[Forthcoming in *Externalism About Knowledge*, ed. Luis Oliveira, Oxford University Press]

**10**

**An Explanationist Defense of Proper Functionalism**

*Kenneth Boyce and Andrew Moon*

In this chapter, we defend a new, explanationist version of proper functionalism. After explaining proper functionalism’s initial appeal, we note two major objections to proper functionalism: creatures with no design plan who appear to have knowledge (Swampman) and creatures with malfunctions that increase reliability. We then note how proper functionalism needs to be clarified because there are cases of what we call *warrant-compatible malfunction*. We then formulate our own view: *explanationist proper functionalism*, which explains the warrant-compatible malfunction cases and helps to block the above objections. We also advance a positive argument for explanationist proper functionalism.

In this chapter, we’ll use ‘proper functionalism’ to denote the following view:

**Proper Functionalism:** S’s belief that p is warranted only if S’s belief that p is produced by cognitive faculties that are properly functioning according to a truth-aimed design plan.

Following a convention in contemporary epistemology, we’ll use ‘warrant’ as a technical term for whatever precisely it is that makes the difference between knowledge and mere true belief.[[1]](#footnote-1) The ‘warrant’ terminology is convenient for talking about that crucial component of knowledge about which epistemologists vigorously disagree. One could also take ‘proper functionalism’ to pick out a theory of *justification* (Bergmann (2006), Graham (2012, 2014, 2019)) or a theory that states both necessary *and* sufficient conditions for knowledge (Millikan 1984b, Plantinga 1993b). However, for this chapter, we will use ‘proper functionalism’ to just denote the above necessary condition.

Our thesis is that proper functionalism is true. We will defend it by proposing and arguing for a stronger view that entails proper functionalism, one that highlights the importance of proper function for grounding the right sort of explanatory relation required for knowledge.[[2]](#footnote-2)

**Explanationist Proper Functionalism:** S’s belief B is warranted only if for some of S’s cognitive faculties whose joint exercise contributes to the forming or sustaining of B, the fact that that exercise results in a true belief is *teleologically explained*.

A more complete description of explanationist proper functionalism – including what we mean by ‘teleologically explained’ – will wait until section 3 after some background is in place. For now, we’ll just note that this subsequent discussion will make clear that something is teleologically explained only if it is the result of truth-aimed cognitive proper function. And since explanationist proper functionalism entails proper functionalism, our defense of the former will be a defense of the latter.

In section 1, we present the initial intuitive appeal of proper functionalism. In section 2, we consider two types of major objections to proper functionalism. In section 3, we explain how some types of malfunction are compatible with warrant, and then we introduce explanationist proper functionalism as a theory that illuminates how there could be such warrant-compatible malfunctions. In section 4, we explain where the objections to proper functionalism go awry. In section 5, we present a positive argument for explanationist proper functionalism. Finally, in an appendix, we show how our discussion provides a response to an objection by Jeff Tolly (2021a) to our previous (2016) defense of proper functionalism.

**1. The Initial Appeal of Proper Functionalism**

On an ordinary day, Wilma sees a beagle and believes that there is a beagle. Intuitively, given that this is an ordinary situation, Wilma *knows* that there’s a beagle. So, Wilma’s belief has warrant (i.e., that which turns true belief into knowledge). Furthermore, the various parts of her visual faculties – the occipital lobes, retina, and cerebral cortex – responsible for the belief are all *properly functioning*; there is no malfunction or disease that impedes the proper function of these mechanisms. Furthermore, the aim or function of these mechanisms is to give Wilma correct information or *true beliefs*. We see that our intuitions about knowledge and truth-aimed proper function coincide.

It is relatively uncontroversial that biological systems can function properly or improperly. Biologists, medical practitioners, and ordinary folk will often affirm that our various biological systems – our hearts, our immune systems, and our cognitive faculties – can function properly or improperly. We mean nothing more by ‘proper function’ than what is meant in these contexts.

What is controversial is what exactly *grounds* proper function or what *makes it* so that something has a way it’s supposed to function. Some will think it’s a designer’s intentions.[[3]](#footnote-3) Others will invoke a process that doesn’t require intentional design, like natural selection or something similar.[[4]](#footnote-4) The proper functionalist about knowledge can remain neutral on these questions.[[5]](#footnote-5) Similarly, we will sometimes speak of a “design plan” – which specifies how something ought to function in various circumstances – but remain neutral on what grounds the design plan. It could be an intelligent designer or a non-intelligent process.

Consider now a new scenario in which, unbeknownst to Vivian, her visual faculties are malfunctioning. As a result, she hallucinates a pug and comes to believe that there is a pug in front of her. In this case, she would not *know* that there is a pug in front of her. Even if her belief were true – say, there really *is* a pug right in front of her feet that she does not see – she would not know there is a pug; the belief is not warranted. Initially, then, it seems that when a belief is not produced by properly functioning faculties, it is not warranted.

