid., 50). To give another example, Amundson cites the treatment of people whose legs fail to function normally. People with subnormal leg function are often encouraged to avoid using a wheelchair even if walking proves painful and slow for them, and even if using a wheelchair would massively improve their day-to-day functioning (ibid., 50-51). Amundson encapsulates these cases succinctly:

Atypical people can function at their highest level using atypical modes of function. Mainstream concerns with normality are directed at typicality of functional *mode*, and are antagonistic to the functional performance of atypical people (ibid., 50).

Thus, people with atypical "global" or "overall" modes of function often benefit more from treatments that help them achieve the highest level of functioning possible *with their unique modes of function*, than they do from treatments that seek to make their overall mode of function more typical. In other words, the best treatments often work *with* a person's overall mode of function, seeking to maximize the person's day-to-day functioning with that particular mode of function, rather than attempting to supplant their mode of functioning with a more "normal" one. There are two important details to note about this observation. First, Amundson adverts to a mysterious and unanalyzed notion of "overall level of functioning," or "level of day-to-day functioning." Apparently, the kind of "function" Amundson invokes here is different than the notion of

“physiological function” that Boorse builds into the BST. Amundson’s idea of “function” seems to mean something like “personal functioning”: being able to do the things one needs to do to get by. In Chapter III, I will flesh out more fully what I think Amundson means when he appeals to “overall level of functioning.” I believe that we can measure a person’s overall level of functioning in terms of whether that person has all of the “basic physical capabilities” necessary for a fully human life – all of the abstract capabilities foundational to human achievement, e.g., the ability to communicate, the ability to plan and reason (see also the last two paragraphs of Section 3.2.2).

Notice also that Amundson calls an individual’s unique physical and mental approach to life their *mode of functioning*. I will formalize this notion of “mode of function” in Chapter III.

In summary, then, the Applied BST would be less than optimal, and in many cases positively harmful, as a guide to medical treatment. Promoting physiological and behavioral normality can inhibit the flourishing of people with atypical overall modes of functioning.

3.3.2. The Societal Injustices of “Normal Function”

In “Against Normal Function,” Amundson draws special attention to the ways in which privileged groups use the doctrine of “normal function” to justify the oppression of people with atypical and unfashionable modes of function (ibid., 33, 51). In essence, Amundson contends that “species-normal function” is a discriminatory and falsely objective social norm based in phony biology (see Section 3.2.1). According to Amundson, “species-normal function” is analogous to the phony biological concept of “race,” which white Europeans used for centuries to justify the oppression of nonwhites. In much the same way that whites have rationalized the subjection of nonwhites by appealing to the idea that certain races are “naturally” inferior, privileged people have frequently rationalized the reduction in opportunity experienced by people with atypical modes of

function by labeling them as “abnormal” or “disabled,” and by claiming that their loss of opportunity is the fault of their mode of function (ibid., 33-34, 51-52). “Like the concept of race,” in Amundson’s words,

...the concept of biological normality is invoked to explain certain socially significant differences, such as unemployment and segregation. Like the concept of race, the concept of normality is a biological error. The partitioning of human variation into the normal versus the abnormal has no firmer biological footing than the partitioning into races. Diversity of function is a fact of biology (ibid., 34).

In short, the societal notion of normal function is used to lend legitimacy to ableism.¹⁷

Amundson refutes the concept of normal function in two ways: (1) by demonstrating the biological implausibility of the principle (as we have seen in Section 3.2.1), and (2) by showing that opportunities of people with atypical modes of function are diminished by the *conscious choices of people in power*, rather than by the modes of function themselves. As such, we should be cautious about using biological normality as a consideration in matters of medical treatment, politics, and social justice.

Amundson builds his case against the societal concept of normal function by stringing together several general observations about human functioning. Most importantly, what an individual can *do* depends not only on her biological makeup, but also on her environment (ibid., 51) and the tools at her disposal (ibid., 45). Amundson emphasizes that this dependency on environment and tools applies not merely to people with atypical modes of function, but to all humans. “Human beings are distinctive among species in their extensive use of tools and in the degree to which they modify their environment,” he points out.

A weak person using an atlatl can throw a spear farther than a strong person without one. A weak person can walk faster on pavement than a strong person can walk on a sandy beach. Such improvements are entirely typical of human beings, in the statistical sense that everyone does them. Tool use and environmental design change the modes and levels of human function (ibid., 45).

Thus, we all rely on certain tools and environmental modifications to achieve our everyday

¹⁷ “Ableism” is a name for discrimination based on mode of function, similar to “racism” or “sexism.”

goals. For example, I live in a house, which shields and protects me from the wind, rain, and snow. My house is equipped with a heating unit, which keeps me from dying of hypothermia when it is cold outside. I use shoes to walk on snow, pavement, and dirt; a computer to write emails and type essays; a phone to stay in touch with my friends and family; weights to exercise; my coffee machine to make coffee, which ensures that I stay awake throughout the day; and antidepressant drugs to keep my outlook bright and shiny (the latter two artifacts constitute no small dependency for me!). Thus, even people with fairly “normal” modes of functioning rely on a barrage of tools and environmental modifications to get through each day.

Moreover, as Amundson points out, the tools and environmental modifications we use are the result of conscious choices (ibid., 47-48). There is nothing inevitable, coincidental, or merely “natural” about the fact that I wear shoes in the snow rather than, say, skis, nor about the fact that I use antidepressant drugs and coffee rather than methamphetamines, a computer rather than smoke signals or stone engravings, a house rather than a boat, or weights rather than heavy bags of sand. In each case, the kinds of tools and environmental modifications I use to achieve my purposes and goals are a result partly of choices I have made – e.g., choosing to get stronger by lifting weights rather than bags of sand – and largely of choices that people in my community and society have made – caffeine and Prozac are legal and societally accepted whereas methamphetamines are not, computers are a far more common and readily available means of word processing than stone engravings.

As such, if people with atypical modes of function suffer from lowered opportunity in life – most apparently, people with physical and mental disabilities, traditionally conceived – we cannot immediately blame their biological makeup for these disadvantages. In many cases, people with atypical modes of function are disadvantaged (a) because they do not have access to the right tools, or (b) because their environment is not well suited to their particular mode of function. For

example, a person who uses a wheelchair experiences reduced opportunity only to the extent that her environment does not accommodate wheelchairs. If her home, workplace, and means of transportation are wheelchair-accessible, and if she does not experience ableist discrimination in hiring and employment, then ostensibly she will function well; if her environment is not wheelchair-accessible, and if her community is prejudiced against her mode of function, then she will not (ibid., 50-51). Blind people will experience a devastating loss of opportunity if they have no access to braille writing, as they will be largely cut off from written communication. But blind people with access to braille will experience little or no loss of opportunity in the realm of literacy. Moreover, as we have seen, whether people with atypical modes of function have access to the right tools, and whether their environment accommodates their mode of function, results from people's *conscious choices*. Our communities can choose, if they want, to make buildings wheelchair-accessible. We have the power to institute braille writing where it is most helpful to blind people, to modify our views so that stimming becomes socially acceptable, and to adapt our educational system to account for people who sign rather than speak. Loss of opportunity does not arise from biology: it arises from societal discrimination, from catering to the needs of one group over others. In the case of people with disabilities, loss of opportunity results from the reification of biological "normality" and the shunning of unpopular modes of function (ibid., 33). Amundson summarizes this point thusly:

... the discussion of opportunity takes a very different form in the context of supposed biological abnormality than in other contexts. Racism and sexism, for example, cause very serious reductions in opportunity. Moral discussion of these problems centers on how opportunity should be restored to the disadvantaged groups, by changing social institutions if necessary. We are well past the time when academic discussion of race and sex was centered on rationalizations of how the disadvantages experienced by certain races and genders were caused by nature itself. But the normality discussions do just that. The abnormal are said to be disadvantaged by nature itself... [yet] the present unequal distribution of opportunities among people with varying biological traits can only appear to be fixed by nature if we ignore the fact that *all* human beings use tools and live in built environments, and that the design of tools and environments is an outcome of human choices. Given the appropriate technology and environment, blind people can read and paralyzed people can be mobile. The disadvantage that attaches to blindness and paralysis derives not from the atypicality of one's biology, but from the absence of appropriate tools and environments (ibid., 47-48).

In short, the glorification of "normal function" results in and reinforces the maltreatment of

people with atypical modes of function, just as the fabrication of biological differences in race and sex have been used to justify the oppression of nonwhites and women. If we are to treat atypical people with the respect and consideration they deserve, we must shift our dialogue away from the supposed “inherent shortcomings” of atypical modes of function, away from how we can make atypical people more like “normal” people. Instead, we must discuss how to restore opportunities to people with atypical modes of function by providing them with the tools and environmental modifications they need to function at the highest level they can, *given their atypical modes of function*.

Amundson’s line of argument stops here: he does not attempt to formulate a set of principles or guidelines as to (1) how we should measure a person’s overall level of functioning, regardless of mode, (2) how we can better approach the medical treatment of people with atypical modes of function, (3) what kinds of abstract abilities or capabilities we should prioritize when deciding how to modify our environment, or (4) how we can tailor our environments and tools to enable people with different modes of function to perform these capabilities. In Chapter III, I intend to take up the torch and build a theory of “basic physical capabilities” that can answer these questions in a clear and organized way.

3.4. Physiology is Too Narrow a Basis for “Health” and “Disease”

To conclude, I wish to make a few quick remarks about the BST’s purported basis in physiology. Since Boorse first formulated the BST in 1977, biology and medicine have undergone several rapid and dramatic changes in worldview. Since 1977, we have mapped the entire genomes of humans and myriad other species. We have conclusively dismissed the notion that race has any basis in biology (ibid., 33-34). We have uncovered the cellular and molecular bases of a virtually incomprehensible number of bodily processes, from gene transcription to cell signaling to aging and

development to cognition and emotion. The fields of genetics, epigenetics, neuroscience, cognitive science, biostatistics, epidemiology, and bioinformatics have exploded, and their unique methodologies have become widespread. In turn, these changes have revolutionized the way we see medicine. We have begun to pioneer medical treatments that target not only the patient's physiology, but also the patient's genome and epigenome (Sweatt 2013). As medicine continues in the coming years to bleed over into these new fields (not to mention fields that we have not thought of yet), we will need principles of medicine that encompass more levels of biological organization than that of physiology. We will need to take into account the molecular, genetic, epigenetic, biochemical, cellular, neural, cognitive, and behavioral levels of organization as well. As such, our theory of health and disease must be more conceptually inclusive than the BST.

As we have seen, moreover, the BST's notion of health as physiological normality is far too narrow to encompass the vast range of healthy diversity in human functioning. In order to allow enough slack for modes of functioning besides the "normal" one, we must build a theory that defines health in terms of a level of organization higher and more abstract than physiology – in terms of the higher-level goals that all or nearly all people pursue, regardless of their anatomical, physiological, and genetic makeups. My account of *health as capability* will do just this.

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Chapter II

Human Goals Relevant to Health

“The link between normality and opportunity may help us recognize the hierarchical level at which biological normality is conceived to operate. A person with unusually low blood pressure, or an unusual muscle configuration in the hand, may experience no direct loss of opportunity... But people who are blind or paraplegic do experience a reduction of opportunity. It is probably at this level, the level of ‘basic personal abilities’ that draws the functional determinist’s attention...” (Amundson 2000, 46).

The concept of “health” is richer, subtler, and more human than mere physiological normality. As we have seen in Chapter I, Christopher Boorse’s (1977) notion of “health” as statistically normal physiological functioning with respect to one’s species, sex, and age is too coarse to deal adequately with many types of healthy bodily variation. In the next two chapters, I will show how we can reinterpret the biological goals relevant to health to account for this healthy variation.

In this chapter, I contend contrary to Boorse (see Boorse 1977, 556) that survival and reproduction (“S & R”) are the wrong kinds of biological goals in terms of which to define health. I argue that we can best think about health as the ability to perform certain everyday functions, such as communicating with other people, moving from place to place, using our imagination, planning, and remembering. In the style of Martha Nussbaum (2000), I call these day-to-day abilities *basic bodily capabilities*.

1. Shortcomings of Individual Survival and Reproduction

The main purpose of this section is to demonstrate why individual survival and reproduction *a la* Boorse is the wrong goal in terms of which to define “health.” In order to show why I disagree with Boorse’s definition of “health,” I want to mention briefly how my philosophical aims differ from his. In short, whereas Boorse’s main goal is to capture a theoretical definition of “health,” mine is to capture a practical one – a definition that tells us not only what health is, but also what kinds of treatments promote health, when they should be administered, and who should be responsible for financing them. (I discuss this difference in philosophical aims more completely in the Introduction.) With this divergence in mind, let us examine how individual survival and reproduction fares as a goal of clinical practice.

Imagine that we have a young adult in a coma. Suppose that her family pays to keep her on life support indefinitely. Suppose further that her medical team makes no great effort to restore her consciousness or her mental and physical faculties, *per se*, but they keep her unconscious body alive for decades until she dies of natural causes at the age of eighty-five. Moreover, suppose that someone decides to harvest her eggs and use them for *in vitro* fertilization. At the time that she dies, this individual has several biological children, grandchildren, and even great-grandchildren. In terms of survival and reproduction, the individual’s life has been overwhelmingly successful: she has produced many descendants and lived longer than most others. As such, this individual’s medical team has succeeded in promoting her individual S & R.

Yet it does not seem that this individual possessed “health” during her adult life in any but a trivial sense of the word. She never woke up from her coma, never got up and walked around, never consumed food or expelled bodily wastes without the aid of technology or assistance, never learned anything new, never had another sensory experience, never communicated with another person. Thus, even though she reproduced and survived to old age, we would not consider her to have lived

an “adult life” at all, let alone a healthy one. To the extent that it was possible to restore her consciousness, her medical team has failed her.

