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DISCUSSION NOTE

Functions and History: A Response to Garson

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Abstract

Justin Garson has argued, contrary to the claims of proponents of purportedly ahistorical theories of functions, that there are no ahistorical theories of functions. In the interest of satisfying uncontroversial desiderata on a theory of functions, the most influential ahistorical views all smuggle in history. I argue that Garson's case relies on a misinterpretation of the ahistorical accounts he targets and that the details of the misinterpretation are instructive. They highlight often unquestioned assumptions about how a theory of functions fits into a broader account of scientific practice and what theoretical work a definition of function should do.

1. Introduction

Whether functions are defined in part by historical properties of the function bearer is a point of contention; however, Justin Garson (2019) has argued that, appearances to the contrary, there are no ahistorical theories of functions. More carefully, Garson has argued that, in the interest of satisfying uncontroversial desiderata on a plausible theory of functions, the major ahistorical contenders all smuggle history into the account. Thus, Garson concludes no extant plausible contender for the correct theory of functions is ahistorical, and we can put this particular dimension of the function debate to rest. I will argue that, at least for two of Garson's primary targets, the case that they smuggle historical properties into the definition of functions is based on a misinterpretation.

Specifically, I argue that Garson's desiderata can be interpreted in two ways, one narrow and one broad. Garson's argument hinges on a narrow reading, but the narrow reading is question begging because most defenders of ahistorical accounts would reject it. The broader reading begs no questions and delivers desiderata that should be uncontroversial, but it undermines the argument that some influential ahistorical accounts smuggle history into their definition of functions.

2. Background

Historical theories of functions say that function possession consists, in part, in having a particular kind of history. For example, a selected-effect account would say hearts have the function of pumping blood because hearts have been naturally

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selected for their ability to do just that. A theistic account according to which hearts have their function in virtue of God's intention when creating them would also be historical. Ahistorical accounts do not make function possession depend on any historical property of the function bearer. For example, Cummins (1975) has argued that hearts have the function of pumping blood because a good explanation of the circulatory system's ability to move materials around the body invokes the heart's capacity to pump blood. That is, something's function is a disposition or capacity it has that contributes in a particular way to a more complex disposition or capacity, as the heart's capacity to pump contributes to the circulatory system's capacity to move materials around the body. Note that for Cummins, function possession is a matter of the system being organized in a particular way so that one disposition partly explains another, regardless of whether those dispositions have ever been activated. A black-headed gull awaiting the arrival of its first clutch still has the disposition to remove hatched eggs from the nest, and this explains the ability to avoid nest predation. History is irrelevant.

Garson does not deny that one could devise a truly ahistorical theory of functions. Rather, he argues that extant purportedly ahistorical theories smuggle history into the requirements for function possession to meet the following two desiderata. First, a theory of functions should capture the distinction between functions and accidents. Male Túngara frog calls have the function of attracting mates, but they also accidentally attract predatory bats. Second, a theory of functions should capture the possibility of malfunction. A heart that ceases pumping blood malfunctions in virtue of failing to perform its function.[1]

Garson also allows that there may be uses of the term "function" to which the two desiderata do not apply. Thus, the real conclusion of Garson's argument is not that "function," in all its uses, must be defined historically, but that insofar as we seek to capture a function-accident distinction and a notion of dysfunction, no theory has shown how this might be done without a historical definition. The implication seems to be that we have good inductive (or perhaps abductive) reasons to think functions must be defined historically to satisfy the desiderata. Theories that have purported to capture the desiderata ahistorically either smuggle history in or offer wildly revisionary accounts. For example, Bigelow and Pargetter's (1987) propensity account partly defines function possession in terms of a "natural habitat," but "natural habitat" is defined historically. Nanay's (2010) modal account, however, is genuinely ahistorical but implausibly revisionary. I set each of these examples aside—in part because I suspect each is guilty as charged—and focus instead on Garson's other two targets: Cummins's (1975) dispositionalist account and Boorse's (1977, 2002) goal-contribution account. As it happens, these two are also the most influential of the four.