Proper functionalism states that knowledge must be produced by cognitive faculties that are properly functioning according to a *truth-aimed* design plan. Suppose you are watching your daughter’s basketball game, it clearly seems to you that she was fouled, and you come to believe that she was fouled. Let us stipulate two things. First, biasing mechanisms were at play in the formation of your belief; had they not been operating, you would have instead, like everybody else, suspended judgment about whether it was a foul. Second, let’s say that it *was* a foul, despite nobody’s being able to clearly see it. In this case, though you formed a true belief, it does not seem that you knew it was a foul. It also seems incorrect to say that the faculties producing your belief were *malfunctioning*. Rather, the relevant mechanisms, which are typically activated in the brains of parents in such situations, were properly functioning. They just were not, in this situation, aimed at producing true belief. Initially, then, it seems that a belief produced by cognitive faculties that are not truth-aimed (even if properly functioning!) will not be warranted.

What we’ve said about perception seems to apply to other faculties. At least typically, in the cases that we gain knowledge by way of introspection, memory, or reason, those are also cases in which our introspection, memory, or reason faculties are functioning properly with an aim toward producing true belief.[[6]](#footnote-6) When proper function or truth-aim is absent, it seems that warrant is absent. So, we see some initial appeal of proper functionalism.

**2. Some Potential Problems with Proper Functionalism**

Potential counterexamples to proper functionalism come in two types. According to one type, a creature has no design plan at all but appears to have knowledge. For example, in the so-called *Swampman* counterexample to proper functionalism, lightning strikes a swamp and causes various molecules to arrange themselves into a perfect molecule-by-molecule replica of Donald Davidson.[[7]](#footnote-7) (Call this creature ‘Swampman’.) To some, it seems that this duplicate of Davidson can *know* things. Furthermore, Swampman is not the product of an intelligent designer, natural selection, or anything else that might confer to him a design plan (and hence, the ability to function properly).[[8]](#footnote-8)

According to the second type of putative counterexample, someone has a design plan, but due to a malfunction, the creature forms true beliefs even more reliably and appears to have knowledge.[[9]](#footnote-9) Consider Jeff Tolly’s (2021a, S1735) case:

*Precision*

Liz is a normal human being. [One] day, she takes some hard hits to the eye sockets. These impacts alter the construction of her neural cortex and color-sensing retinal cones, effectively allowing her to visually represent *double* the number of precise color shades that any other human can. On the basis of her sharp visual experiences, she reliably forms beliefs ascribing (demonstratively) these ultra-precise color shades.

Tolly says that it seems as if Liz’s new fine-grained color beliefs are warranted. We agree that there is an intuitive pull to affirm this. It seems that Liz now has *knowledge* about certain precise color shades. Yet, when Liz forms her color beliefs, many of her faculties are not functioning properly; they are not functioning as they are *supposed to*, despite their enhancement. So, we have a second type of potential counterexample to proper functionalism.

Now, Tolly himself does not propose Precision as a direct counterexample to proper functionalism. He uses it as the first case in a series of cases to argue against our earlier (2016) response to the Swampman objection. Still, it certainly *could* be used as a direct counterexample to proper functionalism, and we take it seriously as such.[[10]](#footnote-10)

An advantage of Precision over Swampman is that the intuition that precision is possible is clearer than the intuition that Swampman is possible. The Swampman case is rather outlandish, and there are some philosophical reasons to think Swampman is not possible.[[11]](#footnote-11) On the other hand, with Precision, we start with a clear case of a human being who already has beliefs, knowledge, and a design plan. Such a being is possible because such a being is actual. Furthermore, the sort of bump on the head described by Precision also seems clearly possible. These points make Precision more persuasive than Swampman. In the following sections, we will respond to both types of cases.[[12]](#footnote-12)

**3. Fine-tuning Proper Functionalism**

**3.1 Warrant-Compatible Malfunctions**

In this section, we will show that proper functionalists should not think that *all* mechanisms causally relevant to the production of a belief must be properly functioning and truth-aimed in order for it to have warrant. Some malfunctions are compatible with warranted belief formation. We will describe four ways this could be so. This will put us in a place to present and explain our explanationist proper functionalism in the next section.

An *external malfunction* is a malfunction of a faculty with effects that are taken as proper inputs into other properly functioning faculties. Suppose I hear a ringing sound, which is caused by a brain lesion. I use introspection to believe that I seem to hear a ringing sound. This belief is warranted, despite the fact that malfunctioning faculties are causally relevant to the belief. The effects of the lesion are taken as proper inputs into other properly functioning faculties: my introspection. We call this an *external malfunction* since the malfunction is sufficiently external to the faculties relevant to the belief’s warrant.

A *redundant malfunction* is a malfunction of a faculty that is producing or sustaining a belief that is also produced (or sustained) by a *properly functioning* faculty that could have produced (or sustained) that belief on its own. Suppose schizophrenia causes me to believe that some man near me is a burglar. A little bit later, I see him burgling a house. My belief that the man is a burglar is sustained by both malfunctioning faculties (my schizophrenia) *and* properly functioning faculties (my vision). Intuitively, I still know he is a burglar, and this is because the malfunction is of faculties that are redundant. My properly functioning, truth-aimed perception is sufficient to produce warranted belief on its own.

