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Analysis

Externalist Medicine and Externalist Biology

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Abstract

This paper assesses the prospects for an externalist perspective for somatic medicine—the view that health and disease of the body might sometimes be constitutively dependent on factors external to the organism. After briefly reviewing the grounds for psychiatric externalism, I argue that similar considerations are already implicit in somatic medical practice, particularly in immunology, public/population health, and occupational therapy. I then argue that the interactionist and population-minded externalist approach to biomedicine represents an important practical application of more general trends in biological theory; namely, the growing rejection of individualistic and reductionistic thinking.

1. Introduction

One striking development in recent philosophy of psychiatry has been the rise of externalism; roughly, the view that failures of cognitive or other psychological functioning might be situated outside the confines of the brain or even body (see, for example, Davies 2016; De Haan 2020; Drayson 2009; Hoffman 2016; Krueger 2020; Roberts et al. 2019; Sneddon 2002; Stein et al. 2024; Varga 2018). In this brief paper, I assess the prospects for the development of an analogous externalist perspective for somatic medicine; the view that health and disease of the body, too, might in at least some cases be best understood as constitutively dependent on factors external to the healthy or diseased organism.

I begin in section 2 by briefly introducing and reviewing the process by which this position emerged as a theoretical possibility. In section 3 I argue that, far from being as radically novel a position as it first appears, disease externalism is in fact already implicitly reflected in medical theory and practice, particularly in sometimes marginalized sub-disciplines such as immunology, public/population health, and occupational therapy. Explicit acknowledgment of their externalist character, I suggest, may lead to better understanding of these disciplines, and a more central role in modern medicine. It may also

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bolster the case for externalist thinking in other areas of medicine. In section 4 I respond to the worry that taking health and disease out of the body means, in effect, taking biology out of medicine. In fact, I argue, the more interactionist and population-minded externalist approach to biomedicine represents a useful and important practical application of a more general trend in biological theory, namely, the growing rejection of individualistic and reductionistic thinking. Recognizing this connection bolsters the scientific credibility of externalist medicine and psychiatry, as well as suggesting new ways of understanding the shifts already underway in biological theory.

2. Psychiatric Externalism

Beginning in the 1960s and 1970s, philosophers of language such as Ruth Barcan Marcus (1961), Hilary Putnam (1975), and Saul Kripke (1980) began to reject the previously dominant "descriptionist" approach to reference associated with figures like Gottlob Frege and Bertrand Russell (see, for example, Frege 1948; Russell 1905). This shift had surprisingly far-reaching implications, including for the philosophy of psychiatry and, as I shall argue here, medicine. Because the development of these implications has been covered in detail elsewhere (for example, Glackin, 2025), I will sketch it only briefly here.

For Frege and Russell, the terms of our language refer to items in the world via descriptive content associated with them; a name—"Arne Slot," say—picks out a particular individual because that individual matches some tacitly accompanying description (for instance, "the bald, Dutch ex-footballer who manages Liverpool FC after previous spells in charge of AZ Alkmaar and Feyenoord"). More generally, on this view, our experience and cognition of the world is always mediated by our conceptual apparatus, by our own *minds*. Figures like Marcus, Putnam, and Kripke reject this; we can be directly acquainted with our world and its furniture, they hold, and linguistic and conceptual reference to particular objects is achieved on the basis of the complex networks of causal interactions we and others have with them. But this means that reference does require causal interaction; for my thought or talk to be *about* something, I must stand in a particular causal relation to it. And that means in turn that what my thoughts are about is at least partly constituted by how the world around me stands; "Cut the pie any way you like," Putnam quips, "'meanings' just ain't in the head!" (1975, 144).

Thus "semantic externalism" or "content externalism." But if mental content can be constituted outside the body, why not mental processes too? A famous thought experiment due to Andy Clark and David Chalmers considers Otto and Inga, both elderly New Yorkers attending the same exhibition at MOMA (Clark and Chalmers 1998). To get there, Otto, whose memory is failing, consults his notebook, whereas Inga can simply recall the same information. But there is no functional difference between the two cognitive processes; so if Inga's process counts as mental, Clark and Chalmers argue, only "prejudice" would deny the same status to Otto's. This is "extended" cognition; subsequent theorizing suggests that it may also be "embodied" (Clark 2012), "embedded" (Clark 2012), or "enactive" (Ward et al. 2017) for a collective package known as "4E."

