

Proper Functionalism and the Organizational Theory of Functions

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Proper functionalism is a teleoepistemic view; it analyzes epistemic kinds in teleological terms. Proper functionalism focuses on warrant. Epistemic warrant is a normative property of beliefs that serves as a good route to truth and knowledge. To a first approximation, proper functionalism is the view that a belief is *prima facie* warranted if and only if the belief results from (or is supported by) normally functioning belief-forming processes that have forming true beliefs as a function, where the processes are reliable in normal conditions through normal functioning. Proper functionalism thereby conceives of epistemic warrant for a belief in terms of the function and normal functioning of belief-forming processes.¹ A substantive proper functionalist view appeals to a substantive conception of functions.

I shall take up three issues. I shall show how proper functionalism supports the thesis that there are various grades of warrant. In fact, I shall show, it supports the thesis that there are at least five grades of warrant.²

Second, I shall address the metaphysical grounds of proper functionalism. Since proper functionalism grounds warrant in functions and normal functioning, proper functionalists should further ground their account of warrant in an account of functions. An account of functions can be substantive or non-substantive. Amongst substantive accounts of functions, the two commonly cited to ground an account of functions for proper functionalism are conscious intelligent design, such as design by God, and evolution by natural selection, design by Mother Nature, as it were.

Either source of functions, however, looks problematic to ground an account of warrant, for surely Swampman—a possible molecule for molecule duplicate of a normal human being created by a cosmic miracle as a bolt of lightning hits a log in swamp that bears no causal or explanatory relationship to any human being or any other living thing, past or present—can be a close psychological and epistemological double of an actual living human being (Millikan 1984, Davidson 1987). Swampman was neither

¹ Self-avowed proper functionalists include Plantinga (1993), Bergmann (2004, 2006), Graham (2010, 2011a, 2012a, 2012b, 2014, 2016, 2017, 2019, 2020), Boyce and Moon (2016, this volume), and Simion (2019). Others who hold similar views include Sosa (2007, 2015, 2021) and Burge (2003, 2020), among others.

² I explicitly noted the possibility of at least three grades of warrant in earlier work (Graham 2012a: 449-450; 2012b: 148-150; 2014a: 22-24; 2019: 117-118; 2020: 194-199). For similar ideas, see Pritchard 2010 and Sosa 2015, 2021.

designed by God nor the product of evolution by natural selection. But since he can have warranted beliefs and even knowledge, it cannot be that epistemic warrant is grounded in either of these two substantive sources of functions.

Does Swampman spell the end for proper functionalism, as many epistemologists seem to suppose?³ I shall show how two other accounts of functions—the generalized selected-effects account and the organizational account—avoids the problem.

Third, I address the well-known “new evil demon” problem (or “brain-in-a-vat” objection) to Simple Reliabilism. Proper functionalism—especially when the functions are grounded in an etiological theory of functions—provides a distinctive explanation for why a grade of warrant should persist in “demon-worlds,” even though situational reliability (and so other grades of warrant) vanishes.

1. Substantive Functions

A substantive account of functions seeks to give an account of functions—or what we can call “substantive” functions—that have (at least the following) five features:

- i. There is an important difference between the effects of the item that are amongst its functions and other non-functional effects, no matter how regular and predictable those effects happen to be. The function of the heart is to pump blood, not to make regular beating noises. The function of your phone is to effect rapid communication, not to collect dust. This is the *function/accident distinction*. If functions are dispositions to produce an effect, they are not just dispositions to produce an effect, for the heart is equally disposed to make noise as it is to pump blood.
- ii. An item with a function may malfunction or experience dysfunction but not thereby lose its function. A diseased heart is still supposed to pump blood. A broken coffee maker is still supposed to make coffee. This is the *function/dysfunction distinction*. Items with functions are not always dispositions, even in normal conditions. For a seriously malformed heart is not disposed to pump, but even so that is what it is supposed to do.
- iii. There is a difference between normal (proper or correct) functioning (working or operating) for an item with a function and the fulfillment of an item’s function. An item may work the way it is supposed to work (it is working properly) but still not do what it is supposed to do (it can’t fulfill its function). A car up the lift for inspection may be in perfect working order, but up the lift it cannot take you where you want to go. In the future, a heart removed from the chest during a complicated surgery might still beat normally though no blood is going through. Perhaps orange juice is being pumped through instead for a vitamin C flush. Outside of normal conditions, a normally functioning item with a function may fail to fulfill its function; a functional item that is not malfunctioning may still fail to fulfill its function for all that. This is the *function/normal functioning distinction*.
- iv. Function ascriptions are explanatory. Saying “because its function is to F” can answer the question “why is this here?” or the question “why does this persist?” Why is there a heart in the middle of the chest? To pump blood. Why are there so many cars? To effect rapid transportation. Call this the *teleological feature of function ascriptions*. Since dispositions typically do not explain why an item with a disposition exists or persists, here is another reason why functions are not just dispositions to produce the effect that is the function, even in cases where function ascriptions entail dispositions for

³ E.g. Lyons 2009: 193; Sosa 2011: 134; Goldberg 2012: 116; Copp 2014: 79; Schellenberg 2018: 203; Tolly 2018.

that effect. On a conception of functions as substantive, an item with F as its function is not merely an item with the disposition to F.

- v. Functions set norms. Function fulfillment is a norm: the function of an item is what it is supposed to do; when it fulfills its function, it meets an evaluative norm. Normal functioning is also a norm: operating normally is working or operating the way the item is supposed to work or operate; when it functions normally, it meets another (distinctive though related) evaluative norm. Dispositions are not, as such, normative in this way. Though a rock is disposed to roll down a hill, when it does, it does not fulfill its function. Rolling down the hill is not something the rock is supposed to do.

A conception of functions can be more or less substantive, depending on how many of these features it respects. On a non-substantive conception of functions, functions are just effects, or dispositions to produce an effect, or dispositions to produce an effect that helps explain some further effect of explanatory interest of a larger containing system (Cummins 1975).

A good deal of the debate in the literature on functions is about the correct analysis or understanding of functions on a substantive conception of functions, where functions have all (or nearly all) of these five features. The two most popular ways of grounding a substantive conception of functions are conscious design and evolution by natural selection, as I've already noted.

When an item is consciously assigned a purpose or end, that is its assigned function. Unintended effects are accidental, non-functional effects. Conscious, intentional design of the structure, working and operation of the item sets the standard for how the item is supposed to work or operate. Conscious design sets the standard for normal functioning. Planes are supposed to fly. That's why they are built. The design of the structure sets how the plane is supposed to work or operate so as to fly, so as to fulfill its function.

