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ABSTRACT

The medical model of disability views disabilities as biological dysfunctions of the individual's body. Historically, this has been unpopular in the literature, but that is at least partly because it has also been associated with objectionable moral or political ideas. As such, it's not clear that the core view about the nature of disability has received a fair hearing. This paper meets the medical model on its own terms. I argue that there is no available naturalistic account of biological functioning such that disabilities can plausibly be understood as biological dysfunctions.

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1. Introduction

What is disability? Historically, the central dividing line has been between naturalistic, biomedical accounts of disability, associated with the 'medical model', which understand disabilities as biological dysfunctions of the individual's body; and social constructionist accounts of disability, associated with the 'social model', which understand disabilities as essentially constituted by social interactions between agents.

Naturalistic accounts have traditionally been unpopular in the literature. This is to a significant extent because the medical model has also been associated with objectionable moral or political ideas, for example, that the individual's body, rather than society, is the 'primary cause' of the hardships people with disabilities endure. However, such ideas are in principle separable from the core view about the *nature* of disability, so it is by no means clear that naturalistic accounts of disability as such have had a fair hearing. And there have recently been defences of naturalistic accounts that are shorn of bigotry towards people with disabilities (Gregory 2020; Koon 2022). Those of us who share progressive political attitudes towards disability must therefore take seriously the possibility that disability is primarily a biomedical phenomenon, rather than (say) a social or moral one.

This paper meets the medical model on its own terms.[1] I argue that naturalistic accounts of disability face a problem. The problem is that there seems to be no

[1] Barnes (2016: 13–21) also criticises naturalistic accounts of disability, but Gregory (2020) and Koon (2022) attempt to address her criticisms. For present purposes, the 'medical model' is the view that disability is a

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naturalistic account of biological functioning such that disabilities can plausibly be understood as biological dysfunctions. This gives us good reason to think that disabilities are not biological dysfunctions of the individual's body, and thus to reject the medical model of disability.

I start on the defensive. Justis Koon has recently given an argument which purports to show that biological dysfunctionality is a necessary condition on disability. In section 2, I show that this argument is unsound. I then go on the offensive. Etiological accounts of biological functioning are most promising for the medical model's purposes. But I argue that this has unacceptable consequences when it comes to so-called 'swamp' people (sections 3 and 4). I then consider three alternative conceptions of biological functions—as Cummins-style systemic functions, Williams-style disjunctive functions, and Boorse-style biostatistical functions—and argue that none succeeds (section 5). In the absence of a viable alternative, this supports the conclusion that disabilities are not biological dysfunctions. I conclude in section 6 by briefly summarising the significance of this discussion for the wider debate.

2. Must Disabilities be Biological Dysfunctions?

My goal is to argue that disabilities are not plausibly thought of as biological dysfunctions. However, in a recent paper, Koon (2022) argues that biological dysfunctionality is a necessary condition on disability. If this argument is sound, my argument is doomed. So let's start by considering Koon's argument.

Biological dysfunctionality is one of three necessary conditions for disability Koon argues for, the other two being *endurance* (the condition must last for long enough) and *impairment* (the condition must make it significantly harder for its bearer to satisfy the ordinary demands of life). He argues as follows (Koon 2022: 3754–55). For each condition, Koon presents a pair of cases, *A* and *B*, that are supposed to be identical except for the fact that, while *A* satisfies all three conditions, *B* fails to satisfy one of them. In each such pair, *A* is intuitively disabled, while *B* is not. Koon concludes that the relevant condition is necessary for disability. For example, for the endurance condition, Koon compares having your arm paralysed for a decade with having your arm paralysed for a day. Plausibly, the former counts as a disability, while the latter does not. Koon (2022: 3755) concludes that, '[s]ince the only difference between the two cases is how long the paralysis lasts, this shows that the medical model is correct in claiming that a trait must be enduring to qualify as a disability'.

But does this follow? Consider a parallel argument: 'Noel and Liam Gallagher are brothers. Now, imagine a pair of people exactly like Noel and Liam—call them Noel* and Liam*—except that Noel* and Liam* are not brothers. While Noel and Liam are siblings, Noel* and Liam* are not siblings. Since the only difference between the two cases is whether or not they are brothers, this shows that people must be brothers to qualify as siblings.' Note that our interlocutor is *right* that Noel* and Liam* are not siblings: since Noel* and Liam* are exactly like Noel and Liam, they are men, and so cannot be siblings of any other kind. Nonetheless, the argument is clearly invalid.

biomedical phenomenon, rather than a social or moral one. This is following Koon (2022: 3750, n.5), who argues that this is the 'only truly essential commitment' of the medical model, although I take no stance on that exegetical question here.