Now, if mental functioning may be external to the brain in all of these various ways—if vehicle externalism, in particular, is true—it seems to follow that mental *dysfunction* can too; cognitive and psychological process taking place outside the brain can go awry outside it as well, and may therefore need to be treated by interventions, which act on, for example,

bodies, ecologies, or cultural scaffolds, rather than directly on the brain and its pharmacology. We thereby arrive at "externalist psychiatry" (Zachar and Kendler 2007), which has in recent years become a thriving and diverse research program (see, for example, Stein et al. 2024; Glackin 2025. But given the roots of this development in philosophical semantics and philosophy of mind, it has seemed natural to many to assume—and at least one significant figure in the literature has stated explicitly (Davies 2016)—that this sort of analysis will be productive only for mental illnesses, and not for somatic ones. But this assumption has been challenged on occasion (see, for example, Glackin 2017, 2025) and in the next section I want to argue that there are broader grounds for that challenge, based in mainstream contemporary medical practice, than has previously been appreciated.

3. General Medical Externalism

Are there other, somatic, medical subdisciplines as amenable to externalism as psychiatry, or where externalist thinking is already—at least implicitly—established? I want to suggest three in particular here that seem by their nature well suited: immunology, public/ population health, and occupational therapy. In each case, externalism will be plausible just in case the relevant phenomena warrant being conceived of as constituting an integrated individual–environment *system,* and not merely as involving causal interaction between the individual and salient features of its environment.[1]

It will not do to set the bar too high for ourselves here; a determined individualist will always be able to construe a purported system as being "really" composed of separate, interacting parts. In the metaphysics of science, there will rarely be a priori grounds for dismissing such an analysis, and we must ultimately choose between competing accounts pragmatically.[2] In medicine, that will mean favoring analyses according as they are, or at any rate promise to be, therapeutically productive.[3]

The immune system is most obviously, but not only, the body's primary defense mechanism against infectious disease (see, for example, Janeway 2001). In addition, it performs a range of tasks at the interface of body and environment, as well as a series of internal regulatory roles: it helps to regenerate and repair damaged tissue, modulate nutrient metabolism and brain functions, establish commensal relationships, and regulate the selection of sexual partners, among many other activities (adapted from Swiatczak and Tauber 2020). As this wider functioning is increasingly recognized, it becomes clear that the old view of immunology as the science of "self and nonself" (Burnet 1969) is no longer tenable. This older view, whereby the immune system functioned as a sort of "border patrol" policing the boundaries of the organism, might have seemed less than amenable to externalist analysis, but even then the appearance is merely superficial. Immunological health does not consist in having a particular internal state but in having an appropriate

[1] I thank two anonymous reviewers, as well as Alex Broadbent, for pressing me on this point.
[2] Though I don't require—and, to be clear, don't make—so strong a claim here, I am inclined to think that the quite radical view of these matters developed by John Dupré (1995) is correct.
[3] In this emphasis on therapeutic payoff as a criterion for judging the appropriateness of externalist analyses, I am to some degree following—as well as Dupré (1995)—the externalist psychiatry of Andrew Sneddon (2002, 312) who adds the "therapeutic virtue" of practical success to the theoretical virtues of causal depth and theoretical appropriateness proposed by Robert A. Wilson (1995, 187–214). While these theoretical virtues are undoubtedly important, my emphasis reflects a commitment to viewing medicine and psychiatry as fundamentally practically oriented, as opposed to theoretically oriented, disciplines (Conley and Glackin 2021).

degree of match between one's internal states and one's external environment. That is to say, one is immunologically healthy just to the extent that one's immune system is disposed to respond appropriately to the *particular pathogens one is likely to encounter*. In externalist psychiatry, a given brain state can constitute cocaine addiction only if cocaine is present in one's social environment and—probably—if it has played a causal role in bringing about that state (Levy 2013). Likewise, we regard someone as allergic only to the actually existing and environmentally present allergens their immune system is disposed to respond to, and not the infinite range of further molecules, existing only in merely possible worlds, exposure to which counterfactually would prompt a similar reaction. Until Europeans and their companion diseases arrived, there was nothing deficient or unhealthy in the abstract about the Native American immunity profile; it was fully appropriate, *up to that point,* to their pathogenic environment. So, even on the older, narrower view, immunology looks resolutely externalist in tenor; whether one is in an immunologically healthy or ill state is not realized by one's body alone, but in significant part by the presence or absence of pathogens outside it.