An *inhibitor malfunction* is a malfunction of a faculty that allows other faculties to function properly. Suppose that certain mechanisms are designed to slowly close my eyelids as part of the process of my falling asleep. However, I take a drug that causes these mechanisms to malfunction so that they fail to close my eyelids; I can thereby continue to look at my clock. I see and believe that it is midnight. This belief is warranted, despite the fact that a malfunctioning mechanism is causally relevant to the formation of this belief. (Had those mechanisms functioned properly, my eyelids would have closed, and I’d be unable to see the clock.) Proper functionalists shouldn’t be worried about such malfunctions. The belief is still being produced by truth-aimed, properly functioning faculties; it is just that those properly functioning faculties are able to function because of the malfunction of *other* faculties.

Lastly, a *design-plan-engulfed* malfunction is a malfunction of a faculty that functions within an overall properly functioning process or system that is designed to adapt and respond to those malfunctions. For a noncognitive example, consider our body’s immune system, which includes responding to certain malfunctions as part of its design plan. Similarly, suppose there are mechanisms in our brains which include responding to certain other cognitive malfunctions as part of their design plan. This could involve adapting to certain damages to the brain so that the overall system continues to function properly, allowing it to produce warranted belief.

We have explained four types of malfunction that are both causally relevant to the production of a belief and also compatible with the belief’s being warranted. Similarly, we will note that there are corresponding types of *non*-truth-aimed proper function that are causally relevant to the production of a belief and also compatible with the belief’s being warranted. Here’s an example that corresponds to the *redundant malfunction*. Suppose my belief that my daughter is the best athlete on the team is caused and sustained *both* by my bias *and* the coach’s testimony. Then my belief is produced *both* by truth-aimed *and* non-truth-aimed properly functioning faculties. But I can still know that my daughter is the best athlete on the team, and this is because my bias (or non-truth-aimed faculties) is redundant. The coach’s testimony would have been sufficient, along with the corresponding relevant faculties, to produce and sustain the belief on its own.[[13]](#footnote-13) Now, with this example, it should be clear how there are types of warrant-compatible, non-truth-aimed properly functioning mechanisms relevant to the production of a belief that correspond with the other types of warrant-compatible malfunctions (external, inhibitor, and design-plan-engulfed).

**3.2 Explanationist Proper Functionalism**

In this section, we introduce a thesis – *explanationist proper functionalism* – which helps explain how warrant could be compatible with certain malfunctions on a proper functionalist theory. We begin with the following two questions:

1. Why are the warrant-compatible malfunction cases relevantly *different* from our example in which Vivian has the unwarranted belief that there is a pug in front of her on the basis of a visual malfunction (or hallucination)?
2. Why are the warrant-compatible malfunction cases relevantly *similar* to our example in which Wilma has a warranted belief that there is a beagle in front of her on the basis of seeing a beagle by way of properly functioning, truth-aimed visual faculties?

Regarding (2), it can’t just be that, in the warrant-compatible cases, there are also *some* properly functioning, truth-aimed faculties involved in production of the belief. Vivian has that. Consider the faculties that take as input how things appear to Vivian and has as output the belief that there is a pug. They are properly functioning – this is called proper function ‘*downstream* from experience’[[14]](#footnote-14) – and they also have a truth-aimed design plan.

Our answer to both questions begins by looking into the nature of *coincidences*.[[15]](#footnote-15) As Harjit Bhogal (2020, 678) puts it, coincidences often “involve there being some kind of striking or compelling ‘match’ between distinct components.” My being at a market (first component) exactly when you are at the market (second component) is a striking “match”; if we ran into each other, we would say we met by coincidence. However, there being such a match is not sufficient for the presence of a coincidence. Bhogal notes that coincidences “have a distinct causal or explanatory structure.” Coincidences occur not only when a striking match is present, but also when there *lacks* a right sort of explanation for why that match occurs. Had we *planned* to meet at the market, our being at the market at the same time would not be a coincidence. Such an explanation for our both being at the market at the same time must be absent for it to be coincidental. Call such explanations *coincidence-blocking explanations*. (Note that each component merely *having* an explanation is not sufficient for there to be a coincidence-blocking explanation. My being at the market at a certain time might be fully explained, and your being at the market at that time might be fully explained, even while both of us meeting there is a mere coincidence.)

In the case of Vivian, we also have a double coincidence. The first coincidence consists of *the fact* that Vivian believes that there is a pug in front of her and *the fact* that there is a pug in front of her. The coincidental match is the correspondence between the content of Vivian’s belief and the reality of the situation. Or more succinctly, it is the fact that Vivian has a *true belief*, which is a coincidence.