On reflection, it's obvious what's gone wrong. The most the example shows is that, *in this specific case*, it is only possible for the relevant people to be siblings if they are brothers. It does not follow that *in general* it is only possible for people to be siblings if they are brothers. We know that this is not so. It is only so in this case because the relevant people satisfy certain further properties (being men) that makes satisfying this condition necessary *for them* to be siblings. Likewise, Koon's paralysed arm case might show that *in this specific case* it is only possible for the relevant trait to be a disability if it endures, but that does not show that *in general* it is only possible for a trait to be a disability if it endures. We are not entitled to make any such general claim on the basis of one example. Koon's argument for the endurance condition is thus invalid; and the point generalises to the argument for the dysfunctionality condition, which has the same structure.

Now, by itself this gives us no reason to think that biological dysfunctionality is *not* a necessary condition on disability. And one might still argue that there is a significant correlation between biological dysfunction and disability, and that the dysfunction condition provides a good explanation of this correlation. The rest of this paper attacks this proposed explanation, by arguing that there is no naturalistic account of biological functioning such that disabilities can plausibly be understood as biological dysfunctions.

3. The Swamp Disability Objection

The medical model maintains that disabilities are biological dysfunctions of the individual's body. But what is a biological dysfunction? On the face of it, the notion of a dysfunction is normative: something is dysfunctional if it is not working as it is supposed to. It is thus incumbent on the medical model to explain how the notion of biological dysfunction it appeals to is naturalistically respectable. Fortunately, there are well-developed naturalistic conceptions of biological functioning the medical model can draw on.

Perhaps most prominent is the etiological conception. While this has been fleshed out in different ways, the core idea is that a body part's functions are understood in terms of what it was selected to do by natural selection, that is, whatever the relevant body part did to enhance the inclusive fitness of the organism's ancestors. For example, because being able to see aided our ancestors in the fight to survive and reproduce, a function of the human eye is to see. A dysfunctional body part is one that fails to fulfil one of its functions.

For the medical model's purposes, this seems promising. The etiological view has an impressive pedigree as a naturalistic approach to biological functioning in general (Buller 1999) and appears in naturalistic accounts of disease (Griffiths and Matthewson 2018) and disorder (Wakefield 1992).[2] Many paradigm disabilities—such as blindness and tetraplegia—are etiological dysfunctions. Koon's (2022) extended defence of the medical model incorporates the etiological view. And one particular attraction in the present setting is that it allows particular token organs to be *enduringly dysfunctional*. If an organ's function were crudely understood in terms of what that particular organ *does*, then a human eye that enduringly failed to see would not be enduringly

[2] It is a question for further research whether problems concerning swamp people, such as the one I raise below, also arise for such accounts of diseases and disorders.

dysfunctional. Instead, it would not have seeing as a function at all. By contrast, it counts as enduringly dysfunctional according to the etiological theory, since human eyes were selected to see by natural selection. Enduring dysfunctionality is vital if disabilities, which can be enduring to the point of being permanent from birth, are to be understood as biological dysfunctions. *Prima facie*, then, the medical model is well-served by etiological dysfunctionality.

So understood, this approach to naturalising disability is reminiscent of teleological approaches to naturalising mental content, or 'teleosemantics'. The details of such theories do not matter here, but very briefly: teleosemantics aims to explain the representational content of psychological states like beliefs and desires in terms of their biological functions, usually understood in etiological terms. For example, the teleosemanticist might explain the representational content of a certain sensory-perceptual state, such as the experience of seeing something red, by saying that our sensory-perceptual systems were selected by natural selection to produce such states in the presence of red things (Dretske 1988; Millikan 1984; Neander 2017; Papineau 1993).

The significance of teleosemantics for our purposes derives from a very influential *objection* to such theories, deriving from Donald Davidson's 'Swampman' example:[3]

> Suppose lightning strikes a dead tree in a swamp; I am standing nearby. My body is reduced to its elements, while entirely by coincidence (and out of different molecules) the tree is turned into my physical replica. My replica, the Swampman, moves exactly as I did; according to its nature it departs the swamp, encounters and seems to recognize my friends, and appears to return their greetings in English. It moves into my house and seems to write articles on radical interpretation. No one can tell the difference. (Davidson 1987: 443)

Swampman is physically indistinguishable from Davidson. But unlike Davidson, Swampman has no evolutionary history. Etiologically speaking, none of Swampman's body parts have biological functions. In particular, it is not the function of Swampman's sensory-perceptual system to produce certain sensory-perceptual states in response to red objects. So, if we are to explain the representational content of psychological states in terms of their biological functions, as teleosemantics has it, then Swampman has no contentful psychological states. This is highly counterintuitive. The *Swampman objection* is thus as follows: if teleosemantics is true, then Swampman has no contentful psychological states; but Swampman does have contentful psychological states; therefore, teleosemantics is not true.