But the newly developing picture only reinforces this impression. On this view, as developed in particular by Thomas Pradeu (2012), the organism that immunology delineates is a *heterogeneous* one; rather than arising in its entirety from successive divisions of a single fertilized egg, it comprises a range of components with different, exogenous, origins (2012, 11–12, 269, *passim*). And this suggests that every individual organism proper can be understood in functional terms as a mereologically complex system, changing over time, which integrates a range of biological entities that originate outside the organism, and may be located inside or outside its conventionally understood spatial boundaries, or transiently located between both: embryos, grafted transplant organs, commensal organisms like remoras and fleas, or symbiotes like gut flora, or the bioluminescent *Aliivibrio fischeri* bacteria, which shortly after birth colonize the light organ of the Hawaiian bobtail squid, *Euprymna scolopes*. Proper functioning of the system requires the presence of these entities, while their own functioning presumes that of the rest of the system. So, the immunological picture increasingly suggests that we view the organism's integrated biological functioning as extended outside the body in much the same way, and for much the same reason, as Clark and Chalmers (1998) posited of the mind and its functions.

Since the 1990s, talk of "public health" has begun to be supplanted by what looks like a near-synonym, "population health" (Arah 2009, 235; Diez Roux 2016; Valles 2018, 2). The transition is lexically significant and, isolated and piecemeal though it has been, signifies a genuine shift in emphasis in what, I argue, is an externalist direction. The health of the wider public has long been recognized as a determining factor on the health of its individual members; most obviously, individuals are not typically at risk from infectious diseases that are not at large in the population around them, yet—connecting with the example of immunology above—may conversely be at less risk where the disease has endemic status and the general level of immunity is high. Notwithstanding such well-known interactions, the relationship between individual and public health has often been conceptualized as essentially one-way and reductive; "the public" is simply an aggregate of all its individual members, so the public health supervenes on the health of those individuals. Of course, the health of individuals is affected by the health of everyone around them, as we have seen, but this is a causal rather than a constitutive relation, and there does not seem to be any

distinctive role for the population here—what causes me to fall ill with "freshers' flu" at the start of term is some infected individual or individuals in my class, not the class as a whole.

What the rise of "population health," as distinct from "public health," signifies is a shift toward revising this ontology, and recognizing group and individual as, if not equals, then at least causal peers. On a population health view, the health of individuals and groups is "largely relative and dynamic … neither individual nor population health is identifiable or even definable without informative contextualization within the other" (Arah 2009, 235). In other words, population health science takes seriously the idea of the life course—the idea that health for an individual person is not a merely occurrent biological state, but follows a trajectory through infancy, childhood, adolescence, adulthood, and senescence, each stage of which is comprehensible only insofar as it is embedded in a social context composed of numerous other humans at various stages of the same process (see, for example, WHO 2021). This yields a sort of content externalism; in this way, proponents argue, we can see that judgments about the—rich, holistic—health profile of an individual necessarily presuppose judgments about their community and its health, and vice versa.