Second, there is the pair of facts consisting of *the fact* that Vivian has a true belief and *the fact* that Vivian’s belief results from truth-aimed cognitive proper function (downstream from experience). The match is that, in forming a true belief, Vivian’s belief also fulfills the truth-aim of some of the cognitive faculties that produced it. More succinctly, the match is the fact that Vivian’s true belief is the fulfillment of truth-aimed cognitive proper function. This match is also a coincidence. Though there is an explanation for each component of the match, it is not a coincidence-blocking explanation. (The structure of this second coincidence can be more clearly put abstractly: there is the fact that object O fulfills function X and also the fact that O’s fulfilling X results from properly functioning mechanisms according to an X-aimed design plan. More succinctly, the coincidental match is the fact that O’s doing X is the fulfillment of X-aimed proper function.)

Contrast this with Wilma’s ordinary perceptual belief that there is a beagle in front of her. Here there is also a match between the content of Wilma’s belief and the reality of the situation, one that constitutes her belief being true. Likewise, there is a match between Wilma’s having a true belief and Wilma’s belief being the fulfillment of truth-aimed cognitive proper function of some of her faculties. Neither of these is a coincidence. There is a coincidence-blocking, teleological explanation for why both these matches exist. The fact that some of Wilma’s faculties are properly functioning according a truth-aimed design plan *explains* why she has a true belief, and it does so in a manner that is attributable to the goodness of her cognitive design plan. With this explanation in place, it is then, intuitively, a coincidence neither that she has a true belief nor that her having a true belief is the fulfillment of truth-aimed cognitive proper function.

The point about *the goodness of the design plan* is worth emphasizing. When ordinary human beings in typical environments use their properly functioning, truth-aimed faculties to form beliefs, it is not by coincidence that those faculties somehow manage to form true beliefs. Rather, it is *because* these faculties are well designed, or have a good design plan, that they reliably get at the truth in typical environments. This teleological explanation renders the fact that their truth-aim was fulfilled non-coincidental. It is also this explanation that is lacking in the case of Vivian.[[16]](#footnote-16)

In light of this, we propose the following:

**Explanationist Proper Functionalism:** S’s belief B is warranted only if for some of S’s cognitive faculties whose joint exercise contributes to the forming or sustaining of B, the fact that that exercise results in a true belief is *teleologically explained*.

‘Teleologically explained’ is meant to be a *term of art*, spelled out here:

**Teleological Explanation:** For any of S’s cognitive faculties, the fact that the joint exercise of those faculties results in a true belief is *teleologically explained* if and only if (during that exercise) those faculties are aimed at the production of a true belief, and the fact that they fulfill that aim is itself explained by the truth-aimed cognitive proper function of those faculties, in a way that is attributable to the goodness of S’s cognitive design plan.

Notice that explanationist proper functionalism does not require that *all* of the cognitive faculties involved in forming or sustaining the belief be properly functioning; it only requires *some*. This allows our view to distinguish the above cases of warrant-compatible malfunction from cases of warrant-incompatible malfunction like Vivian’s.

In the *external malfunction case*, in which I believe that I seem to hear a ringing sound, the fact that the belief is a true belief is teleologically explained, i.e., the fact that the belief fulfills the truth-aim of my *introspective* faculties is explained by the truth-aimed cognitive proper function of those faculties in a way that is attributable to the goodness of their design plan; this is despite the fact that other malfunctioning faculties are producing the ringing sound in the first place. In the *redundant malfunction case*, despite the schizophrenia, there are still *some* cognitive faculties (my visual faculties) sustaining the belief that the man is a burglar, such that the fact that my true belief is sustained is explained by the visual faculties’ truth-aimed proper function, in a way that is attributable to the goodness of their design plan. So, the fact that that belief is a true belief is also teleologically explained.

More briefly, regarding the *inhibitor malfunction case*, the fact that my belief about the time is a true belief is teleologically explained, despite another malfunction keeping my eyes open. And in the case of *design-plan-engulfed malfunction*, the fact that my belief is a true belief is teleologically explained, despite the fact that some of the cognitive faculties involved in the production of the belief are malfunctioning.

**4. Reply to Precision and Swampman**

**4.1 Reply to Precision-A**

In sections 4.1–4.3, we will respond to Precision and Swampman. A result of the discussion will be a premise in our argument for explanationist proper functionalism in section 5.

We say that Precision is ambiguous between at least two readings:

*Precision-A*

The hits that Liz takes to the eye-sockets alter their constitution so that they are now much more sensitive to different wavelengths of light, and thereby capable of sending a far greater amount of visual information to her cerebral cortex. Liz’s cerebral cortex, in turn, adapts (in a manner that accords with its proper functioning) by developing new neuropathways that allow it to process this new information and accurately encode it in Liz’s visual experience (also in a manner that accords with the cerebral cortex’s proper functioning). Liz can now represent double the number of precise color shades that any other human can. On the basis of her sharp visual experiences, she reliably forms beliefs ascribing (demonstratively) these ultra-precise color shades.