Now, for any given person, we can imagine their swamp-replica. This goes for people with disabilities too. Consider Stevie Wonder, who is blind. We can imagine Swamp Stevie being formed in a process analogous to that described by Davidson: lightning strikes, and Stevie Wonder is reduced to his elements. By coincidence, at the same time, a perfect physical replica of Stevie Wonder, Swamp Stevie, comes into existence. Let's suppose that this happened in 1974, midway through Wonder's classic period. Of course no one noticed, not even Swamp Stevie, since Swamp Stevie is physically indistinguishable from Stevie Wonder. Unlike Stevie Wonder, however, Swamp Stevie has no evolutionary history. Etiologically speaking, none of his organs have biological functions, so none of his organs can be dysfunctional. In

[3] Davidson discusses this, not as an objection to teleosemantics, but to his own historical (but non-teleological) theory of mental content.

particular, it is not the function of his eyes (or eye-analogues) to see, so their inability to see cannot be considered a biological dysfunction. So, if we explain disability in terms of biological dysfunction, as the medical model has it, then Swamp Stevie—the person who has been living Stevie Wonder's life since the mid-70s—is not disabled. This is highly counterintuitive. The *Swamp Disability objection* is thus as follows:

(1) If the medical model of disability is true, then Swamp Stevie is not disabled.
(2) But Swamp Stevie is disabled.
(3) Therefore, the medical model is not true.

To make this point vivid, imagine a whole community of swamp people. Let's suppose that, on 1 January 1925, an exact replica of our solar system spontaneously came into existence somewhere else in the universe, replete with a replica of Earth—Swamp Earth—and everyone on it. Life on Swamp Earth has since unfolded pretty much exactly as it has done here. But the Swamp Earthlings have only been around for 100 years, insufficient time (let's suppose) for natural selection to take effect. This means that none of them have biological dysfunctions, etiologically speaking, and it therefore follows from the medical model that no one on Swamp Earth is disabled, including the replicas of the people with disabilities. This seems absurd.

We will use the Swamp Disability objection to structure the rest of our discussion. Given the etiological account of biological dysfunction, premise (1) is true. There are thus two possible responses. The first is to reject premise (2), that is, bite the bullet and say that swamp people cannot be disabled. The second is to modify the medical model so that (1) is no longer true. We will consider these in turn. I will argue that neither is viable.

In doing so, I will occasionally draw on the teleosemantics literature, where analogous responses to the Swampman objection have been explored in detail. But I should stress that, while I am sympathetic to the Swampman objection to teleosemantics, the success of the Swamp Disability objection is independent of the success of the Swampman objection. As we will see, some responses to the Swampman objection do not work as responses to the Swamp Disability objection, so for all I argue here, teleosemantics may survive the Swampman objection. What I argue is that the medical model cannot survive the Swamp Disability objection. (Nor are my objections intended as objections to the naturalistic accounts of biological function I discuss, only to the idea that they can accommodate disabilities as biological dysfunctions.)

4. Biting the Bullet

According to David Papineau:

> The standard teleosemanticist response [to the Swampman objection] is that their theory isn't intended as a piece of conceptual analysis, but as a scientific reduction, and so isn't beholden to every initial intuition about content we may have. If teleosemantics offers a powerful, unifying, explanatory theory, then it should be allowed to override and re-educate any marginal contrary intuitions. Maybe everyday intuition disagrees, but in the light of our theory we can conclude that Swampman really doesn't have contentful mental states. (Papineau 2001: 282)

The idea is to accept that teleosemantics has counterintuitive consequences about Swampman, but to maintain that this cost is outweighed by the benefits of the view, and thus to maintain that our intuitions about this case are simply mistaken. Our intuitions about Swampman are explained as an understandable result of overgeneralisation: since Swampman looks just like Davidson, who has contentful psychological states, we naturally, but mistakenly, assume that Swampman must have contentful psychological states too. Call this, the *bullet-biting response* (Millikan 1996; Neander 1996).

I can imagine someone shoring up the analogous response to the Swamp Disability objection as follows. Consider blumans. Blumans are a fictional species of animal that are indistinguishable from blind humans. But while blumans somehow evolved to have things that look a lot like eyes in their heads, at no point in their evolutionary history has a bluman had the ability to see. Their 'eyes' either serve some other purpose or are evolutionary spandrils. Now, the intuition the Swamp Disability objection trades on is that Swamp Stevie is disabled, just as Stevie Wonder is disabled. However, Swamp Stevie is just as much the swamp-replica of a bluman as he is a swamp-replica of a human. (Recall that there is no causal relationship between a swamp-replica and the person they are a swamp-replica of: the indistinguishability is purely coincidental.) You can, if you like, imagine that blumans exist on some far-off planet, and there is by coincidence a bluman, Stevie Blonder, who is a doppelganger of Stevie Wonder. If so, then Swamp Stevie is as much a swamp-replica of Stevie Blonder as he is a swamp-replica of Stevie Wonder. But, the reasoning goes, we would no more consider blindness to be a disability in blumans than we would consider it to be a disability in bats. This would be like considering humans disabled because we are unable to fly.[4] There is thus no sense in which Swamp Stevie is the swamp-replica of a disabled human *rather than* the swamp-replica of an able-bodied bluman. One might argue on this basis that the intuition that Swamp Stevie is disabled is anthropocentric and unreliable. If our intuitions about swamp disabilities can be undermined in this way, advocates for the medical model might be tempted to bite the bullet and accept that swamp-replicas of people with disabilities are not themselves disabled.