This hypothetical story illustrates that individual S & R is neither (1) sufficient for health, nor (2) the only goal of healthcare. Healthcare professionals usually work to help their patients attain more than just baseline S & R, and we *expect* them to do so, otherwise the above story would not strike us as such a devastating failure. It is not enough for our healthcare providers to ensure that we live a life of a normal length and produce offspring. Intuitively, we would think that they should help us attain other bodily goods as well. If we are in pain, we expect that our healthcare providers will help us to overcome or to weather it. If we cannot move, we expect that our healthcare providers will do something to restore movement to our bodies, or to give us compensatory medicine or technology – e.g., a wheelchair. If we have a tumor that threatens to diminish our ability to see, we expect our doctors and nurses to try and fix it. Individual S & R are blunt biological measurements: they are useful in evolutionary biology, but not in assessing whether a person is healthy or whether she has lived a good life.

Boorse would agree that mere S & R is not sufficient for “health.” According to Boorse, “health” consists in all the parts of an individual’s body making *statistically average or above-average contributions* to her S & R (Boorse 1977, 555; see also Chapter II). Thus, even though the comatose woman in our story achieves better-than-average S & R, yet she does not qualify as “healthy” according to the BST. Several parts of her body – most conspicuously her brain, but perhaps also her muscles, eyes, ears, etc. – make significantly below-average contributions to S & R as compared with other adult women. So Boorse would agree with our verdict that this individual’s medical team has failed to restore her health.

But Boorse’s own definition of “health,” that is, all parts of the body making statistically average or above-average contributions to individual S & R, still falls short of capturing both (1)

how healthcare professionals currently work and (2) how they *should* work, as I have discussed briefly in the Introduction.¹⁸ I will address each of these concerns in turn.

When healthcare workers provide medical treatment, they often do so with an eye to maintaining or restoring normal physiological contributions to individual S & R. For example, a team of emergency room doctors and nurses may identify that a patient has unusually high blood pressure, and so provide medication to temporarily bring blood pressure back into a normal range. A family physician may observe that her patient has unusually high blood cholesterol and advocate changes in exercise, diet, and medication to lower the patient's blood cholesterol. Thus, physiological normality figures as both an epistemic tool and a goal of treatment in contemporary healthcare. So Boorse's account of "health" does capture a prevalent aspect of healthcare practice. Still, many healthcare professionals strive to promote more than just normal physiological contributions to S & R. I claim that there are two main ways in which contemporary healthcare practice promotes something other than statistically normal contributions to individual S & R. (1) In some cases, healthcare professionals work to restore physiological contributions to goals more specific than S & R. (2) In other cases, healthcare professionals seek to promote atypical, poorly understood, or unknown modes of function.

To examine the first kind of case, I claim that healthcare professionals sometimes work to restore physiological contributions to goals more specific than individual S & R; some of these more specific goals may ultimately contribute to S & R, but others may not. For example, healthcare professionals may seek to restore an organ's contribution to breathing, hearing, walking, blood circulation, digestion, etc., rather than its contribution to organismal S & R *per se*.

¹⁸ These two considerations are not utterly contradictory: some current healthcare practices differ from what I believe they should look like, but others do not. That is to say, some aspects of contemporary healthcare are closer to my ideal than others. My goal is to promote a healthcare system that is unified and consistent in promoting people's basic bodily capabilities.

To illustrate, suppose that I break my tibia and visit an urgent care clinic. The doctor wraps my leg in a cast and advises that I use a wheelchair to get around for a few weeks. Then, I will walk with crutches for a few weeks; then only with a boot; and finally my leg bone will be sufficiently healed that I can walk again with no assistance. Suppose that I follow this sequence of recommendations, and after several months my tibia is as good as new. In this case, it seems reasonable to suppose that the doctor's helping my tibia heal *did* restore the bone to a statistically normal level of contribution to S & R. But observe the form of the treatment I followed. Each step in the treatment aimed specifically to restore my tibia's contribution to *walking*, rather than its contribution specifically to my S & R. Each stage brought me closer and closer to being able to walk without equipment; at each stage I made an incremental transition from not being able to walk on my own to being able to walk on my own. That is to say, even though the treatment happened to restore to my tibia a species-normal level of contribution to S & R, yet restoring the tibia's contribution to S & R was not an explicit goal of the treatment. Rather, the treatment was tailored to restoring the tibia's contribution to my ability to walk.

One might object to this example that just because a treatment involves changes in my ability to walk does not mean that *restoring my tibia's contribution to walking* was a goal of the treatment. In other words, just because a course of treatment restores a body part *P*'s contribution to ability *X* does not mean that restoring *P*'s contribution to *X* was the main purpose of the treatment. The same treatment would have also restored my tibia's contribution to climbing ladders, tap dancing, stomping on balloons, riding a unicycle, and standing while I write papers, among an indefinite number of other apparently irrelevant activities. Alternatively, a heart transplant may reinstate the heart's contribution to a patient's ability to watch TV – i.e., by saving the patient from dying of heart failure – but restoring the patient's ability to watch TV is not one of the main goals of heart

transplant surgeries. Perhaps, then, the treatment's restoring my ability to walk was incidental to some other purpose.

If the treatment's restoring my ability to walk *was* indeed incidental to some other, more primary purpose, it is unclear what exactly that purpose would be. In any case, I do not see why we would assume *a priori* that the main purpose of the treatment was restoring my tibia's contribution to S & R, rather than some other goal. For one, S & R is an abstract, high-level goal. As such, the connection between individual S & R and the functioning of the tibia is diffuse and multifaceted, mediated by the patient's environment, the tools at the patient's disposal, and myriad other of the patient's body parts. Accordingly, the tibia's contribution to S & R will be dependent upon so many other factors as to render it impractical as a clinical tool. For the sake of cognitive simplicity, as I see it, healthcare workers typically focus on contributions to more immediate goals than S & R – that is, to goals for which the relevant body part's contribution is more direct and uncomplicated, less layered and multifactorial. For example, the tibia's contribution to walking seems relatively straightforward: the tibia helps to support our bodyweight while we walk and serves as an attachment point for several skeletal muscles involved in walking (Drake et al. 2015, 618-632). Thus, when I break my tibia, my healthcare providers will focus on restoring the tibia's contributions to walking rather than to S & R (even though restoring the tibia's contribution to walking may also happen to restore its contribution to S & R).

To be sure, other of the tibia's functions may have peripheral roles in walking. For example, the interior of the tibia contains bone marrow, which contains the stem cells that generate new blood cells. Without sufficient red blood cells, our bodies might not be able to transport enough oxygen to our muscles to allow for walking. In the case of the broken tibia, however, the ability of stem cells inside the tibia to generate red blood cells will probably not be compromised; therefore, the stem cells inside the tibia will not figure centrally in diagnosis and treatment. This observation

reveals an important aspect of clinical practice: treatments are often designed to restore certain abilities that have become compromised by injury, infection, or genetics – or to maintain abilities that threaten to become compromised. In order to maintain or restore these abilities, clinicians focus on (1) identifying which parts of the body are making substandard contributions to the ability in question and (2) instituting procedures that will either (a) restore the contribution of those body parts to the ability, (b) restore the ability without restoring the contributions of the relevant body parts, or (c) allow for some different ability to supplant the one lost. An example of (a) would be the above treatment for my broken tibia. An example of (b) would be to prescribe a regular oral dose of thyroid hormone to someone whose thyroid has been surgically removed so that she can still regulate her body temperature, digest food, etc. And an example of (c) might be prescribing the use of a wheelchair for someone who has lost use of her legs, and thus who has lost the ability to walk.¹⁹ To summarize, the treatment that a clinician provides depends on which abilities are compromised and which body parts and processes are responsible for compromising the ability, i.e., which parts and processes are making substandard contributions to that ability.

So we have established that healthcare professionals frequently provide treatments that aim to restore the contributions of certain parts and processes of the body *to goals more specific than S & R*. These more specific goals may or may not ultimately contribute to S & R. I would like to make two comments on this conclusion:

(1) I do not mean to say that clinicians never seek to restore the contribution of some body part or process to S & R. In fact, many medical treatments aim specifically to maintain survival or to restore or maintain reproductive functions. For example, suppose someone's femoral artery becomes severed in an accident and a nearby paramedic rushes to help. The paramedic may insert

¹⁹ See below for a more detailed discussion about how healthcare providers may promote atypical modes of functioning in cases of kind (c).

her finger into the victim's femoral artery in order to prevent the victim from dying of blood loss. In this case, the paramedic's inserting her finger into the artery aimed specifically to compensate for the femoral artery's failure to contribute to survival in a way it usually does, i.e., by keeping blood contained within the cardiovascular system.

(2) I have still not fully addressed one of the criticisms issued above: that just because a treatment happens to restore part *P*'s contribution to ability *X* does not mean that restoring *P*'s contribution to *X* is the main goal of the treatment. How do we know, for instance, that the treatment for my broken tibia aimed to restore the tibia's contribution to walking, rather than its contribution to, say, jumping on a pogo stick? After all, the treatment restored the tibia's contribution to both abilities, in addition to countless others. Perhaps the treatment's restoring my tibia's contribution to walking was incidental to some other purpose.

I take the form or design of the treatment as evidence of the treatment's purpose.²⁰ In the case of the broken tibia above, I followed a sequence of treatments that allowed me to transition smoothly from not being able to walk at all, to being able to walk with crutches, to being able to walk with only a boot, to being able to walk independently again. The treatment was designed to gradually restore my ability to walk following the tibial fracture. It was not designed to restore my ability to hop on a pogo stick or stomp on balloons. I did not, for example, start in a wheelchair and transition to using a pogo stick with special pogo-restraints that reduce the weight-bearing load on the healing tibia, to using the pogo stick independently.²¹ Therefore, restoring the tibia's contribution to these activities was not the main purpose of the treatment, even though the treatment did incidentally restore my tibia's contribution to the activities.

²⁰ The notion of "design" I appeal to here is the colloquial one: that is, conscious design by humans, and in particular by healthcare professionals. I am not referring to any more technical notion of biological design.

²¹ If I were extremely passionate about the pogo stick, then I might follow such a treatment. But I am not, and probably only a few people are; as such, this treatment is probably not a very common way to cope with a tibial fracture.

To provide further evidence for my claim that the design of the treatment reveals its purpose, consider how treatment for a tibial fracture might look different for someone who is paraplegic and uses a wheelchair to get around. In this case, the patient's normal mode of locomotion may not include walking at all. As such, her treatment will not consist of a transition from wheeling to walking, since wheeling is her normal mode of locomotion in the first place. She will not have to walk with crutches or walk with a boot at any stage in the treatment; rather, she will be using a wheelchair at the beginning and the end of a treatment. So perhaps she will wear a cast for some time until the fracture has healed. In this case, it looks as though the primary purpose of the treatment is restoring the tibia's structural integrity.²² Thus, even though the paraplegic patient and I would be treated for the same condition, the course of our treatments would look different because our mode of locomotion is different; we *use* our tibias in different ways.

At this point, one may wonder how clinicians decide which of the body's activities should be goals of treatment and which should not. Surely it would not make sense to administer treatment that restores the tibia's contribution to walking if the patient is paraplegic. But with other activities the answer may be less clear. *Why* was my treatment for a broken tibia designed to restore my walking, rather than my ability to pogo stick? In current practice, I suspect that clinicians decide which activities are relevant based on a mix of several factors, including institutional standards of care; prevailing conventions; their education and experience; personal views about which behaviors are worthwhile and which are not; and the patient's goals and circumstances, among probably numerous other considerations. These decisions may be entirely conscious and explicit, or they could be automatic and routine, ingrained by habit and convention. In Section 3 below, I will outline

²² We might also think that restoring the tibia's structural integrity was one of the goals of my transition from wheeling to walking. Either way, these examples illustrate that many medical procedures aim at goals more specific than individual S & R.

an account as to which of the body's activities I believe should be universally considered relevant for treatment.

In addition to providing treatments that focus on contributions to goals more specific than individual S & R, healthcare professionals sometimes provide treatments that promote statistically *abnormal* modes of function, as well as treatments whose effect on physiology is unclear. For example, psychiatrists often prescribe lithium to treat bipolar disorder, but the physiological mechanisms that make lithium an effective treatment for bipolar are not well established (Marmol 2008). A healthcare worker may suggest that someone who becomes paraplegic after a spinal injury use a wheelchair to get around. This course of treatment both (1) leaves intact the legs' statistically sub-normal contribution to S & R, and also (2) prescribes the use of a wheelchair, a decidedly atypical mode of getting around.

In summary, then, the BST's concept of "health" as statistically normal physiological function does not match up with the idea that the goal of healthcare is to promote health. Many contemporary medical treatments aim to restore contributions to goals more specific than individual S & R, such as breathing, walking, and sleeping. Moreover, many other medical treatments promote statistically abnormal, and even unknown, modes of physiological functioning.

Boorse might counter that the BST is not supposed to be an account of medical treatment or the practical, everyday aspects of health. On the contrary, as we have seen in Section 1.1, Boorse insists that he means to define the *theoretical* concept of health (Boorse 1977, 542 and Boorse 2014, 693). This theoretical concept says what health *is*, but nothing about what we should *do* about health (and its failure). That is to say, the BST makes no particular recommendation as to how we should pursue health, or whether we should even pursue it in the first place (Boorse 1977, 569). As such, this criticism – i.e., that the BST does not capture contemporary approaches to medical treatment – does not refute Boorse's theory at all. Rather than demonstrating that the BST falls short as an

account of “health,” Boorse might contend that I have merely provided good reasons to believe his claim that the BST is not an account of practical health.