*Precision-B*

The hits that Liz takes to the eye-sockets alter their constitution in such a way that they are now much more sensitive to different wavelengths of light, while simultaneously altering the visual processing centers of her brain in a way that is *not* in accordance with the proper functioning of her cerebral cortex. In fact, the alterations occurred in such a way that it was random chance whether they would result in a configuration by which Liz’s visual system would continue to accurately encode incoming visual information into her experience or produce visual experiences that were systematically misleading instead. Fortunately for Liz, however, the chance alterations resulted in a configuration that accurately encodes the incoming information. As a result, Liz’s visual experiences now reliably track double the precise color shades that any other human’s visual experiences do. On the basis of these altered visual experiences, Liz reliably forms beliefs ascribing (demonstratively) these ultra-precise color shades.

We concede that the beliefs ascribed to Liz in Precision-A can have warrant, even though they’re partly the result of a malfunction in her visual system.

We’ll argue, however, that there are two reasons we should think that the malfunction in Precision-A is warrant-compatible in a way that is not in tension with proper functionalism. First, the hit caused parts of Liz’s visual system to malfunction, parts which, when properly functioning, would prevent the input of certain visual information. Now, *more* information from the wavelengths of light is allowed into the cerebral cortex. But we see that this is an *inhibitor malfunction*, and so of the sort that is not in tension with proper functionalism. Second, the malfunction is one to which the properly functioning, truth-aimed visual processing centers of Liz’s brain have adapted, and the visual information is processed and encoded in Liz’s experience in a way that accords with truth-aimed proper function. The malfunction in this case would be *design-plan-engulfed*, since it would be part of the design plan of these visual processing centers to account for these malfunctions.

Call un-designed cognitive improvements like these “design-plan-coopting improvements” or “DPC-improvements” for short. Since DPC-improvements are the result of inhibitor malfunctions or design-plan-engulfed malfunctions (or both), we can say that the fact that Liz’s belief is a true belief is teleologically explained, i.e., explained by the truth-aimed proper function of some of Liz’s faculties in a way that is attributable to the goodness of Liz’s cognitive design plan.[[17]](#footnote-17) Hence, we can affirm that Liz’s beliefs are warranted, despite the cognitive malfunction.[[18]](#footnote-18)

**4.2 First Reply to Precision-B**

We’ll now respond to Precision-B. The fact that Liz forms true beliefs is not explained by the truth-aimed proper function of some of her faculties in a way that is attributable to the goodness of their design plan. Hence, Precision-B does not meet the necessary condition specified by explanationist proper functionalism. The question, then, is whether the beliefs have warrant. If Liz *does* have knowledge, then we face a potential counterexample to explanationist proper functionalism (and also, to proper functionalism *simpliciter*).

There are some reasons to think Liz has knowledge. Her beliefs are formed reliably, at least as reliably as any of her other perceptual beliefs. They are also *modally robust*.[[19]](#footnote-19) Liz won’t easily form a false belief about precise color shades; i.e., her beliefs are *safe*. And if a particular color shade were absent, she wouldn’t believe it was present; so, her beliefs are sensitive. So, Precision-B is a potential counterexample to explanationist proper functionalism.

We will now give the first of two replies to the suggestion that Liz’s color shade beliefs are warranted. First, consider the following variant of Russell’s stopped clock case.[[20]](#footnote-20)

*Spun Clock 1*

Gloria has looked at the same analog clock every day and found it to be a reliable indicator of the time. As a prank, one of her older sisters sneaks into her room, takes the clock down from the wall, and spins its hands wildly. After this, the clock will continue to function as usual. The prankster, in a hurry to not get caught, and thinking it exceedingly unlikely that the clock will tell the correct time after the random spin, doesn’t even check whether or not it is accurate as she puts the clock back up on the wall. The prankster then escapes from the room out of a window just moments before Gloria peaks into the room to check the time. Fortuitously, the spun hands of the clock just happen to land so that the clock continues to read exactly the right time. Gloria sees the clock and believes that it’s almost noon.

While Gloria’s belief is true, it seems that she doesn’t know it’s almost noon. This appears to be a case in which it is merely by accident (in the sense relevant to Gettier cases) that Gloria forms a true belief.[[21]](#footnote-21)

One might think that knowledge is absent because safety is lacking. Gloria could have easily falsely believed that it’s after noon or well before noon. This is unlike Liz’s belief, who wouldn’t easily believe falsely about the color shades. But consider the following case.

*Spun Clock 2*

All is as in SPUN CLOCK 1, but Gloria instead peaks into the room to check the time a few hours later and forms the belief that it’s almost 3pm. This is a very infrequently used room.

It seems that Gloria does not know that it’s almost 3pm. For it is counterintuitive to think that Gloria couldn’t know that it’s almost noon (if she checked right away) but could know that it’s almost 3pm (if she checked three hours later). If she lacks knowledge in Spun Clock 1, then she lacks knowledge in Spun Clock 2.