The selected-effects theory of functions appeals to evolution by natural selection as a source of functions. Evolution by natural selection explains the persistence of traits in a population due to their effects. According to the theory, the selected effects of a trait are the functions of the trait. Non-selected effects are accidental effects of the trait, no matter how regular. According to the theory, selection also sets standards for the normal (correct or proper) functioning (working or operating) for the trait. The way the trait worked or operated when it produced the effect that it was selected for is then the way the trait is supposed to work or operate; that way of operating counts as normal functioning.⁴

Standard characterizations of proper functionalism often suppose that these two standard sources are the *only* two possible sources of functions for a proper functionalist theory of warrant. According to standard characterizations, only God or Mother Nature can ground functions. Though God and natural selection may both suffice for substantive functions, this characterization is too narrow, for there are other sources of substantive functions, as we will see. Different proper functionalisms invoke different sources of functions.

Alvin Plantinga is the best-known proponent of substantive proper functionalism. Sometimes people even think of proper functionalism just as Plantinga's theory of warrant.

Plantinga emphasizes that his proper functionalist theory of warrant is neutral on whether God or natural selection is the source of functions and normal functioning. The theory, he writes with Boyce, is supposed to be "theologically neutral" (Boyce and Plantinga 2012: 96; Plantinga 1993: 7, 82). "We need not initially take the notions of design plan and way in which a thing is supposed to work to entail

⁴ Millikan (1984) argues that a selected-effects account can also attribute functions to learned behaviors (and so not just reproduced items). Functions for learned behaviors, she argues, have indirect proper functions. It is also possible to extend the notion of reproduced entity in such a way so as to see learned behaviors as reproductions, and so to extend the selected-effects theory to explain how learned behaviors can have functions through the selective process of trial-and-error learning. Dretske's use of the selected-effects theory of functions (in his account of mental representations as states with the function of carrying-information), for example, focuses on functions from learning and not from evolution by natural selection (Dretske 1986, 1988, 1995).

conscious design or purpose; it is perhaps possible that evolution (undirected by God or anyone else) has somehow furnished us with our design plans” (1993: 21).

Plantinga’s heart, however, does not place much stock in functions from selection. Continuing this passage, he writes:

But in the central and paradigm cases, design plans do indeed involve the thing’s having been designed by one or more conscious designers who are aiming at an end of some sort, and design the thing in question to achieve or accomplish that end. In exploring the notion of design plan, therefore, we must keep close to the front of our minds the way things go in these central and paradigm cases. We must therefore bear in mind the way in which a radio, say, or a rope, or an airplane, or some other kind of artifact can be said to function properly, and what the connection in those cases is with a design plan. (1993: 21)

Throughout his influential book *Warrant and Proper Function* this is just what he does: when explaining purposes (functions) and plans (specifications for proper functioning), he focuses almost exclusively on artifacts. In so doing he elaborates our commonsense conception of the functions of artifacts. He then says little to nothing about functions from selection as a possible source of purposes and plans in the first ten chapters of his book.

And then in chapter 11 when he does discuss accounts of function tied to selection, he argues that there is no adequate “naturalistic” theory of functions (1993: 196-198). He concludes that functions cannot arise from selection but only from conscious design. Insofar as his metaphysics goes, that makes Plantinga an intelligent design reliabilist.

Fortunately for the “naturalist” proper functionalist, Plantinga’s arguments are entirely ineffective (see Graham 2011a). “Naturalist” accounts of functions are alive and well (see Garson 2019). And so we are back to where Plantinga began: either God’s design or Mother Nature’s handiwork suffices for the ground for functions and the standards for normal functioning that ground warrant.

2. Five Grades of Warrant

Before pursuing how substantive accounts of functions ground proper functionalism, let’s further elaborate on proper functionalism as an account of warrant, starting with Plantinga’s version. His penultimate account of prima facie warrant goes as follows:

A belief B of S has prima facie warrant iff

- (1) B has been produced in S by cognitive faculties that are working properly (functioning as they should, subject to no cognitive dysfunction) in a cognitive environment that is appropriate for S’s kinds of cognitive faculties,
- (2) the segment of the design plan governing the production of that belief is aimed at the production of true beliefs, and
- (3) there is a high statistical probability that a belief produced under those conditions will be true. (1993: 46-47).

Condition (1) is actually two conditions: the faculty (the belief-forming process) is functioning (working) normally (properly) *and* the faculty is presently located in normal conditions for the faculty.

Tracking this, Plantinga’s account is then this:

A belief B of S has prima facie warrant iff

- (i) B is produced in S by a normally functioning belief-forming process Z of S;

- (ii) Z is presently situated in normal conditions;
- (iii) the function of the belief-forming process Z is to form true beliefs;
- (iv) the process Z reliably fulfills its function when functioning normally through normal conditions.

Plantinga's aim was not just to analyze warrant but knowledge, to identify and understand the degree of warrant *sufficient* to convert a true belief into knowledge. Could a true belief that meets conditions (i)-(iv) fall short of knowledge? Plantinga soon realized it could, for he realized a false belief could meet (i)-(iv), and so he realized that a belief could meet (i)-(iv) but still be true by accident (Plantinga 1997; cf. Dretske 2017), as in Russell's stopped clock case. He further realized that environmental luck cases were compatible with his account. Environmental luck cases were originally identified by Dretske, Ginet, Goldman and others, the so called "fake barn" cases. Dretske (1969, 1971) and then Goldman (1976) and then Nozick (1981) proposed a sensitivity condition on the reasons/grounds/methods/processes for belief to rule out such cases. Sosa (1999) and Pritchard (2005), among others, proposed a safety condition on the reasons/grounds/methods/processes instead.

Plantinga then proposed an additional "resolution" condition to rule out these cases. When is that condition satisfied? The answer seems to be that it is satisfied when the reasons/grounds/methods/processes are *safe* à la Sosa-Pritchard, (see Plantinga 1996: 328; Plantinga 1997).

Plantinga thereby added a safety condition on the degree of warrant sufficient for knowledge. Call this condition (v):

- (v) the process Z is safe on the occasion vis-à-vis the belief B.

Meeting all five conditions then produces a degree of warrant *sufficient* for knowledge (tabling issues about defeaters for warrant and questions about degrees of warrant tracking degrees of confidence—both topics for other occasions).

In a 2004 paper entitled "Externalist Justification without Reliability," Michael Bergmann made the following observation. Suppose we agree that Plantinga's four (or five) conditions must be met for (prima facie) warrant sufficient for knowledge. Still we can ask about lower grades or levels of epistemic success, as it were, grades of epistemic success that fall short of knowledge. Could we, following Plantinga's inspiration, analyze or understand a lower grade of epistemic success in proper functionalist terms? Bergmann's answer is yes.