My own view here is mildly skeptical, at least about the ontological claim; to the extent that the influence of group health on individual health is constitutive, rather than merely causal, most of the interesting cases seem to be immunological in nature, and do not therefore establish a metaphysically distinctive role for population health. But there are certainly exceptions; one notable example is sickle cell disease. Whether it is healthy to possess the sickle cell gene depends on both the social and pathogenic environments, and these environments are themselves connected. Having one copy of the gene—being heterozygous with respect to it—confers improved resistance to malaria, so all else being equal it is good to have the gene if one lives in an area with a high prevalence of malaria. But all else is rarely equal; this improved resistance creates a selection pressure for the gene in such areas, meaning that those around you are correspondingly likely to possess the gene too. And this in turn means that potential mates are more likely to have it, making offspring much more likely to be homozygous, with a copy from each parent. Such children have defective blood-cells, suffer from great pain, and are susceptible to a host of further illnesses, which are almost invariably life-shortening. We therefore see a high degree of integration between internal and external factors; whether you are more or less healthy for having the gene therefore depends on a very fine balance between the benefits of disease resistance and the costs of potentially very sick offspring, both of which are strongly environment-relative.

Whatever one thinks of the ontology here, then, it is clear that the full health of individuals often requires consideration of an external factor—the health of those in the population around them—to assess. And the question here is not what I do or don't find metaphysically plausible; the philosophical rhetoric around the shift from public health to population health suggests that it is another area of medical practice where externalism has already gained a foothold.

The final such area I discuss here is occupational therapy. This has long struggled for due recognition as a "proper" medical discipline, doubtless at least in part because its name and practical orientation have caused it to be conflated in the eyes of many with occupational medicine or occupational health, a separate discipline concerned with the prevention and treatment of workplace injuries, and the support of workers to return to economically productive status (WHO, n.d.). Occupational therapy is concerned with

"occupations" in a quite different, albeit overlapping, sense: the everyday tasks that those with medical conditions or physical impairments may require assistance to perform in order to navigate their lives.

Occupational therapy is almost wholly externally focused. It starts at the point where conventional, internal medical treatment has run up against the limits of its effectiveness in repairing or restoring the body to a non-pathological state, and focuses instead on what the body and its capacities are *used for*. In other words, rather than seeking to restore a prior or normative internal state of the body, it seeks to restore the body's—and the person occupying it's—ability to function meaningfully in the world in the context of everyday life. It therefore emphasizes the degree to which the body and its activities are *embedded* in a particular environmental context, and makes therapeutic interventions by rearranging the environment and its interactions with the body, so as to *scaffold* the performance of those activities. In so doing, it mirrors closely the strategies of embedded psychiatry (see, for example, Krueger 2020). But it also mirrors and expands a key aspect of biological functionality. "Degeneracy" in biology is the technical name for "the ability of different biological structures to perform the same functional role, and so for organisms to deal with damage or impairment" (Glackin 2025; see also, for example, Edelman and Gally 2001), and represents a ubiquitous phenomenon. Indeed, it is a central concept in systems biology, forming a key explanation of the stability and flexibility of complex biological systems; because such systems can realize their essential functions in different ways, their functioning can survive the injury or removal even of parts specifically evolved to perform a role in it (Glackin 2021, 805).

In effect, occupational therapy seeks to extend the organism's biological degeneracy beyond its own physical boundaries and into its environment; when the narrow physical capacities of the organism cannot be repaired, different bioenvironmental structures can nevertheless be scaffolded to restore the organism's functional interactions in and with its environment. The functioning of the organism is therefore maintained by integrating parts of its environment into the functional system, taking the operative place of those parts internal to the organism that can no longer contribute in the same way. And it therefore provides a potential model for a much broader range of environment-focused therapeutic interventions, whereby disrupted internal functioning can be restored by drawing on external resources.

At least in these three areas, then, the practice of somatic medicine is already to a significant degree openly externalist. I suspect that the same is true, albeit less overtly, in a great many more, and that therapeutic intervention in those areas would be rendered more effective by open acknowledgment of that fact, and the consequent taking of inspiration from areas like occupational therapy. And I suspect, too, that, to the extent that the areas I have discussed in this section are somewhat marginal subdisciplines of somatic medicine, their marginality would disappear if externalism were more widely acknowledged elsewhere. But these suspicions are not part of the present paper's argument; what we are chiefly concerned with here is simply the existential claim that there are at least some existing areas of somatic medicine where externalism has already achieved traction.