While tempting, I argue that the bullet-biting response is ultimately untenable. As Koon emphasises, an account of disability should be, as I will put it, *normatively adequate*: 'Developed countries devote immense resources to researching, treating, and accommodating disabilities, and to direct payments to people with disabilities. An account of disability should be able to explain why these expenditures are justified' (Koon 2022: 3749–50). This is surely right. But with this in mind, the worry for the bullet-biting response derives from what I will call the Equality Thesis. Let us say that someone is *swamp disabled* iff they are the swamp-replica of a person with a disability. The Equality Thesis says that, other things being equal, developed countries would be just as justified in devoting resources to treating and accommodating swamp disabilities, and to direct payments to people with swamp disabilities, as they are in devoting such resources to disabilities.[5] If, for instance, it turned out that half

[4] Ok, it's a myth that bats are blind. Pedants are invited to sub in 'Texas blind salamanders'.

[5] While the normative adequacy constraint mentions *researching* disabilities, the Equality Thesis makes no reference to research. This is because much research concerns causes and prevention, which is not relevant for swamp disabilities. (Thanks to a referee for this point.) I don't think this disanalogy substantially affects the dialectic: parity with respect to treating and accommodating disabilities and swamp disabilities is enough to get the objection going.

the people with tetraplegia had been replaced ten years ago with swamp-replicas, we would nonetheless be just as justified in providing aid and accommodations to the half who are swamp-replicas as we are in providing aid and accommodations to the half who are not.

The challenge to the bullet-biter is this: what *explains* the Equality Thesis? The obvious explanation, of course, is that *these people are disabled too*. Any normatively adequate account of disability will hence *ipso facto* explain why we are justified in providing aid and accommodations to people with swamp disabilities. But if, as the bullet-biter maintains, people with swamp disabilities are *not* disabled, the obvious explanation is unavailable.

This leaves the bullet-biter with a dilemma. The first option is to simply deny the Equality Thesis, maintaining that we would not be justified in providing aid and accommodations to people with swamp disabilities. But this is implausible. It would, for example, mean that on Swamp Earth (where life is, recall, indistinguishable from life on Earth) the resources devoted to aiding and accommodating the analogues of our people with disabilities are in fact unjustified; and all because these people do not have the right evolutionary history.[6]

The second option is to say that what justifies providing aid and accommodations to those with swamp disabilities is *different* from what justifies providing aid and accommodations to those with disabilities. There are two problems with this, however. First, it is utterly ad hoc. Absent independent argument, it is incredible to think that what justifies providing aid and accommodations to people with tetraplegia on Earth is different to what would justify providing such resources to their swamp-replicas on Swamp Earth. I can think of nothing other than allegiance to the medical model that would motivate drawing a distinction here. Second, the fact that we would be justified in providing *the same* aid and accommodations for the two *different* conditions threatens to be a stupendous coincidence unless there is some important similarity between disability and swamp disability that explains why this should be so. But if there is some such important similarity, then arguably it should be this important similarity that appears in our account of disability, rather than the unnecessarily restrictive appeal to biological dysfunction. For example, suppose that what explains the normative correspondence is that people with disabilities and swamp disabilities are both *F*. Then the more unified and consequently more extensionally, explanatorily, and normatively adequate option would be to analyse disability in part in terms of *F*, which *cannot* be biological dysfunctionality, rendering the phenomenon pinpointed by the medical model at best a species of the broader genus.

I thus suggest that the only plausible explanation of the Equality Thesis is that people with swamp disabilities *just are* people with disabilities.[7] Since this is just what the bullet-biter denies, the bullet-biting response is untenable. Call this, the *Normative Coincidence objection*.

[6] One may respond that these resources are still justified, but for some other reason. E.g., one might say that, *for all the Swamp Earthlings know*, the swamp disabled are genuinely disabled, so they are justified in acting as if they are. But this makes the justification implausibly contingent on the Swamp Earthlings not knowing their planet's true history. Any other explanation will run into the worries discussed in the next paragraph.

[7] To be clear, the claim is not that *all* swamp disabilities are disabilities. The Equality Thesis is a claim about what is justified in a society like ours, so the claim is only that, *in a society relevantly like ours*, swamp disabilities are genuine disabilities. Stevie Blonder need not be disabled.

The moral basis of the objection is worth emphasising. In this respect, the criticism mirrors a compelling criticism of the bullet-biting response to the Swampman objection, which Papineau (2001: 282) attributes to Eilert Sundt-Olsen. Sundt-Olsen's objection is that it is clearly morally wrong to kill and eat Swampman, but that it is at best unclear why this would be the case if Swampman lacks contentful psychological states. Similarly, my objection is that we are clearly justified in providing aid and accommodations to people with swamp disabilities, but that it is at best unclear why this would be the case if such people are not disabled. If the problem was merely a slightly surprising extension for the relevant concept, it might be justifiable to dismiss our intuitions about Swamp Stevie as concerning a far-fetched sci-fi case and thus as irrelevant, unimportant, or readily overridable. But disability has an important *normative* role to play, and it is utterly routine to muster purely hypothetical cases like Swamp Stevie when considering moral principles. Without such cases we would risk hamstringing the entire enterprise of moral theorising. My argument is that, if disability is to play its normative role adequately, then the relevant swamp disabilities must be disabilities too.