In my view, however, the BST’s silence on medical treatment is a serious shortcoming: it *does* demonstrate that the BST fails as an account of health. There is no reason why anyone besides philosophers and academicians should care about theoretical definitions of “health” and “disease” if these concepts say nothing about treatment – if they give us no direction as to who should receive which treatments for which conditions, what kinds of outcomes these treatments are likely to have, which treatments are ameliorative and which are augmentative, etc. Concepts of “health” and “disease” that are purely theoretical – that have no conceptual connection to medical procedures – are just as useless to clinicians as they are to their patients that clinicians treat.

Part of Boorse’s motivation for placing “health” and “disease” out of the realm of medical practice, I think, is to prevent us from labeling certain states as “diseased” simply because they are treated – e.g., calling pregnancy a disease because some doctors prescribe contraceptives, or calling the possession of a clitoris a disease because some people practice female genital mutilation (Boorse 1977, 545-546 and Boorse 2014, 701-702). I agree with Boorse that this consideration is important. Boorse provides a valuable insight into the relationship between treatment and the concepts of “health” and “disease” by demonstrating that the extension of the concept of “disease” is different than the range of conditions that people treat (Boorse 1977, 545-546). There are some conditions we generally consider “diseases” that are currently untreatable, e.g., Creutzfeldt-Jakob Disease, the human variant of mad cow disease. Conversely, there are many conditions that healthcare providers treat that we do not generally consider diseases. For example, cosmetic surgeons may provide treatments that mitigate people’s ugliness; yet ugliness is definitely not a disease. Boorse mentions several kinds of conditions healthcare professionals or others treat, but that seem to be textbook non-diseases. For example,

Unwanted fertility, unwanted pregnancy, male foreskins, sagging jowls, and small breasts are treated by medicine, yet never counted as pathological (Boorse 2014, 693).

I reject any ‘cultural notion of health’ [Kovacs 1998, 35]. The fact that ‘the conscious goals of individuals and cultures’ include abortion and contraception [Kovacs 1998, 35] does not show pregnancy to be a disease and infertility to be health, any more than clitoridectomy and human sacrifice show a clitoris to be a disease and death to be health (Boorse 2014, 701-702).

Among standard medical procedures are circumcision, cosmetic surgery, elective abortions, and the prescription of contraceptives... [But] one will search [the medical canon] in vain for such a disease as unwanted pregnancy, and it would be absurd to call foreskins on male babies-a part of normal male anatomy-an innate disease. The performance of sex change operations hardly makes male gender, or female, a disease. The fact is that physicians distinguish, even among conditions they treat, between some they consider pathological and others they do not” (Boorse 1977, 545-546).

Nonetheless, just because “diseases” and “treated conditions” do not coincide perfectly does not mean that we cannot make useful connections between the two concepts. To be sure, I think that finding the right extension for the concept of “disease” is a worthwhile philosophical goal, and that Boorse makes a notable step towards this goal by showing that not all commonly treated conditions are diseases. However, in separating his definitions of “health” and “disease” from matters of medical practice, Boorse fails to address the more pressing issue regarding the many treatments he has mentioned: that is, *providing normative grounds that will allow us to distinguish between legitimate and illegitimate treatments*. Boorse’s account accommodates how, for example, being pregnant and having a clitoris are not diseases. But his account gives no direction as to why it is acceptable for doctors to prescribe contraceptives, but unacceptable for them to perform FGM, even though both procedures apparently treat non-diseases.

Boorse’s project of finding the right labels for bodily conditions is philosophically interesting but practically ineffectual. More than any theoretical definitions of “health” and “disease,” we need to develop a robust universal normative framework that will support us in our efforts to prevent sham treatments such as FGM wherever we find them, and, moreover, that will help us to distinguish legitimate treatments from illegitimate ones in more ambiguous cases. In other words, instead of burying our heads in the theoretical, I believe we urgently need to address the practical

issues surrounding the body and bodily health. As philosophers, we are well equipped to devise a sensible, coherent, and cosmopolitan set of principles to guide our thinking in matters of Western medicine, non-Western medicine, and bodily modifications in general. This set of principles should be able to say that some procedures legitimately treat a disease, other procedures legitimately treat a non-disease, and others yet are illegitimate (or even positively evil).

Now, Boorse might agree that distinguishing legitimate from illegitimate treatments is a more urgent need than determining the extension of the word “disease.” He might also agree that delineating between legitimate and illegitimate treatments is a normative matter: that it requires evaluative principles as to what kinds of procedures are appropriate and what kinds are not. But he might object that “health” and “disease” are insufficient for this task, since they are “value-free theoretical notion[s]” – they simply describe kinds of states an organism’s body can instantiate (Boorse 1977, 542). Because the concepts “health” and “disease” are devoid of value, we cannot use them alone to decide on the legitimacy of medical procedures.

To further illustrate what Boorse means when he calls health and disease “value-free theoretical notion[s],” consider the concept “wavelength of 470 nm” (ibid., 542). This concept refers to a property that different kinds of waves (e.g., electromagnetic waves) may possess. There is nothing normative, Boorse would say, about whether or not the wave has a wavelength of 470 nm. Whether or not an electromagnetic wave has a wavelength of 470 nm is a matter of fact: the wave either has that wavelength or it does not. That a particular wave has wavelength 470 nm does not tell us whether it is *good* that the wave has that wavelength, whether we should change the wavelength to something else, how we should feel about the wavelength being what it is, etc. Any judgments about the wave’s being 470 nm in wavelength, then, must come from somewhere besides the mere concept of “wavelength of 470 nm.” Similarly, we would not attempt to derive a theory of value based solely on the concept of “atom” or “norepinephrine”: these terms simply name kinds of entities in the

universe. In the same way, Boorse would claim, “health” and “disease” designate properties that an individual organism either has or does not. To try to use these concepts as a guide to whether certain medical procedures are appropriate, therefore, would be senseless.

But health is not a theoretical concept in the same way as “atom,” “norepinephrine,” or “wavelength of 470 nm.” On the contrary, health is the *normative ideal* towards which healthcare aims or should aim. Rather than merely naming kinds of physical properties in the world, “health” and “disease” also carry normative content, much in the same way as do the terms “harmony” and “discord,” “good shape” and “bad shape.” To put the matter differently, calling a body “healthy” or “diseased” is similar to calling a building “structurally sound” or “structurally unsound”: the terms denote both (1) something about the object’s physical makeup, and (2) whether we think that this aspect of the object’s physical makeup is good or bad. In other words, the terms simultaneously name a kind of property *and* our attitude towards that property.²³

There is much more to the idea of “structural soundness” than simply whether we think the building’s structure is good or bad. In the same way, there is more to the normative concept of “health” than merely whether we think a particular condition is desirable or undesirable. Thus, the value-based concept of health that Boorse dismisses – that is, health as desirability and disease as undesirability – is grossly oversimplified (Boorse 1977, 544-545). In Section 3, I will outline in detail what I believe the normative concept of “health” consists in.

Boorse might counter my claim that health is a normative concept by appealing to the ubiquity of the terms “health” and “disease” in the biological sciences. As Boorse observes, biologists frequently apply these terms to nonhuman organisms, including pets, livestock, plants, and

²³ Boorse compares “health” and “disease” to the terms “life” and “death,” which he claims are also descriptive, empirical, and non-normative (Boorse 2014, 696-698). In my view, however, the relationship between the concepts “life” and “health” is akin to that between the terms “killer” and “murderer”: whereas the former term in the pair is more-or-less empirical, the latter term has both empirical and normative content.

microorganisms (ibid., 565). A plant biologist might talk about the health of a spruce tree. Entomologists might talk about diseases in grasshopper, butterfly, and bee species. Microbiologists speak of viral infections in bacteria. If health were a normative concept, Boorse might reason, we would expect for the terms “health” and “disease” to apply only in the domain of human values. For example, we might only call a farm cow “healthy” insofar as it can do certain things we value – e.g., yielding edible meat, providing companionship, running around in a rodeo. Yet, on the contrary, biologists and veterinarians use these terms to talk about many other aspects of living organisms, and about organisms in virtually every branch on the tree of life, regardless of whether any people care whether these organisms live or die. That biologists use “health” and “disease” to talk about individual organisms from all species, rather than just those species directly involved in human interests, serves as evidence that these concepts are theoretical rather than normative. “What a healthy hen or cow is like,” Boorse punctuates, “is a biological fact; it is not an economic one” (ibid., 565).

From the vantage point of philosophical conjecture, attributions of health and disease to nonhuman organisms may seem plausible. Indeed, biologists often talk about diseases that afflict bugs and trees; veterinarians certainly talk about the health of cats, horses, and guinea pigs. In myriad other cases, however, it does not make sense to talk about the “health” and “disease” of nonhumans in the same way that we talk about the health and disease of humans. I share with Boorse the view that our medical concepts of “health” and “disease” apply to individual humans, rather than groups or societies.²⁴ But Boorse also claims that these concepts apply to individual nonhuman organisms (ibid., 565).²⁵ This claim fares well only when we consider species whose normal functions all contribute to individual S & R, rather than some other goal. To illustrate, one

²⁴ To see why, see Sections 2 and 3 below.

²⁵ I recognize that this issue depends partly on the problem of biological individuals, but to address what an “individual” is in the first place is beyond the scope of this thesis.

of the normal functions of a bee's stinger is to deter intruders from entering the hive. But deploying the stinger typically causes the bee to die. Here, the normal function of the bee's stinger – that is, stinging – contributes to the survival of the hive, but destroys the survival of the individual bee. Boorse would not want to say that a bee that cannot deploy its stinger is “healthy,” because this bee fails to perform one of its normal functions. On the other hand, performing the function of stinging leads almost invariably to the bee's death. To give another example, in some species of cellular slime mold amoebae, individual amoebae must mass together to form tall “stalks” in order to disperse into the surroundings when nutrients become scarce. But this process works such that many of the cells at the bottom of the stalk die (Bonner 1982). So there are some organisms with normal functions that sacrifice individual survival for the sake of others. Consider another kind of case: that in which reproduction leads to death. In many species of spiders and insects, for example, one mating partner often cannibalizes the other after mating (see, e.g., Lawrence 1992, Xiao et al. 2015). For other organisms, such as the fruit fly, the very act of reproduction significantly increases the risk of individual death due to internal bodily factors (see, e.g., Sgrò and Partridge 1999). So individual survival and individual reproduction sometimes conflict.

These cases demonstrate the difference between the worldviews of biology and medicine. Even though stinging, sitting at the base of a stalk, and the act of reproduction lead to death in bees, cellular slime molds, and male mantises, respectively, these functions nonetheless contribute to the evolutionary fitness of biological units different than the individual organism. Evolutionary biologists would fain call post-coital cannibalization in mantises “bad” or “unhealthy;” somehow or another, this behavior probably contributes to the survival of the mantis lineage. Thus, the worldview of biology places no premium on the wellbeing of individuals, *per se*. The medical worldview, by contrast, focuses largely on the survival and wellbeing of individuals. A good clinician, insofar as she is a clinician, would not intentionally allow a patient to die even if that patient's death

would drastically increase the wellbeing and probability of survival for others in the patient's community (or in the human species). Conversely, imagine we had a special veterinarian who communicates with bees. This veterinarian, insofar as she treats individual bees, would advise her bee patients to refrain from deploying their stingers for the good of their own "health."²⁶ By contrast, an evolutionary biologist who communicates with bees would not likely make the same recommendation.

So the terms "health" and "disease" could not possibly apply for all organisms in all cases in the same way that they apply to humans. Rather, the medical concepts of "health" and "disease" apply only to the extent that we value the individual organism's life. As such, we can properly and profitably apply these concepts to, e.g., pets, intelligent nonhumans, and livestock. Wherever we do not particularly value the individual organism's life, I believe that we use the terms "health" and "disease" by analogy to their respective medical namesakes, and we use them only where the analogy holds, i.e., where the normal functions concerned contribute to individual S & R. To illustrate, suppose we have an individual slime mold amoeba, and no one particularly cares whether it lives or dies. Because we do not value this individual organism's life, we cannot rightly apply to it the medical concepts of "health" and "disease." However, we can still say, *by analogy to these medical concepts*, that the amoeba has a "disease" if one of the normal functions contributing to its S & R – say, the ability of certain enzymes to reduce oxidative damage – becomes compromised. On the other hand, we would not say that the amoeba has a "disease" if it only loses its ability to sit at the base of the stalk, since this function leads to the death of the individual amoeba. In summary, the range of application of "health" and "disease" to nonhuman organisms is far more limited than

²⁶ One can imagine a colony-wide "Stinging Kills" advertising campaign.

Boorse claims. We only call living things healthy or diseased to the extent that we value them as individuals.²⁷

Now that I have addressed the BST's shortcomings with respect to current medical practice, I will demonstrate how it also fails to meet the more demanding considerations I have outlined in the Introduction. Namely, I will show that Boorse's definitions of "health" and "disease" do not match with people's conscious goals and values.

To begin, consider that if we were to ask patients why they seek out and purchase healthcare services, virtually none would answer that they hope to promote statistically typical contributions to S & R by their body parts or processes. Nor would they likely espouse a simpler version of this formula: e.g., hoping to make their body parts do what the average person's body parts do. Now, just because people do not *say* that these are their goals does not mean that these are not actually their goals. Generally speaking, people seek healthcare because they want to be healthy. And, according to Boorse, statistically normal function is constitutive of health. Thus, Boorse might suggest that, insofar as people seek health, they do seek to promote statistically typical contributions to S & R by their body parts and processes, whether or not they can recognize or articulate this fact.