4. Externalism in Biology

One potential source of resistance against the development of externalist thinking in somatic medicine is the sense that, by apparently depreciating the importance of the organism, it effectively "de-biologizes" health and illness. Given the discussion in the preceding section, the explicit support of many proponents of population health science for "social medicine" might seem to give that concern weight. But although I am sympathetic to calls for social medicine (see, for example, Glackin 2025, forthcoming), I think the charge of de-biologization is unfounded. Indeed, I think aspects of modern biological thinking lend significant support to medical externalism. I do not claim an implicative relation or direct connection between the two; those who reject medical externalism have not "tollens-ed" away their right to up-to-date biology! But in order to assuage any fears that biology and the organism are somehow "getting lost" in the externalist picture, I want to show that it is in fact much *more* consonant with much of contemporary biological thinking.

One important facet of this consonance has been touched on already—biological degeneracy. Adaptationist rhetoric in evolutionary biology often seems to imply that there is one, uniquely engineered, and therefore "correct," way for the body to perform its naturally selected functions, when in fact much functional behavior is significantly plastic. This is most well known when it comes to the brain; even between monozygotic (identical) twins, there is no single pattern in which neurons must be wired together for reading, or spatial-processing, or recognizing the faces of parents. While this is probably less widespread in somatic functioning, and certainly less widely recognized, cases of it are no less familiar. Consider the very entertaining minority of infants who, before they begin to toddle, never learn to crawl but instead navigate their surroundings by "bum-shuffling;" both are developmentally appropriate means of locomotion, and either may be more effective in a particular baby's environment (Eijsermans et al. 1999; see also Brumm 2020). Even before resorting to medicalized "interventions" such as canes and strollers, many aging people will respond to stiffening and weakening joints by trading their two-up two-down home for a bungalow.

Biological functions are not confined to the inside of the body; a great deal of our behavior and our interactions with the environment is on any plausible account functional. So, there is no reason in principle to confine the known phenomenon of functional degeneracy in biology to the inside of the body, and to exclude from its ambit the routine restructuring and reorganization of body–environment couplings that we undergo to preserve function in the face of bodily impairment or limitation. Externalist thinking about disease and, in particular, therapeutic intervention can therefore be understood quite comfortably within the conceptual resources of contemporary biological theory; such interventions appear biologically unremarkable.

A second recent current in biological theory that neatly complements disease externalism is the so-called interactionist consensus (originally coined by Philip Kitcher 2001), "which is, broadly speaking, the view that rejects gene-centrism and gene determinism and instead emphasizes the fact that traits of organisms are always the result of genes and environments" (Ferreira Ruiz and Umerez 2021). This takes direct aim at the idea that genes, considered independently of the environment in which they are expressed, "encode" anything like a plan or blueprint for the organism's development; as Susan Oyama (1985) influentially pointed out, one could as easily make the claim that the environment encodes such a blueprint, with genes merely "carrying out" the plan by building proteins as

and when instructed. In short, any sense in which the genes carry information about the phenotype is equally true of the environment; both genes and environment are necessary for the expression of any trait, and—as Donald Hebb supposedly quipped—asking which causes the trait is like asking which of its height and its breadth has caused a rectangle to have the area it does (see, for example, Oyama 1985; Griffiths and Gray 1997; Griffiths and Knight 1998; Griffiths and Linquist 2024; on the provenance of Hebb's quip, see Smith 2019).

The idea that genes, as endogenous causal factors in the etiology of disease, are causally impotent on their own, and can therefore have no effect without the input of exogenous causal factors from the environment, is obviously grist to the externalist's mill. Of course, the "environment" discussed by developmental systems theorists like Oyama and Paul E. Griffiths is as often as not itself internal to the organism, as for instance the intracellular environment in which proteins are built. Be that as it may, what interactionism clearly points us to is the lesson that a narrow, reductionist view of how an organism develops its functional capacities—and how they may go awry—gives us a stunted and simplistic understanding of biological development; for a properly complex picture, we must pay attention to the wider causal processes and interactions that externalist medicine emphasizes.