5. Modifying the Account

Let's recap. Here's the Swamp Disability objection:

(1) If the medical model of disability is true, then Swamp Stevie is not disabled.
(2) But Swamp Stevie is disabled.
(3) Therefore, the medical model is not true.

The argument is valid. I have argued that it is untenable to deny premise (2). The only other option is to modify the medical model so that (1) is no longer true. In this section, I shall argue that this is not viable either.

There are four possible modification strategies. Since swamp people do not have etiological dysfunctions, there are two ways to falsify (1) while retaining the etiological conception: (i) *restrict* the scope of the medical model, so its failure to capture swamp people is no objection; or (ii) *add* a clause to the medical model, which does capture swamp people. Otherwise, one must either: (iii) *drop* the appeal to biological dysfunction altogether; or (iv) appeal to a *different* conception of biological dysfunctionality.

In section 5.1, I argue that (i)–(iii) face significant difficulties, leaving (iv). The literature affords three salient alternatives to etiological functions: Cummins-style systemic functions (section 5.2), Williams-style disjunctive functions (section 5.3), and Boorse-style biostatistical functions (section 5.4). I argue that none can be used to give a plausible account of disability. While this does not show that it is *impossible* to give an account of biological function that suits the medical model's purposes, it provides inductive and abductive support for this conclusion. In the absence of a viable alternative, this provides good reason to think disabilities are not biological dysfunctions, *contra* the medical model. (This also provides my opponent with a clear path of response: provide a plausible account of biological dysfunction that suits their purposes. This should aid in moving the debate forward in the future.)

5.1 Modifications (i)–(iii)

The first modification is to restrict the scope of the medical model, so its failure to capture swamp people is no objection. We might say that the goal of the medical model is only to explain the nature of disability in the actual world or for organisms that are the product of evolution by natural selection. It is thus simply not concerned to say in virtue of what merely possible swamp organisms like Swamp Stevie are disabled, so Swamp Stevie cannot constitute an objection. Call this, the *restrictionist strategy*.[8]

An initial worry for the restrictionist is that she simply leaves the broader metaphysical question of what unites disability across all possible worlds or creatures—that is, of what all possible creatures with disabilities have in common, in virtue of which they count as disabled—unanswered. While the medical model may still offer an interesting generalisation about the disabilities there actually are (or, at best, those that exist among an interesting subset of possible worlds or organisms), it fails to illuminate the nature of disability as such. Indeed, in so far as we see competing accounts of disability as targeting the broader question, the medical model ceases to be in direct competition with them. Those who think that disability is a social phenomenon, for example, need not deny that, as a matter of fact, in the actual world all disabilities are biological dysfunctions of the individuals' bodies. They just think that this is not what makes them disabilities.

A referee, however, suggests the following response: if disability is a biological concept, as the medical model maintains, then we have no reason to think there is a substantive metaphysical explanation of what unites disability across all possible organisms to be given, or if there is one that it would be in any sense more fundamental or important—as opposed to merely vaguer and more general—than the local scientific one. The idea is thus that, while organisms on Earth are disabled in virtue of satisfying the medical model, organisms on Swamp Earth are disabled in virtue of having some other property *F*; and there is no deeper, more fundamental explanation of in virtue of what both these sets of organisms count as disabled. Call this, the *disunity claim*. I suspect that some will find this proposal uncongenial,[9] but in any case the proposal runs into at least two major difficulties.

First, we are now no better off than the bullet-biting response with respect to the Normative Coincidence objection. While we can *say* that organisms on Swamp Earth are disabled, this brings us no closer to an *explanation* of the Equality Thesis unless 'disability' picks out a substantive similarity between those with disabilities and those with swamp disabilities. But this is just what the disunity claim denies. Second, suppose that *F*—the property in virtue of which organisms on Swamp Earth are disabled—is also instantiated on Earth by all and only the organisms with disabilities. Then it would be mysterious why Earthlings do not also count as disabled in virtue of being *F*. At the very least, it would be hard to see what could recommend this disunified model over the unified model which always understands disability in terms of Fness. To avoid this difficulty, this approach will need to maintain that, while on Swamp Earth all and only the organisms with disabilities are *F*, this is not the case that on Earth. But these organisms are physical duplicates in perfectly

[8] See Papineau 2001 for a similar response to the Swampman objection.
[9] For instance, if biological concepts denote natural kinds, then the disunity claim is seemingly in conflict with the common view that natural kinds have essences.

analogous environments! It is thus very hard to see how there *could* be such a property. Indeed, since the only differences between Earthlings and Swamp Earthlings are historical, any such property must be defined in part in historical terms. But *F* obviously cannot be *solely* defined in historical terms: it must also be defined in part in terms of some non-historical property *G* that distinguishes the Swamp Earthlings with disabilities from those without. But there is no non-historical property *G* that is instantiated by all and only the Swamp Earthlings with disabilities that is not also instantiated by all and only the Earthlings with disabilities: the only differences between them are historical. And if all and only the Swamp Earthlings with disabilities are *G* and all and only the Earthlings with disabilities are *G*, then it is mysterious why *G* is not simply the property in virtue of which all these creatures count as disabled.