But many people pursue "health" – whatever exactly they mean by the term – without pursuing statistically normal function. For instance, consider an individual who has lost use of her legs in an accident and uses a wheelchair to get around. Suppose she performs intense resistance training with her upper body; eats a wholesome and balanced diet; has a robust social life, with a handful of close family members and friends, as well as many personal and professional acquaintances; and composes music in her free time. Apparently, this individual is a specimen of

²⁷ Although the medical concepts of "health" and "disease" apply to all individual organisms whose lives we value, yet these concepts are relative to species. The content of the concept "health" will be slightly different for a tree, say, than for a dog. In this thesis, I will focus exclusively on *human health*. However, we can apply the capability theory of health to nonhuman organisms as well. I discuss the "health" of nonhumans in greater detail in Section 3 below.

physical, intellectual, and emotional health. Even more, nearly all the parts of her body contribute at a statistically high level to her S & R. Yet her legs do not, and she has no intention of restoring normal function to them. And unless she restores normal function to her legs, according to Boorse, she can never be fully “healthy”; rather, she will have a permanent disease, i.e., the inability to use her legs for locomotion. According to the BST, therefore, this individual may strive for health with respect to most of her body parts, but she could not be striving for health with respect to her legs or her body as a whole. Thus, the BST’s definition of “health” does not fit exactly with what people strive for when they pursue “health”: people can strive for health even if they make no attempt to restore certain body parts or processes to statistically normal contributions to S & R.

To give another piece of evidence for this conclusion, consider that many people’s conscious goals and values transcend individual S & R. People can wish to be healthy while engaging in activities that endanger their individual S & R. For example, many people perform aid work in areas affected by poverty and natural disaster. Some people risk their lives and even commit to death to further bigger goals – freedom, religion, equality, beauty, innocence, an ethnic group or nation, the wellbeing of progeny and loved ones, etc. But I would not want to say that these endeavors are inconsistent with health. To view the matter differently, consider that if army doctors really wanted to promote the S & R of their individual patients – i.e., soldiers – they would advise these soldiers not to engage in combat! Yet army doctors do no such thing. So both patients and physicians must be aiming at something different than individual S & R, or statistically typical contributions to S & R, when they engage in healthcare transactions.

Even if patients do not aim to attain statistically normal function, *per se*, Boorse might counter that promoting statistically normal function will nonetheless help patients attain whatever their conscious goals are. In other words, promoting statistically normal function supports patients’ goals and values; therefore, contrary to my criticisms, the BST is consistent with patients’ goals. For

example, suppose that a patient's lungs are delivering oxygen to her blood with such low efficiency that she cannot do many of the things she likes to do without getting out of breath: hiking, playing sports, dancing, building furniture, etc. By restoring her lungs' contribution to S & R to a statistically normal level, then, we will ostensibly enable her to do these activities again. Or, suppose a patient has suffered his stroke, and that now his frontal lobe functions with particularly low efficiency – so low that he can no longer do his job, appreciate music, or talk coherently. If we could restore normal function to his frontal lobe, we would thereby restore his ability to do many of the activities he normally does. Thus, Boorse might conclude, supporting normal function is perfectly consistent with supporting patients' goals.

In fact, Ron Amundson addresses a series of claims similar to the above in his “Against Normal Function” (2000). Paraphrasing Norman Daniels (1985), Amundson summarizes the argument as such:

... the preservation and restoration of normal function is a primary goal of health care... Abnormals have reduced opportunity, and so maintenance of normality is maintenance of opportunity. Health care sustains normality, and normality sustains opportunity. Normality is the crucial objective link between health care and opportunity. And since normality is determined by objective science, judgments based on it carry a high authority (Amundson 2000, 46-47).

Put differently, Daniels claims that healthcare should aim to promote normal function because promoting normal function allows people to do the things they want to do. Amundson dismisses this line of reasoning on two accounts. For one, abnormal function leads to reduced opportunity only if a person's available tools, built environment, and social situation prioritize normal modes of function over atypical ones (ibid., 47-48; see also Chapter II, Section 3.3.2 above).

More damagingly to Boorse and Daniels, Amundson points out a variety of cases in which attempting to restore normal function actually hinders the patient's ability to pursue her conscious goals and values (see also Section 3.3.1). For example, many schools in the 19th Century forbade deaf children from signing, teaching them instead to read lips and speak out loud. This method of

education trained deaf children to communicate in a manner more similar to the statistically normal one – that is, talking and listening – but ultimately made communication *harder* for these children. Deaf people communicate far more easily and efficiently with sign language than with speaking and lip-reading, which “are extremely difficult to learn and of marginal value for most profoundly deaf individuals” (Amundson 2000, 43). To consider the alternative, although teaching deaf children to sign would have promoted a statistically abnormal means of communication, yet it would have allowed the children to function at a higher level (ibid., 42-43).

Boorse may object that these examples drag the BST beyond its intended realm of physiological normality and into the territory of *behavioral* normality. But it is not clear whether behavioral normality is distinct from physiological normality. Behaviors are physiological manifestations; each behavior relies on certain small-scale physiological occurrences. Moreover, certain behaviors and capabilities are inextricably tied with particular constellations of physiological functions. In order to read written language, for example, an individual generally must possess eyes that can focus light on the retina with precision. In turn, light-focusing eyes generally have a complicated physiological foundation involving neurons, photoreceptors, smooth and skeletal muscle cells, and connective tissue. Using a wheelchair engages different neuronal pathways and muscle groups than does walking with legs. Obtaining nourishment in the usual way involves different anatomical structures – mouth, salivary glands, esophagus, stomach, etc. – and physiological functions – salivation, olfaction, bile secretion, smooth muscle contraction – than does obtaining nourishment intravenously. Thus, many behaviorally normal functions require or generally involve normal physiology. As such, the distinction between behavioral normality and physiological normality is academic. We do not take the BST outside its intended range of application by applying it to behavioral functions.

To give another example where restoring parts of a patient’s body to statistical normality is

detrimental to the patient's wellbeing, many people whose mothers took thalidomide during pregnancy in the 1960s were born with malformed, nonfunctional, or absent limbs. When these thalidomide babies became children, educators and healthcare providers often discouraged them from getting around with a wheelchair. Instead, these children were given devices resembling legs, which allowed them to get around in a manner that was reminiscent of walking, yet slow and painstaking. When these children became adults, many began using wheelchairs, which enabled them to function at a much higher level in their day-to-day lives (ibid., 49). Thus, attempting to restore these patients to a more statistically typical manner of locomotion reduced their day-to-day functioning and in fact made locomotion unnecessarily difficult.

Restoring one or a few parts of an organism to statistically normal function does not always make the organism healthier. Treatments that bluntly restore statistically normal function in only a handful of body parts ignore the overall structural and functional organization of the patient's body. As such, these treatments may work poorly or even interfere with the rest of the patient's physiology. As we have seen, attempts to teach deaf children to communicate verbally overlooked the simple fact that deaf people's bodies are not often well suited to verbal communication. The ability to communicate verbally hinges largely on the ability to hear: thus, many people who are deaf but seeing communicate more efficiently using sign language than by speaking and reading lips. Promoting verbal communication is sensible only for patients whose bodily organization readily supports it; for those whose bodies do not, different communication styles may be far more effective. In general, treatments that promote statistically normal function neglect the fact that organisms are integrated wholes, and that changing one or two parts of a patient's body to make these parts more statistically normal may not help the patient all. Indeed, this kind of procedure may even hurt the patient or put her through unnecessary hardship, especially if her body has an atypical overall functional organization. Notwithstanding the problem of statistically typical diseases (see

Chapter II, Section 3.2.2), Boorse may be right in claiming that a person with statistically normal function in all the parts and process of her body is healthy.²⁸ But having each part of the body able to “perform all its normal functions on typical occasions with at least typical efficiency” is not the same as *rendering a treatment to restore* normal functional ability.

In summary, promoting statistically typical contributions to individual S & R is not an acceptable goal for healthcare. For one, clinicians nowadays promote more than just statistically normal functioning. Sometimes they promote contributions to other goals, such as breathing, sleeping and walking. Other times, they promote abnormal modes of function, as in the prescription of wheelchair use, or unknown or poorly understood modes of function, as in the prescription of lithium for bipolar. Furthermore, patients do not generally aim to promote statistically normal contributions to S & R by their body parts and processes when they seek medical treatment; and receiving treatment that promotes normal function may actually hinder other of the patient’s goals.

In the following chapter, I will outline Martha Nussbaum’s capability approach to international justice, which I use as a model for my account of “health” as capability. Then, I will present my account, and I will show how a focus on certain general capabilities – such as being able to move from one place to another, being able to communicate with other people, etc. – can solve some of the problems discussed in this chapter, and can also account for some additional subtleties of medical practice.

²⁸ Of course, I believe that this person’s physiological normality is incidental to her being healthy, rather than *the reason* why she is healthy.

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Chapter III

The Capability Approach

“I believe, however, that the human personality has a structure that is at least to some extent independent of culture, powerfully though culture shapes it at every stage... Desires for food, for mobility, for security, for health, and for the use of reason – these seem to be relatively permanent features of our makeups as humans, which culture can blunt, but cannot altogether remove” (Nussbaum 2000, 155).

In the previous chapter, I argued contrary to Christopher Boorse’s Biostatistical Theory (1977) that “health” involves goals more immediate and specific than survival and reproduction. In this chapter, I supplant the BST’s central goal of individual S & R with the notion of *basic bodily capabilities*: that is, concrete bodily abilities that are integral to living a fully human life. According to my account, whether an individual is “healthy” depends on whether her body has these basic capabilities. Medical treatments should focus on restoring, compensating for, and maintaining the contributions of an individual’s body parts and processes to these basic capabilities.

In order to develop my account of “health” in terms of basic human capabilities, I use Martha Nussbaum’s capability approach to international development as a template. More specifically, I use her list of “central human capabilities” (Nussbaum 2000, 78-80) as a guide to thinking about the kinds of bodily capabilities that are relevant to health – and, ultimately, to living a fully human life. Moreover, I demonstrate how my account of health in terms of basic physical capabilities fits into Nussbaum’s larger distributive justice framework: broadly, I see my account as a medical corollary to Nussbaum’s capability approach. In summary, my theory of health is simultaneously (1) a substantial remodeling of Boorse’s biostatistical theory (BST) that renders

“health” an evaluative concept, where the value ultimately comes from *people’s actual values and goals in life*, and (2) healthcare-oriented foundation to Nussbaum’s politically-oriented capability approach.

In Section 1, I provide some initial motivation for thinking about “health” in terms of capability, demonstrating how a focus on concrete capabilities, rather than on individual survival and reproduction (“S & R”), can solve some of the problems with Boorse’s account we discussed in Chapter II. In Section 2, I outline Martha Nussbaum’s capability approach to international justice, which I use as a model for building my account of “health” as capability. In particular, I describe Nussbaum’s motivations for constructing the capabilities approach, and I explicate the normative principles that underlie the approach, including the idea of a “truly human life” (Nussbaum 2000, 72-73) or a life “worthy of the dignity of the human being” (*ibid.*, 6). In Section 3, I present my list of basic bodily capabilities and explain why I chose the capabilities I did.

1. Initial Considerations in Favor of Capabilities

In the previous chapter, I demonstrated that neither (a) individual S & R nor (b) statistically normal contributions to S & R are appropriate targets for clinical practice. In this section, I will provide some initial motivation for thinking about health in terms of what people can *do* with their bodies – that is, in terms of people’s concrete bodily capabilities – rather than in terms of physiological states.

In his “Against Normal Function” (2000), Ron Amundson protests the notion that health consists in normal physiological functioning. He claims, as we have just seen, that treatments meant to institute normal function can be unhelpful or even detrimental for people whose bodies have an atypical overall functional organization. Rather than focusing on the “mode, fashion, or style of function” – that is, the manner in which a biological function is performed (see Chapter I, Section

3.2.1) – Amundson suggests that our healthcare institutions should prioritize “*level* of functional performance,” or how *well* a person can perform certain functions, regardless of mode (Amundson 2000, 48). Amundson does not explain clearly what “level of functional performance” means, which kinds of biological functions it applies to, or how we can measure it.²⁹ We get a vague idea of what the term could mean, however, by looking at Amundson’s examples in which the patient’s highest possible *level* of functioning does not coincide with the normal *mode* of functioning. In some of these cases, treatments that make the patient’s mode of functioning more normal actually lead to a lower level of functioning. In the converse cases, treatments that promote an atypical mode of functioning enable the patient to function at a higher level.

We have already seen several of these kinds of cases. Many educators in the 19th Century barred deaf students from using sign language, encouraging them instead to speak and read lips, a practice called “oralism” (ibid., 43). Although this mode of communication is apparently closer to the “normal” one, speaking and listening, it does not allow profoundly deaf people to communicate as effectively as they would with sign language. In the 1960s, children with deformed or missing limbs were encouraged to get around using leg-like devices, which were cosmetically more “normal” but slower and more laborious to use than a wheelchair (ibid., 49). Today, autistic children are often discouraged from stimming, that is, performing repetitive motions that help with concentration (see Chapter I, Section 3.3.1). Although stimming is an atypical mode of concentrating, it leads to a higher level of concentration in autistic people than does the avoidance of stimming (ibid., 49-50). In each of these examples, as I see it, Amundson discusses different modes of performing certain “basic personal abilities” (ibid., 46) – certain day-to-day functions involving the whole person, such

²⁹ Amundson’s does define *mode of function* and *level of function*, but these definitions are mysterious. “Functional mode,” he propounds, “is the manner in which a functional outcome or performance is achieved. Performance level is the quantitative degree of the functional performance, such as the speed or the strength of a motion (ibid., 36). It is not clear what “functional outcome” or “quantitative degree of functional performance” amount to.

as communication, “mobility,” and concentration (ibid., 50). The focus of healthcare, as Amundson advocates, should be helping people fulfill these basic personal abilities as best they can and in whatever manner they can, rather than forcing patients into one particular mode of performing these personal functions.