Now, there is a sense in which Gloria’s belief in Spun Clock 2 is safe. *At this point*, her beliefs about the time, using the method of looking at the clock, couldn’t easily be false. Put another way, in the nearby worlds that share the actual world’s history up until around the time Gloria forms her belief, she is forming only true beliefs by way of looking at the clock. In Spun Clock 1, it is not the case that in nearby worlds that share the actual world’s history up until around when Gloria forms her belief, Gloria is forming only true beliefs by way of looking at the time; this is because the prankster could have easily spun the hands with a little more or less force. (There is still a sense according to which Gloria’s belief in Spun Clock 2 is not safe since there are still nearby worlds which do not share the actual world’s history in which the prankster’s spin did not land at the correct time. Perhaps we can say Gloria’s belief has *time-slice safety* but lacks *historical safety*.)

Now, for our purposes, it does not matter whether the belief is actually safe or not. What matters, first of all, is that it seems that there is no knowledge in either of the spun clock cases. Secondly, and more importantly, the configuration of the clock in our spun clock cases is relevantly analogous to the configuration of Liz’s visual system in precision-B. Shortly after Liz’s hit, her situation is like that of Gloria in Spun Clock 1. At this point, her color beliefs could have easily been false. And hours after her hit, she is like Gloria in Spun Clock 2. Although the clock does reliably and (time-slice) safely track the time, the fact that it does so is the result of chance (due to a wild spinning of the hands). Likewise, although Liz’s visual system reliably and safely encodes visual information in her experience, the fact that it does so is also the result of chance (due to the hit she took to the eye sockets). So, by analogy, we should conclude that Liz’s color shade beliefs are not warranted, whether right after the hit or hours later.

**4.3 Second Reply to Precision-B**

In addition to an argument from analogy, we can appeal to a deeper principle. The spun clock cases give us reason to accept the following.

**Explanatory Connection Condition:** S knows that p only if there is the right sort of coincidence-blocking explanatory connection between how S’s belief that p was formed and the fact that S’s forming the belief in that way resulted in S’s having a true belief.

In the spun clock cases, there is not the right sort of explanatory connection between how Gloria formed her belief and the fact that her believing the way she did resulted in a true belief. It is a mere coincidence that she manages to form a true belief. Any such explanatory connection was broken by the prankster. Hence the belief is “merely accidentally true” in the sense at issue in Gettier cases, and hence, not warranted.

Similarly, in Precision-B, the relevant explanatory connection is broken by Liz’s hit to the head. Reflecting on the spun clock cases can help us see that a certain sort of explanatory connection is required for knowledge, one that we see is lacking in Liz’s beliefs. This is a deeper, theoretical reason to think that Liz does not have warrant in Precision-B.

We should be clear that we do not intend, as a matter of definition, for “right sort of explanatory connection” to be understood in (explanationist) proper functionalist terms. We intend for what we mean to be grasped by the spun clock cases. There is the way that S forms beliefs, and there is S’s forming true beliefs, and there must *be some explanation* that connects these two things; if not, then it appears to be an accident that S is forming true beliefs (and so the beliefs are not warranted). We take it as a substantive question whether “the right sort of explanatory connection” should be understood teleologically; in fact, we mean to argue for it in the next section.

Our two replies to Precision in sections 4.2 and 4.3 apply directly to Swampman. First, just as Gloria has no knowledge in either Spun Clock 1 or Spun Clock 2, so does Swampman not have knowledge either directly after he is created or hours after he is created. Second, supposing that Swampman is forming all sorts of true beliefs, there is no explanatory connection between how he is forming his beliefs and the fact that his beliefs are true. Just as it is by accident that Gloria’s and Liz’s methods of forming beliefs are getting them true beliefs, so it is an accident that Swampman is. Hence, we should deny knowledge to Swampman.

**5. Assessing Explanationist Proper Functionalism**

**5.1 An Argument for Explanationist Proper Functionalism**

We now move on the offensive and provide an argument for explanationist proper functionalism:

**Explanatory Connection Condition:** S knows that p only if there is the right sort of coincidence-blocking explanatory connection between how S’s belief that p was formed or sustained and the fact that S’s forming or sustaining the belief in that way resulted in S’s having a true belief.

**Bridge Premise:** There is the right sort of coincidence-blocking explanatory connection between how S’s belief that p was formed or sustained and the fact that S’s forming or sustaining the belief in that way resulted in S’s having a true belief *only if* for some of S’s cognitive faculties whose joint exercise contributes to the forming or sustaining of B, the fact that that exercise results in a true belief is *teleologically explained*.

Explanationist proper functionalism follows by way of hypothetical syllogism. We defended the Explanatory Connection Condition in the previous section.