Here's Bergmann's idea: ignoring (v) for the moment, drop Plantinga's condition (ii) and then call the resulting property of belief—the property that consists in meeting (i), (iii) and (iv)—*epistemic justification*. Bergmann then holds the following:

In all possible circumstances, a belief B is prima facie justified iff B is produced by cognitive faculties that are (a) functioning properly (operating normally), (b) truth-aimed (their function is to produce true beliefs), and (c) are reliable in the environments for which they were "designed" (i.e., reliable in normal conditions). (2004: 44)

Justification for Bergmann is then to be understood in terms of functions, normal functioning, and reliability in normal conditions when functioning normally. "My proposed account of justification," Bergmann writes, "is just...Plantinga's account of warrant...without Plantinga's condition (ii)—the environmental condition" (2004: 44). Bergmann thereby weakens Plantinga's account of warrant to arrive at an account of justification.

On Bergmann's account of justification, since there is no requirement that the subject be in normal conditions, there is no requirement that there is a high conditional probability that the belief is true in the subject's present circumstances for the belief to be justified. Hence, on Bergmann's view, justification does not entail reliability. That is, it does not entail *in situ* or *de facto* reliability. Hence the title of his paper.

Even so, Bergmann's view is reliability entailing in a sense, for on Bergmann's view justification entails the reliability of the process *in normal conditions*. Were the process *not* reliable in normal circumstances, it would not confer justification in *any* circumstances. So at least in that sense, Bergmann's account of justification is a reliabilist account of justification, a proper function reliabilist account of a kind or grade of epistemic success (Bergmann 2004: 45).

Why drop the *in situ* reliability condition, the condition that the subject presently reside in normal conditions? The reason is to avoid the "new evil demon" objection to simple reliability theories of justification (Cohen 1984). On a simple reliability theory, a belief is (prima facie) justified only when based on a belief-forming process that is *in situ* reliable, reliable in the circumstances of belief-formation (Goldman 1979). But then imagine an ordinary human being who has been kidnapped by aliens and placed in a vat of nutrients and hooked up to a massive computer and then fed systematically misleading inputs into its otherwise normally functioning perceptual belief-forming processes so that it is massively deceived, Matrix-style, about its present environment. The victim will form perceptual beliefs that are, intuitively, justified, but in the present circumstances there is only a rather small probability that any of the subject's perceptual beliefs are true. Justification thus cannot entail *in situ* reliability, and so the simple process reliability theory of justification must be false. That's the new evil demon problem.

There are (at least) three versions of this kind of brain-in-a-vat case (Graham 2012a: 468-469). Here is the first: a normal human being with a normal history finds herself in radically abnormal conditions, Matrix style. This case is genuinely possible, even if highly unlikely. There are also less unlikely possibilities, as we may stumble unawares into abnormal circumstances, if only for a short time.

Here is the second version: a disembodied spirit exists independently of any relations to a broader physical environment, massively fooled with a mind just like yours or mine, as Descartes imagined. This spirit, however, is metaphysically impossible, at least to my mind. Descartes imagined the impossible.

The third version is a Boltzmann brain that duplicates a human brain, but with no causal or explanatory relations to any human or any broader physical environment. It's floating in a pool of nutrients on an otherwise barren rock somewhere in the multiverse. Boltzmann *brains* may be metaphysically possible, but minds do not supervene on Boltzmann brains. Boltzmann *minds* are not metaphysically possible (e.g. Millikan 1984, Davidson 1987, Dretske 1988, Burge 2010).

The first version challenges the simple reliability theory, for it is a genuine possibility. By the "new evil demon" problem, I have the first possibility in mind.

Bergmann's account of justification avoids the new evil demon problem for his account does not require the *in situ* reliability of the belief-forming process. The process need only be reliable *in normal conditions* when it is in normal conditions for the process to confer justification in any conditions. If reliable while situated in normal conditions, the process will confer justification even if the process is not presently situated in normal conditions. Bergmann's proper functionalist account of justification is then not refuted by the possibility of a massively deceived "brain-in-a-vat", as long as belief-forming processes *are* reliable in normal conditions when functioning normally. Problem solved (2004: 45, 49).

What Bergmann's insight suggests is the further insight that one can, within a proper function reliabilist framework, distinguish level or grades of warrant, grades or levels of the normative property of belief that puts belief on a good route to truth and knowledge. Here are five such grades:

Warrant-grade-one: A belief B has *warrant-1* iff:

- (1) B is based on a (normally acquired) normally functioning belief-forming process Z
- (2) Z has forming true beliefs as a function
- (3) Z reliably forms true beliefs in normal circumstances through normal functioning.

This is the grade of warrant Bergmann calls *justification*. It's also very close to what Sosa calls *adroitness*, though Sosa tends to shy away from a substantive notion of function in his epistemology.

Here is the second grade:

Warrant-grade-two: A belief has *warrant-2* iff:

- (1) B is based on a (normally acquired) normally functioning belief-forming process Z
- (2) Z has forming true beliefs as a function
- (3) Z reliably forms true beliefs in normal circumstances through normal functioning.
- (4) Z is in normal conditions.

This is the grade of warrant closely connected to Plantinga's penultimate account of warrant. It's also very close to what Burge (2003, 2020) calls warrant, though Burge also thinks warrant persists in "demon worlds" like the brain-in-a-vat scenario (see Graham 2020 for discussion). This grade, it should be noted, is compatible with false belief. For our belief-forming capacities, though reliable in normal conditions, need not be infallible when functioning normally in normal conditions. This suggests the next grade of warrant:

Warrant-grade-three: A belief has *warrant-3* iff:

- (1) B is based on a (normally acquired) normally functioning belief-forming process Z
- (2) Z has forming true beliefs as a function
- (3) Z reliably forms true beliefs in normal circumstances through normal functioning.
- (4) Z is in normal conditions.
- (5) B is true—Z has fulfilled its function—(non-deviantly) through the normal functioning of the belief-forming process in normal conditions.

This grade of warrant tracks Sosa's account of "aptness." A belief is apt, according to Sosa (2021), iff it is accurate (it hits the target the subject or the process is "aiming" at) because it is adroit (it is formed by a process or "virtue" that is reliable (enough) in appropriate (normal) conditions in good shape (when functioning normally).