Thus, Amundson’s so-called basic personal abilities are multiply realizable. That is, each basic personal capability can be performed in a number of different ways, each way involving a unique complement of lower-level physiological functions. Take “mobility,” for example (ibid., 50). People can get around by walking with their legs. They can also get around by walking with their legs and using a walker for balance; or, they can use a wheelchair; they can walk with one or two prosthetic legs; they can ride in a boat; etc. Each of these modes of locomotion relies upon a different hierarchy of physiological functions. Walking with prosthetic legs, for example, does not involve the same neural and muscular connections as does walking with organic legs. Using a wheelchair uses different arm and leg muscles than walking with a walker.

In Amundson’s view, then, we measure a person’s wellbeing not by their physiology, *per se*, but by whether they can perform certain day-to-day functions. Details about a person’s physiology are not always an illuminating measure of a person’s health because people live happy and fulfilled lives with an almost inconceivable variety of physiological makeups. Each of the personal abilities we use in our everyday lives – communicating with others, moving from place to place, planning future courses of action, recognizing objects in our surroundings – can be manifested with a variety of different physiological organizations, owing to the plasticity of biological development (ibid., 38-39; see also Section 3.2.1).

In this thesis, I will argue for a conception of “health” similar to Amundson’s, based in a normative principle of human flourishing or wellbeing. To that end, I will develop Amundson’s notion of *basic personal abilities*, outlining a more comprehensive list of personal functions that are

definitive of human health. As Amundson contends, these personal functions will be multiply realizable: each can be performed in a number of different ways, with a number of different kinds of bodily makeups. At the same time, I do not wish to call every condition “healthy,” nor do I want to legitimize just any medical treatment; I still want for my theory to say which conditions are diseases and which medical treatments are illegitimate. Thus, my account will expand the variety of physiological makeups we deem “healthy,” but it will still mark a distinction between health and disease. My approach is cosmopolitan with respect to “health,” but not relativistic.

My search for an account of “health” and “disease” that will accommodate people’s multifarious ways of living hooks up nicely with Martha Nussbaum’s capability approach to international justice. In her *Women and Human Development* (2000), Nussbaum presents a set of so-called *central human capabilities*: concrete abilities that are indispensable for living a life “worthy of the dignity of the human being” (Nussbaum 2000, 5). In particular, Nussbaum outlines ten central human capabilities, which range from the bodily – e.g., “being able to have good health” – to the intellectual – e.g., “being able to form a conception of the good and to engage in critical reflection about the planning of one’s life” – to the emotional – “being able to have attachments to things and people outside ourselves” – to the sociopolitical – e.g., “having the right of political participation, protections of free speech and association,” “having the social bases of self-respect and non-humiliation” – to the ecological – “being able to live with concern for and in relation to animals, plants, and the world of nature” (ibid., 78-80). Nussbaum is interested mainly in promoting the sociopolitical foundations for the central human capabilities: according to Nussbaum, these capabilities are the primary political good that governing bodies should work to secure for their citizens (ibid., 81-82). In this sense, Nussbaum sees central human capabilities as analogous to John Rawls’s *primary social goods* (ibid., 75, 88-89; Rawls 1971).

Amundson is similarly concerned about the sociopolitical bases of “basic personal abilities,”

but his basic personal abilities are apparently more limited in scope than Nussbaum's central human capabilities. As it seems, "basic personal abilities" are the concrete *bodily* capabilities we need to live a healthy life. Despite these differences, basic personal abilities and central human capabilities share several important similarities. In essence, both concepts encompass a set of activities we need to be able to do in order to pursue self-sufficiently the life we want. Moreover, both central human capabilities and basic personal abilities are multiply realizable: people can fulfill them in a variety of ways (Nussbaum 2000, 77). In parallel to Amundson, Nussbaum hopes to give people the basic tools they need to pursue their own conception of the good, whatever it may be, rather than to force people into one particular way of doing things (ibid., 86-88).³⁰ And although both central human capabilities and basic personal abilities admit of a diversity of ways of being performed, they are not utterly inclusive. Rather, Nussbaum's central human capabilities distinguish among levels of capability, and Nussbaum condemns as unjust levels of capability below a certain threshold (ibid., 6); similarly, Amundson's basic personal abilities distinguish between higher and lower levels of functional performance, and, as we have seen, Amundson condemns lowered levels of functional performance due to the fetishizing of normal modes of functioning.

Unlike Nussbaum, however, Amundson does not mention whether there is a definite list of basic personal abilities, or what these basic personal abilities could be. In order to continue Amundson's work, then, I hope to use Nussbaum's central human capabilities as a template for constructing a comprehensive list of *basic bodily capabilities*. These basic bodily capabilities will serve as a full-bodied interpretation and enumeration of Amundson's basic personal abilities. According to my Theory of Health as Capability, "health" will consist in the ability to perform certain activities with one's body – i.e., the basic bodily capabilities.

³⁰ The capabilities approach "is focused on capability and empowerment... rather than imposing on any individual a required mode of functioning" (Nussbaum 2000, 302).

Thinking about health in terms of capability, rather than in terms of physiological states, can help solve many of the problems Boorse's BST encounters when we attempt to apply it to clinical practice (see Chapter II above). As we have discussed, clinicians often provide treatments that aim to maintain and restore the contributions of our body parts and processes to biological goals more specific than individual S & R. For example, common treatments for tibial fracture are tailored to restore the tibia's contribution to walking, rather than its contribution to individual S & R *per se*. By thinking about "health" as a definite set of capabilities, we can more easily identify the goals at which medical treatments should aim: in particular, medical treatments should aim at maintaining and restoring people's basic bodily capabilities.

We also noted in Chapter II above that clinicians frequently provide treatments that promote an unknown or poorly understood mode of physiological function. For example, psychiatrists prescribe lithium to treat bipolar, even though the mechanism of lithium's action is not well established. From the vantage point of the BST, this kind of treatment would not be advisable: according to the BST, as we have seen, "health" consists in all the parts of the body making statistically normal contributions to S & R (Boorse 1977, 555). But for all we know, lithium could be promoting an utterly atypical mode of neural function. (Certainly bipolar patients who take lithium have a higher brain concentration of the ion than people not taking the drug.) Why would clinicians perform a procedure whose precise mechanism of action they do not understand? This phenomenon makes sense if we consider that medical treatments aim to restore people's *capabilities* rather than any particular physiological state. Physicians would not stop prescribing lithium if new research established that lithium promotes an atypical style of neural function (as long as that style was not harmful). Lithium restores the ability of people with bipolar to do the things they need to do to live their lives. Thus, we can restore people's capabilities in any of a number of ways, because the exact mechanism of physiological action is not always the most important aspect of a medical

procedure.

Thinking about “health” in terms of basic bodily capabilities can also help us to bridge the gap between medical treatments and patients’ goals. As we have seen, the foremost economic function of healthcare is providing a service. The providers of a service should be attentive to the wants, needs, and values of their customers. But Boorse’s definition of health as “statistically normal contributions to individual S & R by all the body’s parts and processes” (ibid.) does not really capture patients’ goals. Many patients pursue health and healthcare services without striving for statistically normal physiological function; many people’s goals involve endangering their own S & R. Following Nussbaum, I hope to construct an account of basic bodily capabilities that make up an “object of *overlapping consensus* among people who otherwise have very different comprehensive conceptions of the good” (Nussbaum 2000, 5). That is to say, I hope for my basic bodily capabilities to be general and universal enough that they can support the pursuit of nearly any conception of the good. By promoting bodily capabilities that support most or all people’s wants, needs, and life goals, healthcare can serve its customers (i.e., patients) better. In other words, by rethinking “health” as a set of multiply realizable basic bodily capabilities, healthcare professionals can better help their patients to live the lives they want to live, whatever those lives may involve.

In addition, we pointed out in Chapter II that treatments restoring statistically normal function in one or a few body parts are often *detrimental* to the patient, especially when the patient has an atypical overall bodily makeup. As a fact of clinical practice, most treatments cannot fix the patient’s entire physiological makeup. Rather, medical treatments generally aim to change one or a handful of aspects of the patient’s physiology. Indeed, it might be desirable to promote the BST’s conception of health as full-body normality *if it were medically feasible* – but we do not currently have the technology to remodel a person’s overall physiological makeup in one fell swoop. As such, we should use a conception of “health” that does not necessitate any particular physiological design.

Our account of Health as Capability accomplishes this task. The basic bodily capabilities are multiply realizable: as such, they (1) provide sensible targets for healthcare practice while (2) allowing wiggle room for differences in body type.

An account of “health” in terms of basic capabilities helps to accommodate another subtlety of clinical practice that we have not yet discussed: the cognitive limitations of healthcare providers. I claim that most healthcare providers, being limited by time, attention, and the bounds of human intelligence, cannot conceptualize whole-organismal functioning at a level of detail adequate to predict how particular interventions will affect individual S & R. Individual S & R is an abstract, high-level biological goal, and the connections between molecular and physiological occurrences and individual S & R are not always clear. By anchoring “health” to a concrete set of capabilities, we can focus treatment on a more immediate, concrete, and readily observable level in the hierarchy of biological goals.

2. Nussbaum’s Capability Approach

As the title of the book suggests, Nussbaum’s *Women and Human Development* deals primarily with the problems of women in the developing world. As Nussbaum explains, women everywhere are subject to economic, social, and political inequality. But because “gender inequality is strongly correlated with poverty,” these inequalities are magnified in developing countries (Nussbaum 2000, 2-3). As such, women in developing nations face an especially dire lack of opportunity:

When poverty combines with gender inequality, the result is acute failure of central human capabilities. In the developing countries as a whole, there are 60% more women than men among illiterate adults; the female school enrollment rate even at the primary level is 13% lower than that of males; and female wages are only three-fourths of male wages (ibid., 3).

Thus, women in developing nations are disproportionately deprived of education and pay. Furthermore, they are often subject to severe political and social restrictions – e.g., reduced property

rights; or *pardah*, the imposed seclusion of women common in some predominantly Muslim and Hindu societies (ibid., 45-47) – as well as poor health and nutrition and pervasive sexual violence (ibid., 3-4). Because they so seriously lack freedom, safety, and resources, women in developing nations often cannot choose how they want to live, cannot pursue self-sufficiently their idea of a “good life.” On the contrary, they are prevented from exercising their intellectual and physical powers, from participating in politics, from shaping their lives to make them how they want (ibid., 72). In short, women in the developing world “lack essential support for leading lives that are fully human” (ibid., 4). This notion of a fully human life is the normative kernel of Nussbaum’s capability approach, and I will explain it in detail shortly.

Considering the deeply unsatisfactory situation of women in impoverished societies, Nussbaum proposes that we develop (1) better tools for measuring human development and (2) an overarching set of moral and political principles that governments can use to see that each citizen’s life meets some minimum standard of quality (ibid., 5-6). As Nussbaum elaborates, traditional measures of human development such as gross national product per capita and utility are not sensitive to gender inequalities. For example, a country’s GNP per capita may increase drastically, but this economic improvement may not concretely improve the lives of women, especially if they do not have property rights, educational opportunities, or reasonable access to employment (ibid., 6-7). Measurements of utility, on the other hand, depend on the extent to which people can attain things they prefer more over things they prefer less; but the “apparent” or “manifest” preferences of women in developing countries may not accurately reflect what these women *would actually prefer* (ibid., 112-113). As Nussbaum observes, “individuals adjust their desires to the way of life they know” (ibid., 136); moreover, “people’s preferences are in many ways constructed by the laws and institutions under which they live” (ibid., 142-143). In short, toxic and repressive situations may deform the preferences of women in the developing world, and so the satisfaction of their apparent

preferences may not indicate whether their lives are actually *good*, or as good as they could be. Nussbaum provides examples of women who previously accepted marital abuse, wage discrimination, and other evils, but who began to fight against them after being introduced to the notion that these ills were a violation of rights and of justice (ibid., 112-113). In summary, then, existing approaches to human development do not accurately gauge the situation of women in developing countries. Nussbaum aims to address this problem by devising a novel set of criteria for measuring human development.

More importantly than measuring social, political, and economic inequities, however, Nussbaum also hopes to construct a set of normative principles that we can use to combat them (ibid., 6). In particular, she offers “an account of basic constitutional principles” as to the minimum social and political abilities that governments must provide for if they are to guarantee their citizens fully human lives. Put differently, Nussbaum wants to put forth a normative framework that governments can use to write laws, discuss rights, structure governmental bodies, and set goals as to providing individual citizens with a minimum level of human functioning (ibid., 4-5).

In order to solve these two problems – that of measuring gender inequality and that of ameliorating it – Nussbaum advocates a focus on human capabilities, that is, “what people are actually able to do and to be” (ibid., 5). In particular, Nussbaum identifies a list of ten *central human capabilities* – ten concrete physical, mental, social, and political abilities – that she believes are characteristic of, and essential to, human life as we know it (ibid., 5, 71-72). We can use this list or lists like it to gauge the quality of women’s lives in developing countries. For example, we may ask whether women in a particular country have opportunities for play, employment, self-expression, or social interaction (ibid., 78-80). To the extent that we can answer “yes” for each of these capabilities, we can say that women in the country are able to live fully human lives. Furthermore, we can use Nussbaum’s list of capabilities to set political goals. Nussbaum introduces the concept of a “*threshold*

level of each capability, beneath which it is held that truly human functioning is not available” (ibid., 6).