According to Cummins, a function is a disposition or capacity that figures in an "analytical account" of some more complex disposition or capacity. As previously noted, the circulatory system has the capacity to move material around the body, and the standard physiological story of how this is accomplished consists of a decomposition of that complex capacity into the organized collection of simpler capacities, including the capacity of the heart to pump. Importantly, this process can

[1] Note that I will move fluidly between the terms "dysfunction" and "malfunction." For present purposes I use "dysfunction" to refer to a state and "malfunction" to refer to an event.

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be iterated. The capacity of the muscle fibers to contract partly explains the capacity of the heart to pump, thereby indirectly contributing to the explanation of the circulatory system to move materials, which in turn partly explains the whole organism's ability to survive and reproduce. Dispositions or capacities cited in a "functional analysis" of this kind are functions.

One frequent objection to Cummins's account says the account is too permissive. I will not adjudicate the merit of the objection here. It is important because Boorse's goal-contribution theory, by his own lights, is nearly identical to Cummins's but avoids the permissiveness of Cummins's account by restricting genuine function attributions to the analysis of specific kinds of capacities, namely, goals.

"[O]rganisms are vast assemblages of systems and subsystems which . . . work together harmoniously to achieve a hierarchy of goals. . . . To describe this hierarchy is to do Cummins's 'functional analysis' on a grand scale. Given this picture, the best account of functions, I believe, is to define functions simply as causal contributions to goals" (Boorse 2002, 70, I have omitted for simplicity that Boorse here partially quotes his own 1975, 57).

I quote Boorse at length here because my characterization of Boorse does not match Garson's. I will argue in the next section that Garson mischaracterizes Boorse and that this mischaracterization is not benign; the charge that Boorse implicitly invokes history hinges on it.

Note that Boorse does not define goals historically. The details need not concern us here, but Boorse appeals to classic work in cybernetics that characterizes goals in terms of states to which a system tends to converge from many starting points (Boorse's influences include Sommerhoff 1950; Brathwaite 1953; Nagel 1961).

3. Boorse's account is ahistorical

For Boorse, functions are contributions to nonhistorically defined goals. However, Boorse (2002, 72–73, 91) notes that it may be useful to pick out specific functions by means of adjectival qualifiers. These include phrases like "intended function," "expected function," "naturally selected function," and "normal function." Boorse (1977; 2002) argues that, at least in biomedicine, "normal" means statistically typical, so the composite concept of a "normal function" refers to a statistically typical contribution to a goal. Note that Boorse would say an intended function is an intended contribution to a goal and a selected function would be a contribution to a goal favored by natural selection. There is, for Boorse, just one concept of function, but it can be useful to note that some functions have important additional properties like being typical, intended, or favored by natural selection.

Boorse invokes the notion of normal function in his account of disease, which says, roughly, that disease is failure to perform a species-typical function with species-typical efficiency—the definition is more nuanced than this, but the nuances need not concern us here. In response to the charge that Boorse cannot account for pandemic disease because it is possible for most of a population to have the disease, thereby rendering it statistically typical and thus healthy, Boorse (2002, 99) notes that "obviously some of the species' history must be included in what's species-typical." From this admission Garson infers that Boorse's definition is historical, but that only follows if being species-typical is part of Boorse's definition of function possession. As

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I have taken pains to emphasize, the appeal to species typicality defines "normal," not "function," in "normal function." In fact, Boorse (ibid., 90) describes his theory as a theory of "biomedical normality."

In short, Boorse's theory of biomedical normality is partly historical, but his theory of functions is not. And "normal" is just a way of pointing to a function of interest for the sake of comparing the similarities and dissimilarities between the functional profiles of different individuals (ibid., 91). The same notion of normality could be applied to things that are not functions. Boorse could speak of a normal form, normal behavior, or even a normal philosopher, and all these notions would inherit the historicity of Boorse's notion of "normal," but this would not mean that "form," "behavior," or "philosopher" are historical notions. Garson's argument hinges on the claim that Boorse defines functions as species-typical contributions to survival and reproduction (Garson 2019, 1148), but that is a mischaracterization of Boorse's position.