A belief can be apt in Sosa's sense, however, without being based on safe process/method/virtue. This suggests a fourth grade of warrant:

Warrant-grade-four: A belief has *warrant-4* iff:

- (1) B is based on a (normally acquired) normally functioning belief-forming process Z.
- (2) Z has forming true beliefs as a function.
- (3) Z reliably forms true beliefs in normal circumstances through normal functioning.
- (4) Z is in normal conditions.
- (5) B is true—Z has fulfilled its function—through the normal functioning of the belief-forming process in normal conditions.
- (6) In the circumstances, C, Z is a safe method or process; the subject would not easily form a false belief through Z in C.

Warrant-grade-four tracks Plantinga's ultimate account of (prima facie) warrant.

One might imagine an even higher grade of warrant. For example, some contemporary epistemologists think that knowledge requires not only safety (something like immunity to error in all nearby worlds) but immunity from error in all possible worlds where the belief is held on the relevant process/method/grounds/reasons. Knowledge would then require "metaphysical infallibility." Tabling whether knowledge requires this higher grade, we can incorporate it into our taxonomy as still another grade of warrant:

Warrant-grade-five: A belief has *warrant-5* iff:

- (1) B is based on a (normally acquired) normally functioning belief-forming process Z.
- (2) Z has forming true beliefs as a function.
- (3) Z reliably forms true beliefs in normal circumstances through normal functioning.
- (4) Z is in normal conditions.
- (5) B is true—Z has fulfilled its function—through the normal functioning of the belief-forming process in normal conditions.
- (6*) Formed by Z in the actual world, B is true in all possible worlds. Or, in all worlds where B is formed on Z, B is true.

Any proper functionalist is free to accept this five-way distinction between grades of warrant. It's not the intellectual property of only one proper functionalist account among others.

According to the proper functionalist, all of these grades of warrant are normative for they all entail normal functioning, and normal functioning entails meeting norms (in the sense of meeting evaluative standards, not in the sense of prescriptive guides), where the norms are standards for how the belief-forming process is supposed to work or operate (Burge 2010, 2020; Graham 2012a, 2012b, 2019).

Which grade or grades of warrant knowledge requires is not an issue to be addressed here. Another kind of proper functionalism takes knowledge (as opposed to true belief) to be the relevant function from which one then derives an account (of the grades) of warrant. That version of proper functionalism shall also not be addressed here (see Simion 2019 and compare Miracchi 2015).

3. Warrant and Selection

Most philosophers no longer believe, as did many of our predecessors in the Western tradition, that our bodies and mind/brains are artifacts designed and created by a divine being. The appeal to God as the source of functions is unlikely to have much traction in contemporary philosophy, as a substantial majority of contemporary philosophers are either atheists or agnostics. Though God's design may suffice, God may not be there to do the job.

Evolution by natural selection is now the best explanation for the existence of complex, well-adapted traits, like feet, legs, and opposable thumbs, not to mention the eye and all of the parts of the brain devoted to vision. If we are to ground proper functionalism in a substantive account of functions, it may look like appealing to the popular selected-effect theory of functions is the best (and perhaps the only) way to go.

To elaborate, let's start with a reminder of how evolution by natural selection works. It involves three elements.

First, there is variation of a trait in a population. E.g. some beetles in a population are green, some are brown.

Second, there is selection. Some members of the population are more likely to survive and reproduce because of their variant of the trait. If the beetles are preyed upon by birds, and if the beetles live on brown trees, then the green beetles are more likely to be seen and eaten by the birds than the brown beetles.

Third, the trait is passed on to offspring. Brown beetles have brown offspring; green beetles have green offspring.

These three features are a source of *evolution*—of modification by descent in the traits of a population over time. In our example, over time the entire population is likely to be brown. Because of selection, the green beetles are less likely to survive to reproduce, where the brown beetles will do better. The brown beetles are more “fit” than the green beetles. Being brown is “adaptive;” being green is not. Over time, only brown beetles will exist. So when we ask, of a current population of beetles, why they are all brown, we can answer that they are all brown because the population underwent selection for being brown, where being brown provided camouflage from predators. Traits that now exist because they

underwent selection for an adaptive effect are called *adaptations*. Being brown, for these beetles, is an adaptation.

The popular selected-effects theory of functions then sees traits with functions as adaptations; functions are effects that were selected-for in the past. The function of a trait is the (past, and possibly current) adaptive feature of the trait that explains why the trait was selected-for. As for our beetles, the function of brown skin is camouflage.

How often must a trait produce the effect in order to be selected for that effect? The generic answer is “often enough.” The more informative answer turns to the details of the case. Different cases will give different answers. How often must sperm fertilize eggs to be selected for fertilizing eggs? Once in a billion. How often must a heart pump blood so as to be selected for pumping blood? All the time.

Prominent proponents of the selected-effect theory of functions include Ruth Millikan (1984, 1989), Karen Neander (1991), Peter Godfrey-Smith (1993, 1994), and David Buller (1998). There are many different ways in the literature to spell out the details. Here’s a simple version:

A current token *t* of type *T* has *F* as a (selected effect) function iff:

(1) Ancestors of *t* did (produced) *F*.

(2) There was selection for *T* because ancestors in the population of *T* did *F*, so that *t* exists now (in part) because (1).

Condition (1) is redundant with (2). Stating it separately, however, makes it more evident than it might be otherwise be that functions from selected effects require a history of success in the following sense: if ancestors of *t* did not do *F*, then *F* would not be the function of *t*: if ancestors of tokens of *T* did not do what became the function of (later or) current tokens of *T*, then doing *F* would not be the function of (later or) current tokens of *T*. Selected-effect function ascriptions entail past production of the effect that is the function of the trait. In a slogan, functions entail past success. If there are no “good” cases (of function fulfillment) in the past, there are no “bad” cases (of failure to fulfill the function) in the present or future. For functions from selected effects, the good case is “metaphysically prior” to the bad case.

Recall the first four features of substantive accounts of functions: (i) the function/accident distinction; (ii) the normal functioning/function fulfillment distinction; (iii) the function/malfunction distinction; and (iv) that function ascriptions are explanatory. The selected-effects account of functions captures all of these distinctions.

(i) Selected effects are functions. Not selected-for effects are accidental, non-functional effects. The heart was selected for pumping blood, not for making rhythmic noises.

(ii) Normal functioning is the way the trait worked or operated so as to produce the effect that it was selected for. Normal conditions are those circumstances (and relevantly similar circumstances) where the trait, in working that way, produced that effect. A trait can continue to function normally (work the way it worked when selected for in normal conditions) but stray from normal conditions.

(iii) A trait token can be malformed so that it cannot function normally well enough to fulfill its function, even in normal conditions. Still, if it is a descendent from tokens that were selected for producing the functional effect, then according to the selected effects account, that token still has the relevant function.