For initial support for the Bridge Premise, it is worth noting that the right sort of explanatory connection just was a teleological explanation in the Wilma-Beagle case, the warrant-compatible malfunction cases, and Precision-A. This was lacking in Vivian-Pug case and Precision-B. Furthermore, a teleological explanation (whether by intelligent design or some evolutionary process) seems to be the sort of thing that would make a match between a certain way of forming a belief and the formation of a true belief to not be coincidental. These factors provide some initial support for the Bridge Premise.

**5.2 Comparison With Other Theories of Knowledge**

We will now compare explanationist proper functionalism with other prominent theories of knowledge. In the process, we will show that our theory avoids counterexamples that other theories do not. Examination of these theories will further provide indirect support for the premises of our argument. Obviously, we cannot discuss every theory of knowledge, but we can discuss those that readers are most likely to think will challenge our argument or explanationist proper functionalism directly.

Consider first theories that say that some sort of reliability or time-slice safety is sufficient for warrant. Such theories drive the intuitions of cases like Swampman and Precision, and furthermore, are incompatible with proper functionalism. Fortunately, such theories also fail to include or entail a relevant explanatory connection. Hence, cases like Spun Clock 2 count as direct counterexamples to such theories. Furthermore, as we saw above, the absence of an explanatory connection explains why knowledge would be lacking; this provides support for the Explanatory Connection Condition, the first premise of our argument.

On the other hand, we could take a reliabilist or safety theory that is compatible with Spun Clock 2, such as the *historical* safety theory mentioned above. Perhaps the individual must be forming true beliefs in nearby worlds that do not share the same history, up to around the time of belief formation, as the actual world. And there are nearby worlds where the colleague’s wild spin hours earlier left the clock unreliable. Such a theory might not conflict with Spun Clock 2. Fortunately, now the theory is compatible with explanationist proper functionalism and the premises of our argument for it.

Let us consider virtue reliabilist theories. John Greco writes,

S knows that p if and only if S believes the truth (with respect to p) because S’s belief that p is produced by intellectual ability (2010, 71).

For example, when Wilma knows that there is a beagle, she believes the truth (about whether there is a beagle) because her belief produced by her intellectual ability. Furthermore, so long as intellectual ability does not entail proper function, Greco’s theory conflicts with proper functionalism.

Yet, nothing in Greco’s theory distinguishes Liz in Precision-A from Liz in Precision-B. In both situations, she will believe the truth because the belief is produced by an intellectual color detecting ability. But then Precision-B is a counterexample to the theory. Greco could deny that Liz has the relevant intellectual ability in Precision-B. But it is unclear on what grounds he could deny that. Perhaps intellectual ability *does* require proper function. But then Greco’s theory does not conflict with explanationist proper functionalism or any of our argument’s premises. So, either Precision-B is a counterexample to Greco’s theory, or his theory is compatible with our claims.[[22]](#footnote-22)

Other close competitors are views that like ours strongly emphasis the importance of an explanatory connection between belief and truth. Consider for example the view that Tomas Bogardus and Will Perin’s (2020) call ‘Explanationism’: “In slogan form: knowledge is believing something *because* it’s true. Less roughly, Explanationism says knowledge requires only that truth play *a crucial role* in the explanation of your belief” (2).[[23]](#footnote-23) They go on to explain that their notion of playing a crucial explanatory role is to be understood in terms of difference making.

Bogardus and Perrin’s Explanationism differs from our explanationist proper functionalism since it fails to invoke proper function. It also differs in what it takes the relata of the explanation to be. For Explanationism, the explanatory relation required for knowledge that p holds between the belief that p and the fact that p is true. According to our account, however, the relation holds between the fact that certain of one’s cognitive faculties (among those responsible for producing or sustaining the belief that p) fulfill their truth-aim and the fact that they exhibit truth-aimed cognitive proper function. While the relation we invoke does indeed hold only if the belief that p is true, the fact that p is true does not itself enter directly into the relation. This makes our account immune to certain kinds of objections that threaten explanationist accounts like Bogardus and Perrin’s. Insofar as they are not committed to skepticism about the future, Explanationists are committed to the claim that future facts (such as its being true the sun will rise tomorrow) explain why we have some of our current beliefs. And while Bogardus and Perin do make an admirable attempt at defending this claim (14), we’ll just note that it’s nice that we do not have to deal with that problem.

Our proposed counterexample to Explanationism is the following.[[24]](#footnote-24)

*Holoprojector*

Micha sees what appears to be a vase sitting on a pedestal. As it happens, the pedestal is really a holographic projector, and there is no vase on top of it. Rather, what Micha is seeing is merely a realistic holographic projection. Micha, who is ignorant of these facts, comes to believe there is a vase in front of him. As it turns out, hidden in a hollow compartment within the pedestal, out of sight, is a vase. The setup is such that the pedestal projects a realistic holographic image of whatever is in that compartment onto its surface, and this explains why Micha sees the image before him.

The fact that Micha believes there is a vase in front of him is (given the setup) explained by the fact there is one. So according to Explanationism, Micha knows there is a vase before him. But he does not know. So Explanationism is false.