Perhaps the clearest and most comprehensive support for externalism, however, is provided by the "Extended Evolutionary Synthesis" (EES), which seeks to give a broader and more comprehensive account of evolutionary processes than the orthodox "Modern Synthesis" of the 1930s (Müller 2007; Pigliucci 2007). It is not just the theoretical synthesis that is extended here; as I shall claim, it also extends the sense of what it is that evolves, in just the same spatial sense that the Extended Mind Theory of Clark and Chalmers (1998) extends the sense of what it is that cognizes. While formulations vary, and the assorted elements are independent of one another, there are four main threads to the EES: developmental bias, developmental plasticity, inclusive inheritance, and niche construction (EES Consortium, n.d.). The first of these—which states that although genetic mutation is random, phenotypic variation may not be, and that some trait variants may therefore develop more frequently and easily than others—is not particularly relevant to externalist medicine.

The second strand, developmental plasticity, refers to the "ability of an organism to change aspects of its phenotype in response to environmental conditions" and "enables developmental robustness in the face of environmental fluctuations via compensatory adjustments in morphology and behaviour" (EES Consortium, n.d.). We noted the potential relevance of this sort of plasticity previously; one key claim the EES makes here is that the phenomenon is "ubiquitous across all levels of biological organization" (EES Consortium, n.d.). This commitment means that behavioral accommodations, such as an elderly person moving to a bungalow, fall squarely within its explanatory ambit. More generally, it legitimizes the extended sense of functional degeneracy, which I have used to analyze occupational therapy's focus on intervening at the level of a person's interactions with their external environment, as being fully biological; moving beyond the organism's boundaries does not de-biologize our understanding of the organism's health.

According to the doctrine of inclusive inheritance, what is significant in descent with modification—the primary engine of both natural selection and genetic drift—goes far beyond the genome. Far more than genes are transmitted from parents to offspring in the

course of biological inheritance, from mitochondria and other organelles in the fertilized ovum, and chemical conditions in the uterine environment, all the way through to human culture and public language, parents transmit a huge range of nongenetic factors that affect the child's phenotype because, again, genes are thoroughly impotent in the absence of the appropriate environmental conditions for their expression.

Niche construction, in turn, emphasizes that the organism's environment is not a "given," static causal factor, but a product of the organism's (and its ancestors') ongoing activity in it; organisms by their lifestyles actively alter and shape the ecological niches in which they live, and they and their offspring are in turn altered and shaped by the new selection pressures the altered ecology creates. The relationship of organism and environment is therefore dialectical and interdependent; via niche construction and natural selection, adaptation works in both directions. Taken together, these two strands of the EES emphasize again that what we look to when we try to assess how an organism functions, and how *well* it functions, cannot be restricted to what is happening within the boundaries of its own body. Functioning—and therefore malfunctioning too—richly involves and implicates those parts of the environment with which the organism interacts, and can be shaped by and for those interactions just as surely as the organism is. An externalist approach to disease therefore seems a natural consequence of this sort of distinctively externalist reasoning at the cutting-edge of biological theory.[4]

5. Conclusion

When we think about the future of medicine, it can be hard to shake the influence of science fiction. We—or, at any rate, I—readily imagine radically advanced, indistinguishable-from-magic technologies of almost dizzying precision: individually tailored, deterministic gene-therapies; *Star Trek* tricorder-style diagnostic scanning; fleets of nanobots to cruise around our bloodstreams like space-fighters, knitting bones, clearing plaques, and neutralizing pathogens. The reality may be more mundane.

It is possible that we are nearing, sooner than we think, the limits of our ability to diagnose and treat diseases by ever-more-specific microtargeting. It is also possible that we will develop all these marvelous technologies, and yet need them less. Because a key part of the future of medicine and the development of more effective therapies, either way, will be an embrace of the holistic insight that diseases—and health—take place both inside and outside the body, and the new avenues for treatment that this realization opens up. As I have argued here, it is a perspective that has already borne fruit in somatic medicine, albeit much more limited and isolated fruit than in psychiatry. But it is also a perspective that neatly accords with several themes in modern biological thinking. Biomedicine, it turns out, can be a much broader church than we have so far supposed.

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[4] For a novel application of niche construction theory to externalist psychiatry, which could serve as a potential model for somatic externalist treatments, see Felipe Nogueira de Carvalho and Joel Krueger (2023).

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