(iv) Function ascriptions on the selected effects theory are shorthand for a historical explanation for the existence or persistence of the trait in terms of the functional effect. Why are the beetles brown? Because being brown was selected for, to camouflage the beetles from birds. Why do

mammals have hearts? Because having hearts (like these) was selected for, to pump blood (in this way).

That the selected effects theory captures these four features helps explain why the theory has been so popular.

One might think that the selected-effects theory is too demanding in the following way: must an item, to have a function, be a trait within an individual who is the descendent of other individuals? Why is *reproduction* required for functions? Why can't a trait have a function because the trait *persists* because of its selected effects? Taking this to heart, Justin Garson offers what he calls the "Generalized Selected Effects" theory of functions:

A function of a trait is an activity that led to its differential reproduction, or its differential retention (its persistence), in a population. (Garson 2019: 93; cf. Bouchard 2008; Doolittle 2014)

For Garson, populations and selection are still required for functions (that's the "differential" part of the definition), but reproduction is not.

What's Garson's reason for this liberalization? The first is that this is how some neuroscientists talk when they talk about the functions of neurons. There's a population of neurons in the brain with different effects. Some survive because of those effects and others are pruned away. There is thus differential selection among traits in a population. But there's no reproduction—the neurons don't reproduce or make new copies of themselves—but only persistence. Even so there's still functions.

The second and "main" argument for the Generalized Selected-Effects theory is just that it captures our four substantive features of functions just as well as the "standard" selected-effects theory just rehearsed. "Parity of reasoning," he says, "demands that we accept it" (Garson 2019: 101).

The third is that it easily accounts for why learning should also be a source of functions. It is often noted that trial-and-error learning looks a lot like natural selection, for both trial-and-error learning and natural selection are forms of consequence selection (Wright 1973; see Frieman 2002 for discussion and references). We try *this* behavior; we try *that* behavior. Through trial and error, the one that works better is retained. Learning selects *this* behavior over *that* behavior. *This* behavior persists; *that* behavior does not. So by the Generalized Selected Effects theory, *this* form of behavior has producing the effect that explains why it persisted over variant forms of behavior as its function, even if this form of behavior is not the result of differential reproduction.

I accept the conditional: if selection over variants in a population grounds functions, then differential persistence works just as well as differential reproduction. An item may then have a selected-effect function even if the item is not because of reproduction, and so has no ancestors. On the generalized selected-effects theory, a first-generation trait may acquire a function.

4. Normal Functioning Encodes Reliability: Why Should Warrant Persist in Demon-Worlds?

Ruth Millikan turned to the selected effects theory of functions to analyze knowledge in her 1984 paper, "Naturalist Reflections on Knowledge." True beliefs that are knowledge, she conjectured, are at least beliefs that are true through the normal functioning of the belief-forming process in normal conditions when the process has forming true beliefs as a function. Something close to warrant-grade-three is, for Millikan, at least necessary, and given the drift of her essay probably also nearly sufficient, for knowledge. If we analyze "competencies" in terms of capacities with selected-effect functions, then Millikan's view would be that knowledge is true belief that manifests competence, or what Sosa later came to dub as apt-belief. In other words, Millikan, at least to a certain extent, anticipated Sosa.

I relied on the selected effects account of functions to develop an account of warrant-grade-one in a series of articles, including "Testimonial Entitlement and the Function of Comprehension" (2010), "Does Justification Aim at Truth?" (2011b), "Epistemic Entitlement" (2012a), and "Warrant, Functions,

History” (2014), where evolution by natural selection or learning by consequence selection could ground functions (for the emphasis on learning, see Graham 2012a: 457 and especially Graham 2014a: 31-34; see also note 4). My thesis in those papers was that “justification” or “entitlement” or “warrant” consists in the normal functioning of the belief-forming process when the process has forming true beliefs *reliably* as a selected effect function, so that the process does produce reliably true beliefs through normal functioning in normal conditions. The individual, however, need not presently be in normal conditions to function normally, and so “justification” may persist even if the individual is not in normal conditions, such as a brain-in-a-vat scenario. My thesis was about the metaphysical ground for warrant-grade-one.

My development of the thesis was original in the following way.

I noted that when an item had to reliably produce an effect in order to be selected for that effect, such as the heart, then we would describe the function as reliably producing the effect. And that makes sense. The heart that reliably pumped blood was selected over less reliable variants. Thus, the function of the heart is to reliably pump blood, not just to pump blood simpliciter. When it comes to belief-forming processes, there could be a number of selected effects. Some belief-forming processes may not have forming true beliefs as a function. Others may have forming true beliefs as a function, but they need not have done so reliably in order to be selected for forming true beliefs. And then there are some that were selected for forming true beliefs, reliably so. In this last case, I say that the process has forming *reliably* true beliefs as a function, not merely forming true beliefs as a function (Graham 2012a, 2014b).

So I would revise our previous definitions of the grades of warrant in such a way as to incorporate this point. Here is my revision of warrant-grade-one:

Warrant-grade-one: A belief B has *warrant-1* iff:

- (1) B is based on a (normally acquired) normally functioning belief-forming process Z⁵
- (2) Z has forming **reliably** true beliefs as a function
- (3) Z reliably forms true beliefs in normal circumstances through normal functioning.

Subsequent grades of warrant would then be revised in similar fashion.

My development of my thesis was also original in a second way. I relied on the following fact to derive an interesting corollary with an important upshot.

Here is the fact. On the selected-effect theory of functions, it is *a priori* necessary that if a trait has a selected-effect function, then, ceteris paribus, in normal conditions it will, often enough, fulfill its function through normal functioning. For if it did not fulfill its function often enough through normal functioning in normal conditions, then the trait would not have been selected for the relevant effect. That’s just the logic of selected-effect functions. This point applies with equal force to any etiological theory of functions—any theory that attributes functions (partly) in virtue of past effects. If the trait did not have that effect in the past in certain conditions when working a certain way, then the trait would not

⁵ Why also add the parenthetical “normally acquired”? That’s to exclude “Truetemp” and related types of counterexamples to both reliabilism and proper function reliabilism. “Normally acquired” means the belief-forming process must be acquired through a process that generates functions for the individual. If Lehrer’s tempucomp is grafted on to your brain (Lehrer 1990), though it may have been designed to detect the temperature, if you did not acquire it in a way that generates functions for you, it does not contribute to warrants for your so-caused beliefs (pace Lyons 2009: 127-128). Or if an alien’s organs are grafted onto your brain, though the alien’s organs may have the function to reliably form true beliefs, if you did not acquire the organ in such a way that it has a function for you, then it doesn’t contribute warrants for you (Graham 2012a: 478; Millikan 1984b: appendix). Though not accidental *for the alien*, the structure is accidental *for you*. Lucky accidents that produce reliably true beliefs do not generate warrants.

acquire that effect as its function. Again, this is why the good case is metaphysically prior to the bad case; no good cases then no bad cases.