A similar difficulty awaits the second modification strategy. Rather than remaining silent about swamp organisms, the *extensionist strategy* seeks to add at least one new clause to the account, with the express purpose of capturing swamp organisms with disabilities.[10] For example, adapting Koon's account, we might say that *A* is disabled iff: (i) *A* has an enduring biological dysfunction that causes *A* a significant degree of impairment; or (ii) *A* closely resembles a member of some existing species *S* such that, if *A were* a member of *S*, then *A* would satisfy (i). Formulating the additional clause(s) so that they are extensionally adequate will be tricky. But suppose it can be done. The extensionist nonetheless runs into the following general difficulty. According to the extensionist, *for organisms that are the product of evolution by natural selection*, disabilities must be biological dysfunctions. Call this, the *restricted dysfunction condition*. But for swamp organisms, like those on Swamp Earth, disabilities need not be (indeed, *cannot* be) biological dysfunctions. This is liable to seem arbitrary and ad hoc unless we can be given a principled explanation for why certain non-dysfunctions on Swamp Earth like blindness count as disabilities while others do not. The difficulty is in seeing what principled explanation there could be for considering certain non-dysfunctional conditions on Swamp Earth to be disabilities that does not also undermine the idea that the relevant conditions need to be dysfunctions on Earth.

The obvious thing to appeal to is the physiological similarity between Swamp Earthlings and Earthlings, for whom conditions like blindness are disabilities in virtue of being dysfunctions. But *mere* physiological similarity to Earthlings *cannot* be enough. Recall the blumans from section 4, who are physiologically similar to blind humans, but are not disabled. (One might argue that physiological similarity to Earthlings is only sufficient for swamp organisms, but this will not help, since there could be a population of able-bodied *swamp* blumans.) But if mere physiological similarity to organisms for which the relevant conditions are dysfunctions is not enough to explain why some non-dysfunctions on Swamp Earth are disabilities and others are not, what else can we appeal to? The only obvious resource is the *social* significance of the relevant conditions on Swamp Earth. But of course these conditions have precisely analogous social significance on Earth. If the social significance of certain bodily conditions on Swamp Earth is sufficient to explain why these conditions count as disabilities despite their not being dysfunctions, and the relevant bodily conditions have the same social significance on Earth, then the social significance of said conditions on Earth should be sufficient to explain why they count as disabilities here

[10] Thanks to Joe Bowen, Heather Logue, and a referee for suggestions along these lines.

too, without having to appeal to their dysfunctionality. The restricted dysfunction condition thus seems redundant. If, on the other hand, the social significance of the relevant conditions on Swamp Earth is *not* sufficient to explain why only those non-dysfunctions count as disabilities, it's unclear what principled justification there might be for including clauses that capture these conditions and not others.

The extensionist thus faces a dilemma. If there is a principled reason for considering certain conditions to be disabilities on Swamp Earth despite their not being dysfunctions, then this should *also* suffice to explain why these conditions are disabilities on Earth, rendering even the restricted dysfunction condition unmotivated. If, on the other hand, there is no principled reason for considering these conditions in particular to be disabilities, then the account is liable to seem ad hoc and gerrymandered.

The third possible modification is to drop the reference to biological dysfunction in the medical model altogether. Instead, we simply understand disability as any enduring, naturalistically-definable trait that causes its bearer a significant degree of impairment.[11] This overgeneralises, however. Koon (2022: 3761–62), for example, gives several plausible examples of enduring traits that should not count as disabilities even if they cause their bearers a significant degree of impairment: being short, unintelligent, lazy, timid, or irritable; menstruation that results in recurring cramps; having white skin in sunny climates. The medical model thus needs to identify *which* enduring traits can count as disabilities. We might as well call these traits 'biological dysfunctions'. The question then becomes that of whether it is possible to give a plausible naturalistic account of biological dysfunction. We have seen that the etiological account will not do. What are the alternatives?

5.2 Systemic Functions

One leading alternative is to understand biological functions as Cummins-style *systemic* functions (Cummins 1975; Davies 2000). On this view, the function of a component of a system is whatever contribution it makes to the capacity of the system that we are interested in. For example, suppose we are interested in how a sighted human is able to navigate their environment. Since the eye contributes to the human's success in this endeavour by enabling them to see, the function of the eye in this context is to see.