I imagine Garson objecting here that there may be an important sense in which Boorse's theory is ahistorical but that this is just a matter of bookkeeping and does not undermine the core point. It is clear that Garson's primary aim is to establish that we need history to explain dysfunction and the function-accident distinction. Even if it is not strictly true that Boorse's definition of function is historical, he still invokes history to explicate the desiderata. Garson could well concede that it is a bit misleading to say there are no ahistorical theories of function but note that the philosophically substantive implications remain intact. If ahistorical theories of functions still rely on historical theories of something else to do theoretical work we associate with functions, it is unclear what point there is in defending them.

Addressing this response will require more careful consideration of what it takes to satisfy the desiderata.

4. The desiderata reconsidered

Garson (2019, 1148) claims his two desiderata are "very minimal, very traditional, and largely uncontroversial" and that proponents of the allegedly ahistorical views he targets all purport to account for them, so he is "not begging any questions." The situation is, in fact, much more complex.

First, both Boorse and Cummins appear at various points to disavow the need to account for dysfunction. As Garson notes, dispositionalist theories appear to rule out the possibility of dysfunction. Cummins (1975, 73) is very explicit that having the function of x-ing requires having the capacity to x. To be dysfunctional is to lack the capacity to perform a function, but Cummins's account would imply that something that cannot perform a function "does not have the relevant function, so it cannot be dysfunctional either"[2] (Garson 2019, 1151). The suspicion that Cummins does not accept the theoretical need to account for malfunction is confirmed by his note (1975, fn. 14) that it only makes sense to talk about functions that cannot be performed in the context of designer intentions and that these play no role in serious science.

[2] Conley (2023) argues that this reasoning is mistaken, but because my aim here is interpretive, what matters is not whether the argument succeeds but that many philosophers including Garson, Cummins, Davies, and Boorse developed their views on the supposition that it does.

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Davies (2001) develops a version of Cummins's account and does not mince words: "On my view, natural traits cannot malfunction; they can disappoint our expectations, but they cannot malfunction" (149). Similarly, Boorse (2002, 89) writes "if Carla's heart cannot pump blood, then pumping is not, in fact, the function of her heart; it has no function." Similarly, referring to artifacts rather than organs, Boorse claims "objects that cannot fly do not have the function of flight. They have only the intended function flight, which means, precisely, that they are intended to have the function of flight but do not have it" (ibid.). Of course, Boorse claims this precisely because he recognizes that as a restricted version of Cummins's account, his own account inherits the commitment that a thing cannot have a function it cannot perform.

Though Cummins dismisses the need to account for dysfunction, proponents of his account have offered explicit, if only fleeting, characterizations of dysfunction (e.g., Craver 2001; Hardcastle 2002). And Boorse (1977) offers a theory of *disease*—he later altered the terminology to "pathology"—as subnormal functioning, a concept that looks awfully close to dysfunction. Boorse (2002) also offers an account of the function-accident distinction, while Cummins (2002, 171) acknowledges it as an outstanding puzzle.

This combination of explicit rejections of the desiderata and apparent attempts to satisfy them presents a *prima facie* interpretive puzzle. However, we can make sense of the situation by noting that there are two ways to interpret the desiderata.

On a narrow reading of the desiderata, they require that we adopt a definition of function that delivers as a more or less direct corollary definitions of both dysfunction and a function-accident distinction. For example, if possessing a function is a matter of having a history of selection for performing some role, then dysfunction is a matter of being unable to perform the selected role, and the difference between functions and accidents is a matter of whether a role that is performed was selected for or not. The preceding quotes seem to show that Boorse, Cummins, and Davies all reject the desiderata, narrowly construed.

On a broader reading of the desiderata, they simply require that our overall account of the role functions play in science provide a means of making sense of the observation that we sometimes attribute dysfunctions and sometimes make a function-accident distinction. We can satisfy the desiderata with a theory according to which dysfunction and the function-accident distinction are explained by the interaction between our concept of function and other concepts and theories in an overall account of scientific practice. More pithily, maybe the apparent normativity and teleology of function attributions is an emergent feature of how they are used in practice, rather than an inherent feature of functions considered in isolation. For example, in Boorse's case, a notion of dysfunction arises only when we pair an ahistorical definition of function with a statistical notion of normality that may have its own explanatory role and other applications.