In other words, truly human functioning requires some minimum level of ability or opportunity for each capability. According to Nussbaum, our political goals with respect to women in developing countries (or, better yet, the goals of the governments of those countries) should be ensuring that each individual meets or exceeds the threshold level for each capability (ibid., 5-6).

Here is Nussbaum’s exact list of central human capabilities:

1. **Life.** Being able to live to the end of a human life of normal length; not dying prematurely, or before one’s life is so reduced as to be not worth living.
2. **Bodily Health.** Being able to have good health, including reproductive health; to be adequately nourished; to have adequate shelter.
3. **Bodily Integrity.** Being able to move freely from place to place; having one’s bodily boundaries treated as sovereign, i.e. being able to be secure against assault, including sexual assault, child sexual abuse, and domestic violence; having opportunities for sexual satisfaction and for choice in matters of reproduction.
4. **Senses, Imagination, and Thought.** Being able to use the senses, to imagine, think, and reason – and to do these things in a ‘truly human’ way, a way informed and cultivated by an adequate education, including, but by no means limited to, literacy and basic mathematical and scientific training. Being able to use imagination and thought in connection with experiencing and producing self-expressive works and events of one’s own choice, religious, literary, musical, and so forth. Being able to use one’s mind in ways protected by guarantees of freedom of expression with respect to both political and artistic speech, and freedom of religious exercise. Being able to search for the ultimate meaning in life in one’s own way. Being able to have pleasurable experiences, and to avoid non-necessary pain.
5. **Emotions.** Being able to have attachments to things and people outside ourselves; to love those who love and care for us, to grieve at their absence; in general, to love, to grieve, to experience longing, gratitude, and justified anger. Not having one’s emotional development blighted by overwhelming fear and anxiety, or by traumatic events of abuse or neglect. (Supporting this capability means supporting forms of human association that can be shown to be crucial in their development.)
6. **Practical Reason.** Being able to form a conception of the good and to engage in critical reflection about the planning of one’s life. (This entails protection for the liberty of conscience.)
7. **Affiliation. A.** Being able to live with and toward others, to recognize and show concern for other human beings, to engage in various forms of social interaction; to have the capability for both justice and friendship. (Protecting this capability means protecting institutions that constitute and nourish such forms of affiliation, and also protecting the freedom of assembly and political speech.)
B. Having the social bases of self-respect and non-humiliation; being able to be treated as a dignified being whose worth is equal to that of others. This entails, at a minimum, protections against discrimination on the basis of race, sex, sexual orientation, religion, caste, ethnicity, or national origin. In work, being able to work as a human being, exercising practical reason and entering into

meaningful relationships of mutual recognition with other workers.

8. **Other Species.** Being able to live with concern for and in relation to animals, plants, and the world of nature.

9. **Play.** Being able to laugh, to play, to enjoy recreational activities.

10. **Control over One's Environment. A. Political.** Being able to participate effectively in political choices that govern one's life; having the right of political participation, protections of free speech and association.

B. Material. Being able to hold property (both land and movable goods), not just formally but in terms of real opportunity; and having property rights on an equal basis with others; having the right to seek employment on an equal basis with others; having the freedom from unwarranted search and seizure (ibid., 78-80).

There are a couple of key aspects of this list that I would like to highlight. First, it is immediately apparent that each of Nussbaum's ten capabilities involves several component capabilities, or sub-capabilities. In fact, this list contains roughly 50 sub-capabilities.¹ I am not sure whether Nussbaum means for these precise sub-capabilities to *constitute* the major ten capabilities, or whether she means for them merely to illustrate how each of the major capabilities could be interpreted. For my purposes, though, the answer is not entirely important. We will be satisfied to notice simply that each of Nussbaum's ten central human capabilities has complex and multiform foundations. In other words, the central human capabilities are not basic, unanalyzable, atomic parts of human nature. Rather, they are relatively high-level or apex abilities, each supported by certain lower-level capabilities and environmental conditions.

Second, Nussbaum points out that the capabilities are interrelated and often partly dependent on one another. To illustrate,

One of the most effective ways of promoting women's control over the environment [#10], and their effective right of political participation, is to promote women's literacy [#4]. Women who can seek employment outside the home [#7B, #10B] have exit options that help them protect their bodily integrity from assaults within it [#3] (ibid., 81).

Thus, the capabilities are not mutually exclusive, but rather intricately overlapping and causally related. Nonetheless, Nussbaum emphasizes that we cannot compensate for a dearth in one capability by enhancing a different one, nor should we sacrifice one capability for the sake of

another. “All of [the capabilities listed] are of central importance,” she asserts, “and all are distinct in quality”; therefore, “we cannot satisfy the need for one of them by giving a larger amount of another one” (ibid., 81). In other words, each of the capabilities are uniquely valuable in themselves – their values are non-commensurable. Accordingly, it would be inappropriate to sacrifice political participation for, say, increased longevity or safety. Similarly, we would be wasting our efforts if we tried to compensate for a lack of literacy education by increasing opportunities to play sports. Paradoxically, then, the central human capabilities are overlapping and interrelated, yet each uniquely valuable in themselves.

Third, Nussbaum stresses that her list of capabilities is not the only such list possible. On the contrary, the precise list of capabilities she puts forth is simply the best list she has conceived so far based on her own experiences, reflections, and “cross-cultural discussion[s]” (ibid., 76). She encourages us to consider the list for ourselves, to test it against our beliefs and intuitions, and to debate it with others. “In this sense,” she affirms, “the list remains open-ended and humble; it can always be contested and remade” (ibid., 77). Thus, Nussbaum’s precise list of capabilities is not the be-all and end-all, but rather a *starting point* for philosophical, political, and community discourse.³¹

Moreover, once we have settled upon a list of capabilities, Nussbaum envisions that we will need to engage in a second process of debate and reflection in order to actually implement them. Since “central human capabilities” are supposed to be general enough to play a central role in any human life, they will be *too general* to be justiciable or politically effective unless we provide additional detail as to (1) what each capability amounts to in practice, (2) what the threshold level of

³¹ Of course, some of the capabilities will seem “more [or less] fixed than others” (ibid., 77). In other words, Nussbaum predicts that the capabilities in her list will garner varying degrees of consensus. Nonetheless, she wagers, some of the capabilities in the list presumably will win widespread support. “... it would be astonishing,” she illustrates, “if the right to bodily integrity were to be removed from the list; that seems to be a fixed point in our considered judgments of goodness” (ibid., 77). Thus, although Nussbaum’s list of capabilities is flexible, it is not likely to be *completely vacated* upon examination; therefore, the list gives substantial political recommendations without being pushy.

performance is, (3) how exactly we should measure performance, and (4) what role government, corporations, and private individuals have in ensuring the capability (ibid., 77). It is not enough, in other words, to say merely that the government will provide for “basic mathematical and scientific training” (ibid., 79). Rather, we must specify who will provide the training, when they will provide it, who will fund it, who will receive it, what it will consist in, what it means to receive a “threshold level” of math and science education, etc.

Nussbaum acknowledges that different people and societies will interpret the capabilities differently, depending on differences in “individual tastes, local circumstances, and traditions” (ibid., 105). For instance, a community of Buddhist monks may interpret human affiliation and social interaction (see Nussbaum’s capability #7) much differently than, say, taxi drivers in Melbourne, rural Guatemalan villagers, or families in urban Tokyo. As such, Nussbaum leaves to individuals, communities, and societies to figure out how exactly to implement each capability in the list:

... items on the list are to some extent differently constructed by different societies. Indeed, part of the idea of the list is its *multiple realizability*: its members can be more concretely specified in accordance with local beliefs and circumstances. It is thus designed to leave room for a reasonable pluralism in specification (ibid., 77).

Thus, the capabilities approach is flexible and open-ended, adaptable to different cultural norms, material circumstances, and environments. This practical flexibility and adaptability, the so-called “multiple realizability” of the capabilities approach, fits Nussbaum’s goal of providing normative principles that (a) give substantial recommendations as to how to provide people in developing countries with a minimum standard of living, yet (b) remain sensitive to cultural differences (ibid., 34-35).

Fourth, in the same spirit of pluralism and multiculturalism, Nussbaum points out that “capabilities” are *opportunities* to perform certain human functions – not the actual performance of those functions. As such, the capabilities approach seeks to provide each individual with the social, political, and economic foundations for truly human functioning, but it does not seek to force

anyone to adhere to any particular manner of functioning, nor even to take advantage of opportunities for functioning (ibid., 87). “Where adult citizens are concerned,” Nussbaum reiterates,

capability, not functioning, is the appropriate political goal. This is so because of the very great importance the approach attaches to practical reason, as a good that both suffuses all the other functions, making them human rather than animal, and figures itself as a central function on the list. It is perfectly true that functionings, not simply capabilities, are what render a life fully human, in the sense that if there were no functioning of any kind in a life, we could hardly applaud it, no matter what opportunities it contained. Nonetheless, for political purposes it is appropriate that we shoot for capabilities, and those alone. Citizens must be left free to determine their own course after that. The person with plenty of food may always choose to fast, but there is a great difference between fasting and starving, and it is this difference that I wish to capture (ibid., 87).

Thus, the actual manifestation of the central human capabilities – e.g., *using* one’s senses and imagination, *having* loving relationships, *being* healthy and well nourished – is what makes a life fully human. Put differently, living a fully human life requires more than merely having the capability to function; on the contrary, it requires acting these functions out. Despite this fact, Nussbaum does not advocate forcing people to perform any particular function, because her approach places a special premium on individual choice and practical reason:³² being able to reflect on and choose our actions, she claims, is a key aspect of what makes a life truly human (ibid., 82-83). Accordingly, we do not want to tell a person that they *have* to eat, sleep, perform fulfilling work, spend time with friends, etc., if they do not want to. The best that governing bodies can do is to provide sociopolitical conditions that allow people opportunities to perform central human functions, and let people take or leave these opportunities as they see fit.

In order to clarify what responsibility she believes governments have in ensuring that each citizen meets a threshold level of capability, Nussbaum enumerates three different kinds of capabilities: basic capabilities, internal capabilities, and combined capabilities. *Basic capabilities* are the “innate equipment” required to perform central human functions (ibid., 84). In essence, we have

³² As I understand, Nussbaum uses the term *practical reason* broadly to refer to any critical reflection about how we should act or what kind of life we want to live (Nussbaum 2000, 79). Although Nussbaum cites Kant’s philosophy as an inspiration, she does not seem use the term “practical reason” in the more restricted Kantian sense.

basic capabilities for functioning simply by dint of having a working human body. These basic capabilities make it physically possible for us to perform human functions, either right now or someday in the future. “[Basic] capabilities are sometimes more or less ready to function,” Nussbaum expands. “The capability for seeing and hearing is usually like this. More often, however, they are very rudimentary, and cannot be directly converted into functioning. A newborn child has, in this sense, the capability for speech and language, the capability for love and gratitude, the capability for practical reason” (ibid., 84). Thus, having the “basic capability” for language does not necessarily mean that we can actually speak. It means that we have the kind of brain such that it is physically *possible* for us to speak, and moreover that we *will* speak given the right kinds of experiences – e.g., hearing others speak during our early childhood. To use a metaphor, we can think of basic capabilities as seeds that can grow into the ability to perform central human functions. Newborn humans have the basic capability for speech; rabbits do not.

Internal capabilities, on the other hand, are the actual physical ability to perform central human functions: e.g., the ability to speak if one wants to, the ability to have friends if one so chooses, the ability to perform work if one decides to work (ibid., 84-85). In Nussbaum’s words, internal capabilities are

developed states of the person herself that are, so far as the person herself is concerned, sufficient conditions for the exercise of the requisite functions. Unlike the basic capabilities, these states are mature conditions of readiness (ibid., 84).

Internal capabilities may develop from basic capabilities simply by the individual’s getting older. For example, people generally acquire the internal bases of reproductive functioning when they grow through puberty (ibid., 84). Other internal capabilities, such as the ability to express oneself freely in words, art, and music, may develop only by practicing the corresponding function; without adequate practice, the basic capability to perform these functions may not blossom into an *internal* capability (ibid., 84).

Combined capabilities consist of (1) the internal capability to perform a particular function *and* (2) the sociopolitical conditions necessary to perform it (ibid., 84-85). As Nussbaum illustrates,

A woman who is not mutilated but who has been widowed as a child and is forbidden to make another marriage has the internal but not the combined capability for sexual expression (ibid., 85).

Thus, combined capabilities require both that people are physically able to perform the associated functions, and that they have the social and legal ability and the economic wherewithal to do so. Nussbaum's list of central human capabilities is a list of combined capabilities (ibid., 85). In order to realize each of the central human capabilities, then, people need (1) to have had the right kinds of developmental experiences, and (2) to have presently the right kind of social and political environment (ibid., 85). According to the capabilities approach, governments have a clear responsibility to ensure a sociopolitical environment appropriate to the exercise of central human functions – for example, by passing and interpreting legislation that supports central capabilities, enforcing laws, providing all adult citizens the opportunity for political participation, providing primary and secondary education, etc. However, it is less clear what responsibility governments have to provide the developmental experiences necessary to turn people's basic capabilities for functioning into internal capabilities. Whether people develop certain internal capabilities, Nussbaum notes, depends partly on natural luck (ibid., 89). For instance, some people with profound mental disabilities may never be able to fully exercise practical reason or literacy, no matter what their sociopolitical environment. Some people's lives might get cut short by a lightning strike, a tornado, or a stroke. As such, governments cannot fully guarantee that each citizen has all the internal capabilities necessary for the exercise of central human functions. But they can guarantee the *social bases* of these internal capabilities (ibid., 89). For example, governments cannot control whether some people are born with dyslexia; but they can provide programs that help dyslexic people learn how to read better. Governments cannot control which of their citizens are artistically gifted; but they can provide resources, leisure time, and educational institutions that will allow

people to practice reading and writing literature, playing musical instruments, and making art. So governments have a duty to provide social, political, and economic conditions favorable to the exercise of central human capabilities, but they cannot guarantee on a case-by-case basis that each person will meet the threshold level for all capabilities.