Now, one problem with appealing to systemic functions in the present context is that on this view the function of a component of a system is always relative to a particular capacity of the system as a whole. So, the function of a particular body part will be relative to some capacity of some complex system of which it is a part. The system is plausibly the organism as a whole, but which capacities are relevant to determining the functions of the organism's body parts? It is by no means obvious. Suppose, for example, we appeal to the organism's ability to survive and/or reproduce. This would entail that a body part can only be dysfunctional, and thus can only be a contender for a disability, if it inhibits the body's ability to survive or reproduce; and it is, to say the least, not at all obvious that all disabilities do this. For example, in the contemporary world where many folk have access to good prosthetics, it seems perfectly possible that missing a foot will not substantially affect one's ability to survive or

[11] Thanks to Heather Logue for this suggestion.

reproduce. However, this is a comparatively minor worry, so let's assume that we have some way of specifying the relevant capacities.

The major objection is the familiar point that the systemic account of functions cannot make sense of a component of a system, such as an organ, being *enduringly* dysfunctional. An organ only has the function to φ on this view if the organ contributes to some complexly achieved capacity of the system by φ-ing. This, of course, requires that the organ does in fact φ, that is, that it is functional, at least for the most part. The account can make sense of occasional malfunctions, if functioning is the rule. But it cannot make sense of enduring dysfunctionality: an eye that cannot see cannot contribute to any complexly achieved capacity by seeing, and so cannot have the function to see, and so cannot be dysfunctional in virtue of being unable to see. As noted above, this is devastating to any theory that seeks to understand disabilities as biological dysfunctions.[12]

5.3 Disjunctive Functions

So, we cannot go in for a systemic account of functions if we want to make sense of enduring dysfunctionality, and we cannot go in for an etiological account of functions if we want to avoid the Swamp Disability objection. Intriguingly, however, in the context of defending teleosemantics from the Swampman objection, J R G Williams (2020: 194–200) has suggested a way of *combining* the systemic and etiological accounts of functions, such that it can both allow for enduring dysfunctionality *and* avoid the Swampman objection.

Williams offers a helpful 'warm-up' case. Suppose we have three things: a watch, a broken watch, and the swamp-replica of a watch. Now, suppose we explain what it is to be a 'timekeeping device' in terms of whether or not the thing can be used to keep the time. Then while the watch and the swamp-watch count as timekeeping devices, the broken watch does not, despite the fact that this is what the broken watch was designed and manufactured to do. By contrast, if we explain what it is to be a timekeeping device in terms of what the thing was designed and manufactured to do, then the watch and broken watch count as timekeeping devices; but the swamp-watch does not, despite the fact that it works perfectly well to keep the time. Given that the problem in each case is that the explanation seems insufficiently broad, a natural third proposal is to explain what it is to be a timekeeping device *disjunctively*: something is a timekeeping device if it can be used to keep the time *or* if that is what it was designed and manufactured to do. On this account, all three count as timekeeping devices: the swamp-watch by satisfying the first disjunct, the broken watch by satisfying the second, and the normal watch by satisfying both. While the account is disjunctive, it is not arbitrarily gerrymandered, since the disjuncts are closely related: the normal watch satisfies both disjuncts precisely because it in fact does exactly what it was designed and manufactured to do.

Williams suggests that the teleosemanticist pulls the same trick. For example, we might say that a sensory-perceptual system has the function to produce certain sensory-perceptual states in response to red objects iff this is something that the

[12] One response would be to appeal to a *modal* account of functions, such that what matters is whether the body part's φ-ing *would* contribute to the relevant capacities, rather than whether it *does* (Nanay 2014). This would be ill-advised, however, as there are serious problems with such accounts (Artiga 2014; Garson 2019).

system in fact does as part of its contribution to the relevant capacities of the organism (that is, it is a systemic function of the system) *or* this is something the system was selected to do by natural selection (that is, it is an etiological function of the system). The idea is that, in the usual run of things, our sensory-perceptual systems do what they were selected to do in a way that contributes to our relevant capacities, meaning they satisfy both disjuncts. But Swampman's sensory-perceptual system will satisfy the first disjunct despite not satisfying the second, allowing Swampman to have contentful sensory-perceptual states; while an evolved organism can have an enduringly dysfunctional sensory-perceptual system in virtue of satisfying the second disjunct, but not the first.

This may work as a response to the Swampman objection.[13] But it cannot work as a response to the Swamp Disability objection. While Williams's account allows swamp organs to have functions, and it allows *evolved* organs to be enduringly dysfunctional, it does not allow *swamp* organs to be enduringly dysfunctional. Consider, for example, a swamp-replica of a *broken* watch. Williams's disjunctive account does *not* consider this to be a timekeeping device, since such a device can neither be used to keep the time, nor was it manufactured and designed to do so. Similarly, a swamp-replica of a blind eye, such as we find in Swamp Stevie, neither has seeing as a systemic function (since it does not in fact see) nor as an etiological function (since it has no evolutionary history). Unfortunately for the medical model, which explains disability in terms of biological *dys*functions, it is precisely the possibility of a swamp organ that is enduringly dysfunctional that they need if they are to avoid the Swamp Disability objection.