Garson's argument as it applies to Boorse relies on treating Boorse's "normal function" as a standalone, if derivative, notion of function. Boorse is read as having two theories, a goal-contribution account that does not attempt to satisfy the desiderata and a biostatistical account that does. Assuming a narrow conception of what it takes to satisfy the desiderata, this of course looks like the only interpretive option. If Boorse explicates a notion that looks like dysfunction, then he must be

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defining a derivative notion of function because our definition of dysfunction must be a direct corollary of our definition of function. But this reading is implausible given Boorse's own descriptions of his account, as I argued in the last section.

Paul Davies's (2001) deflationary account provides a useful example of a Cummins-style approach because it is more developed than most and relies on attitudes rather than statistics, a strategy Garson also considers and rejects. According to Davies (2001), when we call something dysfunctional, we erroneously project our own desires and expectations onto the system. We treat it as though what we want or expect it to do is somehow a feature of the functionally characterized item itself. On Davies's view, this leads to nothing but confusion and error, and we should expunge dysfunction-talk from scientific discourse. Importantly, for Davies, his account of dysfunction isn't part of his theory of function but a theory about our own cognitive biases. On a broad conception of the desiderata, this deflationary picture satisfies the dysfunction desideratum because it explicates the practice of attributing dysfunction.

We can easily imagine a less pessimistic view according to which a complex array of attitudes and explanatory practices are at play when we characterize an item as dysfunctional, much as Davies suggests, but these attributions aid, or at least do not harm, scientific discourse. I believe this is roughly what Craver (2001) and Hardcastle (2002) have in mind, but as Garson notes, their suggestions are fleeting, leaving ample room for interpretation.

Garson (2019, 1152) objects that dysfunctions cannot be reduced to preferences, citing examples like teething, sleeping, and pain from childbirth as dispreferred but not dysfunctional. But it is difficult to see equating dysfunction with dispreference as a fair characterization of those who invoke attitudes to explicate dysfunction, absent the assumption that a concept of dysfunction must follow directly from a definition of function. Davies is not reducing dysfunction to preferences; he denies dysfunction even exists. Rather, Davies is saying the mistake we make when we think something is dysfunctional is to project our own attitudes onto the world outside our heads—a less pessimistic view might say this is sometimes useful. This does not imply that we always so project. There may be an interesting psychological story to tell about why we sometimes do and sometimes do not project our attitudes in this way, and it may or may not be that some of the attitudes or the broader story invoke history. But that would not render the causal role account historical because the psychological story is external to that account. The desiderata, broadly construed, are only satisfied by the combination of the definition of function in tandem with the psychological story.

Garson faces a dilemma. If we construe what it takes to satisfy the desiderata broadly, as I have suggested we should, then there are ahistorical theories of function that do satisfy them. However, if we construe the desiderata more narrowly so that they require the relevant distinctions to fall directly out of our definition of functions with little to no input from our broader theories of science, then the desiderata simply beg the question against ahistorical accounts.

But what of the claim that we need history to explain the desiderata, even if we allow that the historical component may arise somewhere other than in our definition of function? Perhaps this is right, but Garson's argument as written falls short of establishing it. At best we can say Boorse relies on history, and the most obvious developments of accounts that rely on our expectations and other attitudes may rely on history as well. These observations are suggestive, but there are too many

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unexplored options to say with any confidence that history must play a role in a theory of dysfunction or a function-accident distinction.

Perhaps more importantly, even if history will need to be part of the story, this does not mean it is theoretically unimportant whether the historical part of the story is our definition of function.