Here is the corollary. Recall that normal functioning is just working or operating the way the trait worked so as to produce the effect that became the trait's function. Normal functioning is then *constitutively associated* with function-fulfillment: normal functioning *just is* working or operating in such a way so as to produce the functional effect, often enough, in normal conditions. What counts as *normal* functioning for a trait with a selected *effect* function is *understood in terms of* function fulfillment. Though occasionally distinct (an item on an occasion can function normally without fulfilling its function, even in normal conditions), the concepts of normal functioning, normal conditions, and function fulfillment are all holistically interrelated. You don't fully understand one without understanding the others: each one is constitutively understood in terms of the others.⁶

Here is the important upshot. Assume forming reliably true beliefs is the selected-effects function of a belief-forming process. Then (given the fact) it is a priori necessary that the process, given its function, will reliably form true beliefs in normal conditions when functioning normally. If it didn't, it would not have that function. (Note: it is contingent that a structure has a function, and so contingent that it works a certain way in a certain kind of circumstances so as to produce an effect. What's necessary is that *if* it has a function due to its etiology, then it did work in such and such a way in such and such circumstances to produce such an effect.) Then (given the corollary) normal functioning for such a process just is working or operating in such a way so as to produce reliably true beliefs. It then follows that normal functioning for such a process is constitutively understood in terms of forming reliably true beliefs. You don't understand what it is for this process to function normally unless this way of operating—the normal way—reliably produces true beliefs in normal conditions. Normal functioning thereby “encodes” reliably getting things right. That's the upshot.

This upshot, I believe, helps provide a better explanation for why warrant-grade-one (what Bergmann calls “justification”) is a genuine grade of warrant better than the standard explanation in the literature given by some reliabilists. Here's the standard explanation. Take a belief-forming process that is reliable in normal conditions. Then “envat” the process so that it is no longer in normal conditions, and so no longer such as to produce reliably true beliefs. Should the process in the vat continue to confer justification (or “warrant”) on the beliefs so formed? The standard explanation says yes because *if* the process *were* in normal conditions, then it *would* reliably form true beliefs (e.g., Sosa 2015; cp. Graham 2020, 2022).

Now the Simple Reliabilist about justification, who thinks *in situ* reliability is necessary for justification, may dig in her heels and deny that such a response is adequate. “To say that the process would be reliable, were it in normal conditions,” she says, “is simply to say it would confer justification on the beliefs it so forms, were it in normal conditions. It is not to say,” she continues, “that the beliefs are justified even when massively false. It's not to say that the process confer justification while envatted.” If probable truth isn't present *in situ*, she says, justification (or warrant) isn't present either, even if it *would* be there if things *were* otherwise than they are.

But if we think of warrant as the normative property of belief that provides a good route to truth and knowledge, then we can see why normal functioning for a belief-forming process with forming true beliefs reliably as a function should provide at least a *degree* or a *grade* of warrant, even when the process is no longer situated in normal conditions, and so not *in situ* reliable. That's because, on the selected-effects theory of functions, normal functioning isn't *simply* operating in a way that *would* produce true beliefs in normal conditions. Rather, normal functioning is *constitutively understood* in terms of function

⁶ The holistic explanatory individuating interconnection between normal functioning, normal conditions, and function fulfillment for items with an etiological function marks a fundamental contrast with functions from conscious design. For an item with a consciously assigned function the purpose, the design plan, and the intended circumstances can all be individuated independently of one another. See Graham 2012a: 459-460 and 2012b: 75, n. 12.

fulfillment. So when the belief-forming process has forming true beliefs reliably as a selected-effect function, then normal functioning is constitutively understood in terms of reliably getting things right—normal functioning encodes reliably getting things right (Graham 2014a: 21-22). So even in a vat, the belief-forming process can meet a norm or standard that is constitutively understood in terms of reliably getting things right, and so in terms of truth and knowledge. That’s why, even if the subject is not in normal conditions, the beliefs so formed enjoy a degree or grade of *warrant*.

5. The Organizational Theory of Functions

Though I relied in the papers just cited on the selected-effects account of functions to ground a substantive proper functionalist theory of warrant, I was aware that one might ground a proper functionalist theory of warrant in another substantive account of functions. Substantive proper functionalism, one might argue, is a big tent. Any adequate substantive account of functions suffices for a substantive proper functionalist account of warrant. Though I once believed the selected-effects theory was the best theory of natural functions, over time I have come to prefer another substantive theory of functions, the organizational theory of functions associated with Peter McLaughlin, Alvaro Moreno, Matteo Mossio, Christian Saborido, and Gerhard Schlosser, among others.⁷

Paradigmatically the differentiated traits—the eyes, the hands, the liver, the heart—of living organisms have functions. What is it about living organisms that would make sense of why some of their traits have functions, functions in the substantive sense?

Here is the idea behind the organizational theory. All living organisms are self-organizing systems made up of various differentiated parts, where living organisms distinguish their insides and their outsides (e.g. we have skin), where activities of the parts of the organism contribute to the persistence of the whole (when the heart pumps blood the organism stays alive), and where the persistence of the whole organism helps contribute to the persistence of the parts (when the organism stays alive through taking in energy from the environment, it self-replicates and self-repairs its parts, and so the heart is replicated and repaired). Living organisms are organizationally differentiated self-organizing and self-maintaining systems with an inside and an outside that, by taking in and metabolizing free energy from the environment, remain far-from-equilibrium (and thereby stay alive), despite the second law of thermodynamics.

The organizational theory of functions then sees functions as the effects of traits of a self-organizing system with differentiated parts that contribute to the self-maintenance of the system which, in turn, contribute to the persistence of those very traits within the system. Here, to a first approximation, is the organizational account of functions:

A function of trait T in S is F iff:

- (1) S is a differentiated self-organizing system.
- (2) T did F in S.
- (3) By doing F in S in the past, T contributed to the self-maintenance of S.
- (4) T thereby persists now in S (at least in part) because (3).