Fifth, although Nussbaum has built the capabilities approach with the situation of women in developing countries especially in mind, she means for the approach to apply to everyone. The capabilities approach is a universal theory of distributive justice (ibid., xiii-xiv, 7). Accordingly, Nussbaum hopes for her list of central capabilities to be “an object of *overlapping consensus* among people who otherwise have very different comprehensive conceptions of the good” (ibid., 5). Put differently, Nussbaum means to make her capabilities list such that anyone, or almost anyone, would value the items in it, regardless of what their *overall* conception of the good is like. She might hope, for example, that her list of capabilities could generate agreement among elderly people in retirement homes, coal miners, single mothers, Neo-Luddites, and professional basketball players.

As we have seen, Nussbaum’s claim for the universality of the capabilities approach rests largely on a conception that she calls “truly human life,” “fully human life,” or a life “worthy of the dignity of a human being” (Nussbaum 2000, 71-73). Indeed, this notion of a “truly human life” is the normative foundation of the capabilities approach. According to Nussbaum, the idea of *truly human life* has two main conceptual components. (1) Some functions, such as communicating with others through language, are so central to human life that “their presence or absence is typically understood to be a mark of the presence or absence of human life” (ibid., 71-72). In other words, these central functions are *characteristic* of human beings: they are what render a life human, what we recognize when we recognize the humanity in others. (2) Moreover, there is a “truly human,” as

opposed to a “merely animal,” way to perform each of these functions (ibid., 72).³³ In particular, to perform these central functions in a human way means to perform them in “a way infused by practical reasoning and sociability” (ibid., 72): that is, through reflection, consideration, choice, cooperation, and mindfulness of others.

In order to clarify the distinction between truly human functioning and merely animal functioning, Nussbaum mentions an example of Marx’s that contrasts the eating of a starving person with the eating of a person who is not starving. The person who is not starving can choose what she wants to eat, when to eat it, and who to eat it with. She can eat with manners appropriate to her society – e.g., in the United States, eating off of a plate, on a table, with silverware. The starving person, on the other hand, cannot always choose when or what to eat or who to eat with, nor does she always have the chance to eat in a sociable way: “... she just grabs at the good in order to survive, and the many social and rational ingredients of human feeding can’t make their appearance” (ibid., 72). What separates human functioning from animal functioning, then, is the ability to consider and reflect on possible courses of action, weigh them against our values and preferences, act according to our choices, and cooperate freely with others. Living a *truly human life* means being able to perform central human functions in this characteristically human manner.

In the following section, I use Nussbaum’s capability approach as a template for constructing my account of “health.” Briefly, I believe that “health” consists in having the bodily capability to perform certain activities: in particular, “health” is being able to use one’s body to perform all the activities necessary for a truly human life. By contrast to Boorse (1977), then, my account of “health” is normative, since it begins with this notion of truly human life. In further

³³ Here, I mean for “animal” to refer to nonhuman animals, as Nussbaum uses the word in *Women and Human Development*. Nussbaum carries on this linguistic tic from the Marxist tradition; the word “animal,” I think, is supposed to evoke connotations of squalor, mindlessness, and desperation, much like that of chickens packed together in an industrial farm, forced to walk around in their own feces.

contrast to Boorse, I argue that “health” is a constellation of capabilities for action, rather than a physiological state.

3. Health as Capability

As we have discussed, Nussbaum claims that living a truly human life involves having a minimum level of capability for each central human function, e.g., the ability to plan and shape our own lives, to use our imagination, to have friends. Along similar lines, I want to claim that “health” involves having a minimum level of capability for certain body-dependent activities: e.g., getting from one place to another, communicating with language, obtaining nourishment.

I think of my account of “health” as the bodily, as opposed to the sociopolitical, basis for the central human capabilities. According to my account, “health” is what you can do with your body. And what you can do with your body depends, in turn, on (1) the body itself, and (2) the body’s physical surroundings. As Ron Amundson points out (2000; see Chapter I, Section 3.3), what people can do with their bodies depends on what kinds of tools are available to them and what kinds of features are in their built environment (Amundson 2000, 45-48). As Amundson encapsulates pithily, “Given the appropriate technology and environment, blind people can read and paralyzed people can be mobile,” e.g., with braille and wheelchairs, respectively (ibid., 47). If “health” is what you can do with your body, and if what you can do with your body depends partly on your built environment and the technology available to you, then health must depend not only on factors internal to your body, but also on the devices at your disposal – wheelchairs, pacemakers, dialysis machines – and your surroundings – whether buildings are wheelchair-accessible, whether the air is clean or polluted, whether libraries have books in braille. Thus, whereas Nussbaum’s central human capabilities encompass many of the sociopolitical aspects of human activity – e.g., freedom of

speech and association, access to employment opportunities (Nussbaum 2000, 78-80) – my central bodily capabilities, or *basic bodily capabilities*, will encompass the human body and its physical surroundings.³⁴

Now that I have given a brief overview of how my account of “health” derives from and relates to Nussbaum’s capability approach, I will present my most current list of basic bodily capabilities. In parallel to Nussbaum’s capabilities list, I consider these items valuable both in themselves and for what they allow us to do. (Below, I will discuss how basic bodily capabilities contribute to higher-level conscious goals and the pursuit of comprehensive conceptions of the good.) Happily, this view accords with the common intuition that health is valuable both in itself and for what it allows us to accomplish besides. Moreover, I believe that each item on the list has *distinctive* value: as with Nussbaum’s capabilities, we cannot make up for a dearth in one basic bodily capability by fortifying a different one. At the same time, however – and as we shall see – these capabilities may overlap or contribute to one another.

Here is the list of basic bodily capabilities that I believe are constitutive of health:

- (1) **Lifespan:** Being able to live a life of a normal length.
- (2) **Breathing.** Being able to get oxygen and expel carbon dioxide by breathing.
- (3) **Nourishment:** Being able to get nourishment from food and water.
- (4) **Sleep:** Being able to rest from sleep.

³⁴ We often think of healthcare as confined to what happens in hospitals, doctor’s offices, and physical therapy clinics. But Amundson’s observations about the inextricable connection between technology, environment, and capability, combined with my claim that health *is* capability, suggest that healthcare may be far more general a concern than we think. According to this view, many central aspects of health depend, in addition to doctors, nurses, dental hygienists, dentists, and other classical healthcare professionals, on the decisions of people who design technology and the built environment: politicians, architects, urban planners, civil engineers, ergonomics researchers, conservationists, bureaucrats, and public health officials. “Health” is what we can do with our bodies, but what we can do with our bodies depends, perhaps paradoxically, on factors far beyond the scope of our bodies. The failure to realize this fact contributes to the “hospital view” of healthcare mentioned in the first sentence of this footnote.

- (5) **Bodily control:** Being able to control the movement of skeletal muscles; having awareness of body position in space.
- (6) **Self-defense:** Being able to defend oneself from threats, both large (e.g., tornado, bear) and small (e.g., virus, bacterium).
- (7) **Locomotion:** Being able to move from one place to another.
- (8) **Sensation:** Being able to sense the external environment and its effects on the body: namely, heat, cold, mechanical stress, pain, the presence of nearby objects, and what those nearby objects are doing.
- (9) **Object recognition:** Being able to recognize objects in environment and their spatial relationships.
- (10) **Object relationships:** Being able to recognize how objects relate to oneself and one's goals.
- (11) **Object manipulation:** Being able to manipulate physical objects to change their position and orientation in space.
- (12) **Humean reasoning:**³⁵ Being able to recognize patterns, reason inductively, form generalizations, and anticipate future events based on these generalizations.
- (13) **Episodic memory:** Being able to remember events, facts, people, and places.
- (14) **Procedural memory:** Being able to acquire new skills.
- (15) **Imagination:** Being able to think hypothetically about alternative states of affairs: i.e., things that are not yet true but could be in the future (e.g., an invention), or things that could never be true in fact but could be true in principle (e.g., if the laws of physics were different than they are, if you had played junior college baseball back in 1979).

³⁵ Not a typo: "Humean" means that proposed by David Hume in his "An Enquiry Concerning Human Understanding" (1748).

- (16) **Planning:** Being able to chart future actions according to anticipated state of affairs.
- (17) **Emotion:** Being able to experience a full range of human emotions.
- (18) **Attachment:** Being able to form attachments with other people.
- (19) **Communication:** Being able to communicate with other people using language.
- (20) **Empathy:** Being able to understand other people's point of view.
- (21) **Coordination:** Being able to coordinate and sync activity with other people.
- (22) **Reproduction:** Being able to reproduce, if one so desires.
- (23) **Motivation:** Being able to want for certain states of affairs to attain, to be *towards* something.*
- (24) **Coherence:** Being able to act for reasons.*
- (25) **Satisfaction:** Being able to feel satisfied when a goal is attained.*

Thus, I have attempted to break Nussbaum's central human capabilities into smaller, more basic bodily abilities. "Health" consists in having a threshold level of capability for each of these 25 basic bodily capabilities. A "disease," on the other hand, is any failure to meet the threshold level for one or more of these basic bodily capabilities. There are several comments I would like to make about the list.

I mean for the capabilities in my list to be *multiply realizable*, just as are Nussbaum's central human capabilities and Amundson's basic personal abilities. That is to say, each basic bodily capability can be performed in one of several different ways. Following Amundson, I call these different ways of performing a basic bodily capability *modes of function* (Amundson 2000, 36).

To illustrate a couple of different modes of function for some of the capabilities, we can communicate with language by speaking and listening, using sign language, or reading and writing. We can reproduce by having sex or by *in vitro* fertilization. We can sense details about our environment by seeing, hearing, touching, or even by feeling vibrations. We can get around by

walking unassisted, walking with a walker, or using a wheelchair. We can form attachments with other people in inconceivable many and diverse ways. We can defend ourselves from “large scale” threats by using judo, wielding a gun, wielding a bat, running away, hiding, or avoiding dangerous situations altogether. We can defend ourselves from microscopic threats by initiating an immune response, washing our hands, or taking antibiotic medications. Some people feel well rested after only six hours of sleep, whereas others need nine or ten hours.

An individual is healthy with respect to a particular capability if she meets the threshold level for that capability, regardless of the mode of function she uses to meet the threshold. In other words, it does not matter how a person fulfills each capability – i.e., what mode of function she uses – as long as she meets the *threshold level* of capability. (I leave to healthcare institutions and members of society to determine what the threshold level is for each capability; see below). As such, a person who gets around by walking is no healthier, as far as locomotion goes, than a person who gets around using a wheelchair. On the other hand, a person who cannot get around self-sufficiently *in any way* is not healthy. To give another example, a deaf person who communicates via sign language is no less healthy, as far as communication goes, than a hearing person who talks and listens; yet a person that cannot use any form of language is not healthy. A person with depression who augments her motivation with antidepressant drugs is no less healthy, as far as motivation goes, than a person who is motivated without antidepressants, given that their levels of motivation are comparable. But a person with depression who seeks no treatment at all is *not* healthy, because presumably her levels of motivation fall below the conventional threshold. A person who senses the environment primarily using tactile sensation (e.g., Helen Keller) is no less healthy, as far as sensation goes, than a person who senses the environment primarily by seeing and hearing. But a person who cannot sense the environment at all is not healthy. In short, an individual’s body falls short of health when it

cannot perform certain characteristically human abilities. For each of these abilities, what matters is not the *mode of function, per se*, but the *level of function* (Amundson 2000, 48).

Some of the items on the list appear to have more room for variety than others. For example, there may be an innumerable number of ways to form attachments with other people, but there do not seem to be as many alternative ways to breathe. Perhaps one can breathe with the assistance of a nebulizer, oxygenator, or iron lung. For other items yet – e.g., object recognition, emotion, interpersonal coordination – it seems like there *could* be a plethora of different modes of functioning, but I cannot say for certain, because we do not yet have a complete understanding of how the brain gives rise to mental phenomena.

As with Nussbaum's list of central human capabilities, moreover, some of the items on the list "may seem to us more fixed than others" (Nussbaum 2000, 77). For example, the ability to breathe, and the ability to get nourishment from food and water, seem like they would be part of any conceivable list of basic bodily capabilities. But some people might object, for instance, that imagination and empathy are not part of what it means to be "healthy," however important these capabilities may be. Following Nussbaum, I leave the exact list of capabilities open to debate and interpretation. I leave the implementation of the capabilities approach – that is, determining which modes of performing each capability are healthy, what is the threshold level of capability required for health, in what kinds of situations this threshold level applies, etc. – to healthcare institutions, governing bodies, and individual citizens.

Thus, I do not consider my list the last word on basic bodily capabilities. Rather, this list is simply the best that I have yet been able to come up with. The content of the list is partly contingent upon my own experiences regarding health and healthcare, which include (1) being a patient and introspecting about my own experiences; (2) observing the lives and healthcare experiences of friends and family; (3) reading the philosophy of medicine literature, especially on the content of the

terms “health” and “disease” (see, e.g., Chapters I of this thesis); (4) taking undergraduate-level coursework in biology, neuroscience, anthropology, cognitive science, public health, and philosophy of science; (4) volunteering in an emergency room for several summers; (5) shadowing physicians, nurses, and phlebotomists; and (6) talking about health and healthcare with medical and nursing students, hospital residents, and healthcare professionals.³⁶ Ultimately, I hope for this list to spark debate – most immediately among philosophers, but perhaps someday among clinicians, laypersons, policymakers and others – about which capabilities are central parts of “health” and which are not.