5. Why it matters whether functions are historical

Garson lists three major implications if there are no ahistorical theories of function. If there are no ahistorical accounts of function, then (1) the usual conception of the function debate as a competition between historical and ahistorical accounts is misleading; (2) purportedly ahistorical accounts cannot claim an advantage in accounting for ordinary intuitions and standard biological usage patterns according to which new beneficial traits that result from random mutations lack a history but have a function; and (3) a popular brand of pluralism, according to which historical and ahistorical accounts of function are used respectively by historical and ahistorical disciplines or explanatory projects, must be mistaken. It is too simple to say, for example, that evolutionary biology uses a historical notion of function while molecular biology uses an ahistorical notion if all accounts are historical.

None of these implications follow if functions are defined ahistorically, even if we do need to invoke history somewhere else in our overall theory of science to satisfy the desiderata. This is enough to show that the critique of Garson is substantive, but there is a much deeper issue at stake.

Recall that for Cummins, Boorse, Davies, Craver, Hardcastle, and so forth, function attributions first and foremost, perhaps exclusively, explain how a system works. However, historical accounts appear to render functions epiphenomenal and thus unsuited to this explanatory task. Historical properties are causally inert in that whether a thing has a particular history is not in itself causally efficacious. Of course, the actual chain of causes that led to a system's current features is a historical property, but it is the product of that historical chain of events so far, not the historical process, that is causally efficacious. Thus, defining function in terms of history threatens to make functions causally inert, too. It is unclear how a causally inert function can contribute to an explanation of how a system works. It is therefore unsurprising that those who want to emphasize this explanatory role for functions are wary of historical definitions.

Though the issues are more complex than this short summary indicates, the idea that history makes functions causally, and thus explanatorily, inert is ubiquitous and influential in the philosophical debate about functions (see e.g., Davies 2001; Mossio et al. 2009; Garson 2016). Fans of historical versus ahistorical theories differ in their assessment of how serious this problem is relative to other concerns. Thus, the historical-ahistorical divide in the philosophy of functions tracks important underlying disagreements about what a theory of functions needs to do. The same explanatory divide informs the intuitions and biological usage Garson cites as primary motivators of ahistorical accounts. Newly mutated traits contribute to the working of a larger system, so they appear to play an explanatory role ahistorical theorists uniquely emphasize. Similarly, the brand of pluralism Garson critiques is motivated by the appearance that some areas of science are concerned with why

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traits exist and others with how systems work (e.g., Mayr 1961). And it should not be ignored that pluralism often serves as a way for historical accounts to embrace a causally inert conception of functions without denying the uncontroversial observation that function attributions sometimes appear to explain how a system works.

Thus, A central motivation—in my estimation, the central motivation—of ahistorical accounts is that they completely avoid the problems raised by the causal inertness of historical properties. Even if historical properties arise elsewhere in an overall theory, the causal inertness of those properties does not undermine the explanatory role of function attributions. Perhaps the problems arise in new forms, but the new form may also be more tractable. For example, Boorse can plausibly claim that the statistical properties that define disease play an important role in the practice of medicine other than causal explanation. Davies, if he has to invoke history at all, would only use it to define concepts he claims do no scientific work.

6. Conclusion

Garson has argued there are no ahistorical accounts of function because the extant purportedly ahistorical accounts smuggle history into their definition of function. I have argued that Garson's case relies on a misinterpretation of the accounts he targets. Insofar as these accounts invoke history, it is not in the definition of functions. I have diagnosed the source of this misinterpretation in the assumption that definitions of dysfunction and a function-accident distinction must be a direct corollary of our definition of function. I have argued that ahistorical theories tend to rely on theoretical tools external to a definition of function to explicate dysfunction and the function-accident distinction and ultimately that this makes sense given their picture of functions' explanatory role and the causal inertness of historical properties. My primary aim has been to draw attention to the possibility that the normative and teleological character of functional explanations may emerge out of the interaction between our definition of functions and our broader theories of scientific practice. It may well be that we need history to make sense of these practices, but it will take more work to determine whether this is right and, if it is, whether the relevant history is part of the definition of function or arises elsewhere in a broader theory. And this latter question matters because it makes a difference to how we understand the explanatory role of functions, dysfunction, and the function-accident distinction. We miss important theoretical options worth taking seriously unless we recognize that there are indeed ahistorical theories of function.

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