This theory of functions, like the selected-effects theory, is an etiological theory, for it explains the current function of a trait in terms of the past effects of the trait. If this heart, for example, pumped blood in an organism in the past, and pumping blood contributed to the ongoing self-maintenance of the organism, and this heart persists now in the organism (at least in part) because it contributed to the

⁷ Schlosser (1998); McLaughlin (2001, 2002, 2009); Mossio, Saborido & Moreno (2009); Saborido, Mossio & Moreno (2011); Moreno & Mossio (2015); Saborido & Mossio (2016); Mossio & Bich (2017). For critical discussion, see Artiga and Martinez (2015) and Garson (2019).

ongoing self-maintenance of the organism, then it has pumping blood as (one of) its function. Functions are then (past) beneficial effects that (help) explain re-current persistence (McLaughlin 2001: 168). Unlike the narrow selected-effects theory, however, it does not require that the function bearer have distinct organisms as ancestors; it does not require reproduction. It does not require generations of organisms with the trait in question to persist before it ascribes a function to the trait. Rather it only requires the individual trait within an individual organism contribute to the maintenance of the organism, which in turn contributes to the persistence of the individual trait. Once that feedback loop occurs, regularly enough so as to be non-accidental, the organizational theory ascribes functions. And so the organizational theory, like the selected-effects theory, is an etiological or “backwards” looking theory. It just doesn’t look back to ancestors in a population of variants that underwent selective forces; it looks back to earlier “cycles” of the trait within the individual organism. Nor does it look back to earlier variants within a current population that underwent selection, as in Garson’s generalized theory. Selection isn’t a part of the organizational theory. It is then a mistake to call the selected-effects theory *the* etiological theory of functions, for the organizational theory also looks to the “etiology” of the trait to ground functions.

Recall the first four features of substantive accounts of functions: (i) the function/accident distinction; (ii) the normal functioning/function fulfillment distinction; (iii) the function/malfunction distinction; and (iv) that function ascriptions are explanatory. The organizational account captures all of these distinctions.

(i) Effects that contribute to self-maintenance are functions. Effects that do not contribute to self-maintenance are accidental, non-functional effects. The heart contributes to self-maintenance by pumping blood, not for making rhythmic noises.

(ii) Normal functioning is the way the trait worked or operated so as to produce the effect that contributes to self-maintenance. Normal conditions are those circumstances (and relevantly similar circumstances) where the trait, in working that way, produced that effect. A trait can continue to function normally (work the way it worked when it contributes to self-maintenance) for in normal conditions) but stray from normal conditions.

(iii) A trait token can be malformed so that it cannot function normally well enough to fulfill its function, even in normal conditions. Still, if it is a token of a type that where typical tokens persist because they contribute to self-maintenance, that token still has the relevant function even though it is malformed (McLaughlin 2001, 2009).

(iv) Function ascriptions on the organizational theory are shorthand for a historical explanation for the existence or persistence of the trait in terms of the functional effect. Why are the beetles brown? Because being brown contributes to the self-maintenance of the organism in its natural habit, for it provides camouflage from birds. Why do mammals have hearts? Because having hearts (like these) contributes to the continued life and self-repair of organisms like these.

That the selected effects theory captures these four features implies that the theory should be better known.

As an etiological theory, many of the previous interesting highlighted consequences of the selected-effects theory carry over to the organizational theory and its use in grounding a substantive proper functionalist account of warrant.

On the organizational theory, like the selected-effects theory, the “good” case is metaphysically prior to the “bad” case: If there are no “good” cases (of function fulfillment) in the past (if the trait did not do F), there are no “bad” cases (of failure to fulfill the function) in the present or future (for the trait would not have F as a function).

On the organizational theory, like the selected-effects theory, there is a constitutive relation between what counts as normal functioning, normal conditions, and function fulfillment. Normal functioning just is the way the trait worked or operated in a set of circumstances so as to produce the effect that contributed to the self-maintenance of the system which, in turn, contributed to the persistence of the trait. Normal circumstances are just those circumstances (and circumstance of similar type) where, in working that way, the trait produced that effect by working that way that contributed to self-maintenance of the system and so to its own persistence.

On the organizational theory, like the selected-effects theory, when a belief-forming process has forming true beliefs reliably as a function, normal functioning encodes reliably getting things right. One can then explain why warrant should persist in demon-worlds—warrant-grade-one—just as well on the organizational theory as on the selected-effects theory.

Though the organizational theory takes its inspiration from living organisms, it has a broader application. If an android like Data from Star Trek or a society like the population of South Korea is a differentiated self-organizing system, then this theory allows (at least as stated) for the possibility that manufactured entities and social systems have parts with functions.

If God does not sound appealing to you as the grounds for a substantive proper functionalism, selection (on either the standard narrow theory or Garson's generalized theory) or contributions to self-organization may ground a substantive proper functionalism instead. Though proper functionalism as such is a big tent, there are different ways to ground its metaphysical basis.

6. What About Swampman?

Perhaps the reason many epistemologists shy away from proper functionalism is Swampman. It is certainly the standard objection to the literature. Here is Ernest Sosa:

[E]pistemically efficient competence need not derive from any design, whether intentional or unintentional, divine or evolutionary. Swampman cases show this clearly enough. (Sosa 2011: 134)

Here is David Copp:

“Proper functionalism”...rests on the claim that the human cognitive system was selected for in the evolutionary development of the species on account of its having had the property of leading humans reliably to form true beliefs... I reject this strategy because, it seems to me, the issue whether a given process of belief-formation is epistemically appropriate is independent of the details of the evolutionary development of our species. Perhaps human beings popped suddenly into existence, out of thin air...Nothing in epistemology turns on whether our cognitive system is the way it is due to its having been selected for.” (Copp 2014: 79)⁸

And here is Sanford Goldberg:

One worry for [Proper Functionalism that appeals to “naturally evolved” processes] concerns the possibility of an analogue of the “swampman” scenario...Since [Swampman] has no “naturally evolved” mental faculties, the present view must deny that it has any doxastically justified beliefs; but this seems an unhappy implication, since its beliefs, after all, are very like yours, and yours are doxastically justified.” (Goldberg 2012: 116-117).

⁸ And see more recently Tolly 2018 and Schellenberg 2018: 203-204, 217.

What's my response?

First, in at least these three passages, the authors are pointing out that Swampman is not the result of God's design nor the offspring of previous living organisms that have undergone generations of evolution by natural selection. If Swampman can have warranted beliefs and knowledge, then warrant and knowledge does not require God's design or evolution by natural selection over prior generations. If proper functionalism requires design by God or selection over generations, then these authors have a point.