Aside from the life experiences I have mentioned above, I have also turned to a handful of academic sources for guidance in constructing the list. In particular, I have read about infant development and the accumulation of bodily capabilities that takes place in infancy and early childhood (Muir and Slater 2000, Kail and Cavanaugh 2000). Infant development is especially informative in thinking about human capabilities because infants begin life with virtually *no* capabilities, yet over a span of a few years they develop many adult capabilities one-by-one. Because the acquisition of these capabilities is staggered in time – here the infant learns how to walk, there the infant learns how to talk – it is easier to discriminate the capabilities from one another. (Adults, on the other hand, often integrate their capabilities with such mastery that it is difficult to discern distinct capabilities.)

As I have discussed in the Introduction, *goals* and *purposes* have a central role in my account of “health.” Each individual’s goals and purposes are what ultimately endow the other items on the list with value. Having personal goals and projects, having ideals and values towards which one strives, are what make life worth living, *what make anything worth doing*. Since “health” is that which

³⁶ Special thanks to Harsha P. Jayatilake, Ali Y. Saad, Phyllis M. Boniface, David Schrock, Eli Cornblath, Matt Thimm, and Jennifer Feutz.

enables us to use our bodies to do the things we want to do, and since purposes are what make these activities worthwhile, purposes are what make health worth having.

Accordingly, I have added asterisks to the final three items on the list – motivation, coherence, satisfaction – which I see as especially important to creating and pursuing purpose in one’s life. In order to have reasons for living, we first have to *want* or *desire* something. Motivation is, in a sense, the driving force behind purpose. For example, it would be absurd to say that *learning* is my purpose in life if I never, on any level, had wanted to learn. It would be senseless to say that *caring for my brothers* is my purpose if I had no motivation to do so.

Coherence, as I use the term, refers to the ability to act for reasons, to act coherently. *Satisfaction* refers to feeling fulfilled, accomplished, content, or cathartic upon the achievement of one’s goals. In other words, it is the internal *end* or *telos* to our pursuit of goals.³⁷ Although I do not understand why, it seems that anticipated psychological reward is ultimately what drives us to do anything. Thus, the inability to feel pleasure or satisfaction upon fulfilling our goals is a serious problem with *health*, because it erodes our motivation, thereby eroding our purposes in life, and in turn demolishing any reason for us to be alive and healthy in the first place.³⁸

These three “purpose-related capabilities,” motivation, coherence, and satisfaction, are perhaps the most controversial inclusions on my list of basic bodily capabilities. It may be counterintuitive that the ability *to want, to desire, and to feel satisfied* is just as much a part of “health” as

³⁷ Whereas the “external” *telos* of our goals is the fulfillment of the state of affairs or “state of the world” that we seek to make true – e.g., providing aid to tsunami victims, completing a public works project, having a happy marriage, being the richest and most feared cocaine dealer in all of LA – the “internal” *telos* of these activities is invariably some kind of satisfaction or psychological reward. This satisfaction can come with any of a range of emotions, from vengeance to elation to relaxation to satiation to conscientiousness to sexual pleasure to pious awe to arrogance to completion or finality.

³⁸ This assertion explains why a person with depression might commit suicide. If she feels no satisfaction from performing activities she normally enjoys, if she gets no psychological reward from achieving her goals, then she loses her motivation. If she loses her motivation, then she loses her purpose, and so, by definition, she loses her reasons for living. This line of reasoning supports the seemingly paradoxical notion that suicide can be simultaneously (1) rational and (2) the result of mental illness.

the ability to breathe and obtain nourishment. But I hope that I have shown how these bodily prerequisites of purpose give meaning and value to all the other items in the list. Without reason for living, there is no reason why anyone would want to breathe or eat in the first place. In a manner of speaking, then, the axis of desire-motivation-satisfaction-purpose is the motor that pulls health along.

In the following subsection, I address advantages of using basic body capabilities as goals for treatment.

3.1. Basic Bodily Capabilities as Targets for Treatment

As I have discussed in Chapters I and II, Christopher Boorse claims that “health” consists in statistically normal contributions to survival and reproduction by all the body’s parts and processes (Boorse 1977, 555). But individual survival and reproduction are too abstract as biological goals – too close to the apex in the hierarchy of biological goals, too far removed from biological goals at the levels of the molecular, cellular, and physiological – to provide sensible foci for medical treatment.

(By the term “biological goals” I mean any goal-directed activity that is performed by, or that occurs within, a living organism. I borrow Boorse’s conception of *goal-directedness*:

To say that an action or process A is directed to the goal G is to say not only that A is what is required for G , but also that within some range of environmental variation A would have been modified in whatever way was required for G (Boorse 1976, 78).³⁹

So *biological goals* include unconscious goals, such as the pancreas’s maintaining a stable level of blood glucose, or a bacterium’s directedness towards higher concentrations of a particular nutrient, as well as the conscious goals I have discussed above, e.g., striving to be the President of

³⁹ For a more detailed explication of this definition, see Chapter I, Section 1.

the US. I share Boorse's view that living organisms are "centers of activity... objectively directed at various goals" (ibid., 79) – in other words, that organisms consist of complex, integrated, multilayered, hierarchical systems of goal-directed processes.)

Where individual S & R is too abstract to be useful in clinical practice, statistically normal physiology is too specific, too fine-grained (Boorse 1977, 558-561). As Amundson (2000) demonstrates, there are numerous different yet equally healthy ways for a person to function in the world. Each of these different modes of functioning involves different sets of physiological occurrences – e.g., using a wheelchair requires the use of different muscles and neuromuscular connections than does walking – and different sets of physiological makeups – e.g., deaf people who use sign language have different ear and brain physiology than people who speak and listen. Thus, Boorse's concept of "health" as statistically normal physiology does not account for the full range of healthy physiological variation (see Chapter I, Sections 3.2.1 and 3.3).

Replacing individual S & R with basic bodily capabilities solves these problems of organizational hierarchy. Activities such as breathing, obtaining food and nourishment, recognizing objects in one's surroundings, and experiencing a full range of emotions are concrete and everyday. We use them frequently and centrally in our daily lives, and so they are more familiar and immediate than individual S & R. Moreover, it is easier to predict how changes at the physiological level will affect these concrete capabilities than it is to predict how they will affect individual S & R. The latter calculation may depend on long-range interactions among physiological variables, contingent life events, and apparently unrelated aspects of physiology and environment. (For example, how accurately can we really calculate the effect of contracting strep throat on my longevity and reproductive chances?) The former, on the other hand, would tend to require less calculation. Bodily capabilities are related more directly than individual S & R to occurrences at the level of cells, molecules, and physiology. For example, it may be difficult to see how sleep apnea will affect my

survival and reproduction, but it is not difficult to see how the condition will affect my breathing and sleep. By making “health” a matter of *contributions to basic bodily capabilities*, rather than contributions to individual S & R, we can focus medical treatment on a level in the hierarchy of biological goals that is easier to think about, easier to work with, and more familiar.

Defining “health” in terms of basic bodily capabilities also allows us to call a wider range of physiological makeups “healthy.” Whereas Boorse reserves the designation of “health” exclusively for people whose physiology falls within narrow vicinity of statistical normality, my account allows for a more inclusive range of healthy physiological variation. This aspect of my account accommodates Amundson’s intuition that different modes of functioning and different physiological makeups work better for different people (Amundson 2000, 50).

Furthermore, by making “health” relative to these concrete capabilities, rather than technical details about physiology – e.g., “blood plasma concentration of cortisol” – we can lessen the exploitative potential of the intellectual monopoly that our healthcare institutions hold. One way that healthcare institutions could take advantage of patients (if they do not do so already) is by using medical jargon to restrict the awareness patients have of their own bodily conditions. Esoteric terms such as *myocardial infarction* or *bilateral avascular necrosis*, for example, mean nothing to laypersons. As such, when clinicians talk to one another with these technical terms, they shut most patients out of their discourse, intentionally or not. Although redefining “health” in terms of basic bodily capabilities will not eliminate the use of medical jargon – after all, every profession has a technical vocabulary – it may help combat it by encouraging talk of health in familiar terms like “breathing,” “eating,” “imagination,” and “ability to plan.”⁴⁰

⁴⁰ I am not advocating that healthcare professionals throw away their technical terms, or that they “dumb down” the technical terms of medicine to accommodate non-experts. I am advocating that clinicians add talk about concrete capabilities to their professional vocabulary.

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Conclusion

Future Directions for Research

Due to time constraints, I was not able to develop this thesis as fully as I had originally hoped. In this final section, I will briefly note some of the areas in which I had hoped to extend the capabilities approach to health. These lines of inquiry may be potential avenues for future research into the capabilities approach to health.

1. Statistical Normality and Reference Class

In Chapter I, Section 3.1, I discussed some of the problems with the Biostatistical Theory's *reference classes* – that is, the group of organisms to which we compare an individual when we want to find out whether or not it is healthy. I propose that we think about reference classes not in terms of whole organisms, as Boorse (1977) advocates, but rather in terms of *capabilities*. Each of the basic bodily capabilities encompasses its own set of reference classes. Each reference class for a given capability corresponds to a particular manner of fulfilling that capability: or, in Amundson's words, a particular “mode of function” (Amundson 2000, 36).

For example, there are several modes of performing the capability of *locomotion*: walking, using a wheelchair, walking with a cane, etc. Each of these modes of locomotion corresponds to a reference class. The reference class for a given mode of fulfilling a capability will encompass all and only those parts of the body involved in executing the capability.

Thus, for each of the twenty-five basic bodily capabilities, each person inhabits one mode of function, i.e., one reference class.

Furthermore, we can think of each reference class as a causal-role system in the style of Robert Cummins (1975) – referred to colloquially as a “Cummins system.” In essence, a Cummins-style systemic explanation diagrams how the behaviors of the individual parts of a system interact to produce the behavior of the system as a whole. For each of these reference classes, the parts of the body that contribute to a particular mode of functioning are the system parts in the Cummins system, and the performance of the capability is the system behavior. Defining reference classes as different Cummins systems that contribute to the performance of a capability lends technical content to Amundson’s notion of *mode of function*.

In healthcare practice, I envision that clinicians would consider only a finite number of reference classes for each capability. As such, each patient would necessarily get “binned” or “pigeonholed” into one of the most common reference classes for a given capability. By pigeonholing people, we might overlook some of the nuanced aspects of their physiology that are not encompassed by any of the major reference classes for a particular capability. This perhaps non-ideal practice is not necessary to my theory, nor is it an inevitability of healthcare, *per se*. But it would be practically useful to clinicians.

Of course, it would be nice if we could practice individualized medicine on each patient; however, this vision of healthcare will not be feasible in the near future. Clinicians need to be able to make generalizations about modes of function so that they can make *generalizations about treatment*. Each patient isn’t a completely new and unique being with completely new treatment needs. People are generally similar enough, by and large, that doctors can gain wisdom and knowledge about treatment and generalize over populations. This generalization makes treatment way faster and more efficient than if each patient were a complete case study.

2. Medical Necessity and Human Enhancement

We can use the capability approach to health to draw principled distinctions among different kinds of medical treatment. Two important debates in the philosophy of medicine literature concern *medical necessity* – that is, the question of which procedures are medically necessary – and *enhancements* – that is, the question of which procedures bring the patient to above average functioning.

To offer a brief proposal as to how we could draw these distinctions, I would venture that *medically necessary treatments* are just those that restore a basic bodily capability that was absent or maintain a capability in danger of falling below the threshold level; *elective treatments* are those that do not maintain or restore a capability, but that raise some physiological process from a below-average level of functioning *a la* Boorse to an average level; *enhancements* are those that do not maintain or restore a capability, and that raise some physiological process from an average level of functioning to an above-average level.

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ⁱ Here are the 50 sub-capabilities that make up Nussbaum's ten central human capabilities:

1. Living life of normal length
2. Not dying while you still realistically have life left that's worth living
3. Reproductive health
4. Adequate nourishment
5. Shelter
6. Getting from one place to another
7. Protecting yourself
8. Reproductive choice
9. Sexual satisfaction
10. Imagination
11. Thinking
12. Reason
13. Literacy education
14. Mathematical education
15. Scientific education
16. Artistic self-expression
17. Religious self-expression
18. Musical self-expression
19. Literary self-expression
20. Freedom of expression (sociopolitical)
21. Freedom of religion (sociopolitical)
22. Pursuing meaning in life
23. Having pleasurable experiences
24. Avoiding non-necessary pain
25. Ability to grieve
26. Ability to form attachments
27. Ability to love
28. Ability to experience full range of human emotions
29. Not having emotional development blighted by anxiety
30. Forming a conception of the good
31. Planning your own life
32. Ability to live with others
33. Ability to interact socially
34. Empathy
35. Ability to show concern for others
36. Ability to have friends
37. Social bases of self-respect
38. Social bases of non-humiliation
39. Protection from discrimination based on identity (religion, gender, race, culture, ethnicity, sexual orientation, social class, national origin, etc.)
40. Ability to work
41. Ability to interact with co-workers
42. Being able to live with other species
43. Being able to play
44. Political participation
45. Free speech
46. Free association
47. Equal property rights
48. Right to seek employment
49. Equal access to employment

50. Freedom from unwarranted search and seizure (Nussbaum 2000, 78-80).