To emphasise, this is *not* a criticism of Williams's response to the Swamp*man* objection. Williams (2020: 198) acknowledges that a swamp-replica of an evolved, systematically dysfunctional sensory-perceptual system would not count as dysfunctional by his lights, and argues that this is no problem for his theory. This provides a clear demonstration of the point mentioned earlier: the Swampman objection and Swamp Disability objection need not stand or fall together.

5.4 Biostatistical Functions

The final naturalistic approach to biological functions to consider is the biostatistical account, principally associated with Christopher Boorse.[14] The core idea is that the function of a part of the body is to be understood in terms of what is statistically typical for the species. Thus the human eye has the function to see because it is statistically typical for human eyes to see; a human eye that cannot see is therefore dysfunctional in virtue of being atypical. Boorse adds some important details to this core idea and different defenders of the biostatistical account flesh it out in different ways. This does not matter for our purposes, however, since the objections to using a biostatistical account in the present context target the core idea.

A first worry is that there is good reason to think that the biostatistical account will not avoid the Swamp Disability objection. This is because it appeals to what is statistically typical *for the species*. But species are typically understood in historical terms (Neander 1996: 119). So understood, Swamp Stevie is not a member of our species,

[13] It depends on whether it is possible to give a naturalistically-acceptable account of the systemic functions that Swampman's sensory-perceptual system satisfies, a task Williams (2020: 198–99, n.8) openly forswears.
[14] See, e.g., Boorse 1977, 2014. Gregory's (2020) Inability Theory implicitly appeals to a biostatistical account.

or any species, so his 'eyes' cannot be statistically atypical for his species.[15] This is a serious problem, but compared to the next it is comparatively minor, so I'll say no more about it.

The major problem with appealing to a biostatistical account of dysfunction in this context is that there is no reason to think that a disability needs to be statistically atypical. If as a result of some plague or weapon of war 60% of the humans in the world become blind, then the eyes of the blind will no longer be functioning in a species-atypical way. But it would be absurd to conclude on this basis that blindness is no longer a disability. The right thing to say is that, under these circumstances, more than half of the people in the world are disabled.[16] As with swamp disabilities, the problem with saying otherwise is not just that it is counterintuitive, but that it is morally problematic: the idea that we would no longer be justified in providing aid and accommodations to people who are blind under these circumstances is preposterous; the ad hoc idea that we would be so justified, but not because they are disabled but instead for some other reason, is not much better. The only way to respond to this objection is to define a body part's function in terms of what is statistically typical among some proper subset of the species, which for some reason excludes most of the newly-blind. But since the newly-blind need not differ from the rest of the population in any other naturalistic respect, it's hard to see how there could be a principled, non-circular, naturalistic way of specifying the relevant subset.[17] And if there *is* such a way of zooming in on the able-bodied, the biostatistical account would surely be redundant.

6. Conclusion

Naturalistic accounts of disability that are shorn of bigotry towards people with disabilities are a vital contribution to the literature. But whether it is plausible to say that disabilities are biological dysfunctions depends on what a biological dysfunction is. I have argued against appealing to etiological, systemic, disjunctive, or biostatistical accounts. As these are the leading contenders, the prospects of finding an account that suits the purposes of the medical model are poor. This gives us good reason to think that disabilities are not fundamentally biological dysfunctions of the individual's body, *contra* the medical model.

Of course, I have not defended an alternative account of disability here. This must await another occasion. So advocates for the medical model could always respond that

[15] This may seem like shaky ground to stand on: is it not just as counterintuitive to say that Swamp Stevie is not a human as it is to say that he is not disabled? On what principled basis can we see Swamp Stevie as an objection to historical accounts of disability, but not species? (Neander (1996) aims to undermine the Swampman objection via this line of reasoning.) This question is answered by the discussion in section 4: the problem with saying that Swamp Stevie is not disabled is that it is morally problematic. There are no such consequences, as far as I know, with saying that Swamp Stevie is a member of a different species. This is precisely why I'm happy to think that 'species' expresses a biological concept, about which we should defer to biologists, but that 'disability' does not.

[16] Boorse's account in fact appeals to what is typical among all members of the species that have ever lived, not just those presently alive. (Thanks to a referee for this point.) To retain our counterexample, we need only suppose that the living sufficiently outnumber the dead, such that 60% of those alive outnumbers 50% those who have ever lived. This would be the case on Swamp Earth, but would also have happened on Earth if our species' current exponential population explosion had happened sufficiently early in our history (or were able to continue unchecked sufficiently into the future).

[17] For relevant discussion of a similar objection to Boorse's biostatistical account of health and pathology (Boorse 1977, 2014), see, e.g., Schwartz 2007, Kingma 2010, Griffiths and Matthewson 2018, and Barnes 2023: 22–34.

their rivals all face worse problems, and thus that their view is still the most plausible overall. Unless an objection shows a view to be outright inconsistent, this response is always available. What I hope to have shown here is that this should be an unwelcome consequence: the medical model of disability has counterintuitive and normatively problematic consequences, and we therefore have good reason to look elsewhere.

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