But, as should be plain by now, proper functionalism—at least substantive proper functionalism—only requires a substantive source or ground for functions, and God and Mother Nature are not the only two. Neural selection or trial-and-error learning are two ways cognitive traits can acquire functions according to the generalized selected-effects theory, and contributions to self-maintenance is another way cognitive powers can acquire functions according to the organizational theory of functions. So even if God or Mother Nature is not a possible source of functions for Swampman (even over Swampman's entire lifetime), selection within Swampman's lifetime and the way Swampman's traits contribute to his continued self-maintenance are possible sources of functions for his cognitive capacities. In other words, these authors—like nearly every other author in epistemology to address the issue—have missed the generalized selected-effects and organizational theories of functions, etiological theories of functions that provide grounds for attributing functions to Swampman's various traits and cognitive capacities. As I said, epistemologists should know more about the various sources of functions. So if you are going to press the Swampman objection against proper functionalism, you need to take these other two sources of functions into account.

Once we acknowledge the point just made, the issue then becomes this: if Swampman can acquire functions given the passage of enough time in his lifetime for selection to play a role (either neural selection or trial-and-error learning or via other possible mechanisms) and for various effects of his traits to play an explanatory role in accounting for his continued existence and self-maintenance as a differentiated living being, does Swampman have beliefs and warranted beliefs *at inception*, prior to the passage of time required to assign functions, at least according to these two other sources of functions? In other words, does Swampman *at inception* have warranted beliefs without his cognitive capacities having any functions?

Now I know full well that some people will say yes. Some people will have the intuition that Swampman at inception is a psychological duplicate to Davidson (or to some other real human being). They might also insist that he is an epistemic duplicate as well. If Davidson is justified or warranted in believing P, then so is Swampman. Or so the thought goes. But here are some grounds to doubt the idea that Swampman at inception is an epistemological duplicate of Davidson.

Consider memory. Davidson has many reliably formed, warranted true beliefs "stored" in memory. However, for Swampman's relevantly similar beliefs, none of them were formed by a reliable-belief forming process (coming into being by cosmic accident is not a reliable belief-forming process). Among Davidson's memory beliefs, many are about his personal history. But for those, all of the surrogates in Swampman's mind are false.

Consider empirical knowledge. Davidson has a great deal of knowledge of the world built up over the years through personal experience and through learning from others. Countless past perceptual experiences, now long forgotten, contributed to his first-hand empirical knowledge and his knowledge from second-hand sources. Swampman at inception, we assume, has surrogates of all the beliefs Davidson has. But whereas many of Davidson's beliefs are warranted by past experiences and communications now forgotten, Swampman never had those perceptions nor talked to any of those people. So for all of the beliefs that Davidson has that are warranted by past encounters with the world and with others, Swampman's corresponding beliefs are not warranted at all. At best they are a coherent set of beliefs, but if we have learned anything about coherentism from the debates in the 1980s, coherence is not sufficient for warrant.

Consider inferential knowledge. Davidson has reasoned to many of his beliefs, either explicitly or implicitly, deductively or inductively. The conclusions he formed are warranted, when they are, by the

warrant for his premises and by the quality of his reasoning. Tabling the issue about warrant for the premises, at inception Swampman hasn't had the time to do any reasoning. And so the surrogate beliefs Swampman has for the beliefs that Davidson arrived at through reasoning are not beliefs that Swampman arrived at through reasoning. And so these surrogate beliefs are not warranted at inception either.

Consider knowledge through rational understanding. Davidson knows a great number of simple truths of logic and mathematics, and many philosophical claims too, through rational understanding. Many of these beliefs are now, as it were, "dispositional" or stored beliefs, as he is not currently thinking them. But even so, they are warranted not simply because Davidson could appreciate them now through rational understanding, but because he came to believe them in the past through rational understanding. Swampman at inception, however, never "came" to believe them through rational understanding. He just has them, if he does, at inception. And so these surrogate beliefs are not warranted for Swampman at inception either.

Consider even perceptual warrant. Davidson is looking at a red ball rolling down a hill and forms that belief that is a red ball. Davidson's belief is the result of the normal functioning of his perceptual capacities in response to light entering his eyes bouncing off the ball. Though this process does not take much time, it still takes time. Swampman at the very moment of inception may have a type identical perceptual state and a type identical perceptual belief, but the perceptual state was not caused by light bouncing off a ball and entering his eyes and the perceptual belief was not caused by the perceptual state, for at inception he had both the perceptual state and the perceptual belief, and no light from the ball had yet to enter his eyes. So not even perceptual beliefs are warranted at inception, assuming that perceptual warrant requires that the perceptual belief at least be based on a corresponding perceptual state.

What all of these points collectively show is that Swampman at inception is not an epistemic duplicate of Davidson, even if Swampman at inception has many mental states, especially beliefs, that are type identical to many of Davidson's beliefs. Though it may be reasonable to believe that Swampman *over time* will acquire many warranted beliefs (even though he was not designed by God and is not the product of evolution by natural selection over previous generations), it is not at all reasonable to believe that Swampman's beliefs at inception are "doxastically justified" just like yours, mine, or Davidson's.

So to press the Swampman objection against proper functionalism, one needs to argue that Swampman will have *some* warranted beliefs *after* inception but *before* either consequence selection for persistence or contributions to self-maintenance have had enough time to play a role. And it is here, I believe, that intuitions are (or at least should be) wobbly. It may be intuitive that Swampman, after having interacted with his environment in reliable and regular ways, has acquired many warranted beliefs. But I dare say I do not find it clear that his cognitive capacities would not simultaneously acquire the function to form reliably true beliefs through those reliable and regular interactions. In other words, though I appreciate the force of the Swampman objection if only God or Mother Nature were the source of functions, I do not think it has much force at all when we see that "generalized" selection or contributions to self-maintenance are also sources of functions.

To pour salt on the wounds, I should add that epistemologists should think twice about taking for granted that Swampman at inception even has a mind, or at least taking it for granted that Swampman at inception has representational states, like perceptions and beliefs, with determinate contents. That's because the consensus in the philosophy of mind—that discipline of philosophy that directly addresses this issue—holds that Swampman, at least at inception, does not have representational states with determinate mental contents (Putnam 1981; Millikan 1984; Davidson 1987; Dretske 1988; Papineau 1993; Burge 2007, 2010; Neander 2017; Shea 2018). Swampman, to acquire perceptions and beliefs, needs to reliably and regularly interact with his environment. Even having a mind—not just having warranted beliefs—takes time. Epistemologists who think it's fine to ignore the philosophy of mind when it's inconvenient to their epistemological views should recall their own epistemic pronouncements on others who ignore counterevidence just because those other people find it inconvenient.

The Swampman who has been around long enough to acquire perceptions and beliefs has been around long enough to acquire etiological functions for his cognitive capacities. Swampman may be a problem for proper functionalism 1.0, but he's no problem at all for proper functionalism 2.0.⁹

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