Explanationist proper functionalism, by contrast, delivers the correct result that Micha does not know. Granted, given the setup, some of Micha’s truth-aimed, properly functioning cognitive faculties produce a true belief in this scenario. But the fact that they do so is not itself attributable to the goodness of Micha’s design plan. It is only because of the nature of the setup (not the sort of environmental conditions taken for granted by Micha’s design plan) that Micha’s belief-forming tendencies reliably track the truth about what is in front of him in this situation. It is, from the perspective of the design plan, merely by accident that this is so. Hence, the fact that the exercise of Micha’s faculties produces a true belief is not teleologically explained.

The holoprojector case also illustrates that it is not enough for the presence of warrant that there merely be *some* coincidence-blocking explanation for the fact one forms a true belief. It is no coincidence that Micha forms a true belief in that scenario. Even so, he does not know. The coincidence-blocking explanation must be of the *right sort*. Our contention has been that it must be teleological.[[25]](#footnote-25)

One might attempt, however, to explain Micha’s lack of knowledge via the presence of a coincidence in some place other than the fact he forms a true belief. David Faraci (2019, 20) has suggested, for instance, that perhaps knowledge requires not only “(i) an explanatory connection between beliefs and the truth, but also (ii) an explanatory connection between the source of the belief [such as having a particular sort of perceptual experience] and the truth, as well as (iii) an explanatory connection between *that* explanatory connection and the fact that the agent consults the source she consults.”

But the first two of these elements are already present in the holoprojector case. There is in that case not only a coincidence-blocking explanation for why Micha truly believes there is a vase, but also for why his perceptual experience of a vase matches the reality of there being one. It is also easy to see how the third condition could be met. Perhaps the designers of the apparatus were taking advantage of human belief-forming proclivities as part of a deliberate attempt to engineer Gettier scenarios. And of course, we can continue supplying such explanations at higher levels if we like. Perhaps the designers were influenced by an evil demon to act in this way, and so on.

Regardless of how many coincidence-precluding layers of explanation exist, the explanatory connections might still be of the wrong sort for Micha’s belief to be warranted. For the right sort of explanatory connection to hold, the fact that Micha forms a true belief must *owe* itself, in the right way, to the operation of Micha’s cognitive faculties. We have already seen, furthermore, that the mere reliability of those faculties is not enough for that. Rather, those faculties must be *directed* toward truth, and it must be *because* they are so directed (in a manner attributable to their design plan) that they manage to get at it (by way of producing a true belief). In short, what is missing is the formation of a true belief by way of truth-aimed cognitive proper function, in a manner attributable to the goodness of the cognitive design plan.

**Appendix**

**A.1 Our Case**

Jeff Tolly (2021a) has provided a challenging critique of our earlier Boyce and Moon (2016) defense of proper functionalism. By attacking Precision, we have gone some way toward undermining his critique. In this Appendix, we will go further.[[26]](#footnote-26)

In our earlier paper, we considered Billy, a human infant in an experimental program concerning early childhood development. We considered the following scenario:

*Case 2:* Billy sees a red ball go behind a screen. But due to a genetic birth defect, he has an abnormal doxastic response to that input and forms the belief that the round object he just saw has ceased to exist.

A healthy, properly functioning human would believe that the round object continues to exist. We argued that this is an unlearned doxastic response that is “wired” into humans. Unlike healthy humans at his age, Billy believes that obstructed objects cease to exist.

Here is the next case:

*Case 3:* All goes as it did in Case 2. However, owing to the design of the cognitive experiments to which Billy is being subjected, red objects that pass behind the screen placed in front of Billy are (as soon as they are behind the screen and out of Billy’s sight) instantly annihilated by a powerful laser (which is also behind the screen and out of Billy’s sight). We’ll also add that Billy only tends to have the sort of abnormal doxastic response described in Case 2 when he sees *red* objects being occluded. In other cases when he sees objects of different colors occluded, he believes in their continued existence just as any other human child would.

So, Billy believes the red ball ceases to exist behind the occlusion because of his genetic disorder. Yet, the belief is also true because the ball is zapped by a laser. Intuitively, we said, Billy does not know the ball is absent; his belief lacks warrant. This intuition served as the basis of our earlier defense of proper functionalism and response to the Swampman objection.

**A.2 Tolly’s Reply**

Tolly suggests that Case 3 is underdescribed. He disambiguates it as follows.

(Case 3a) The scientists at Billy’s experimental facility are committed to locking Billy in the facility for his entire life. Through elaborate locking mechanisms and deception, he will never get out. Their goal is to destroy every red ball that becomes obscured to Billy throughout his entire life.

(Case 3b) In one week’s time, the scientists at Billy’s facility will let Billy go free in the outside world, where he will proceed to make all sorts of incorrect *non-existence* ascriptions to every single red ball that he sees passing behind an obstruction. (2021a, S1731)

Tolly remarks,

If we fill in the case with 3b, it’s much clearer that Billy’s belief lacks warrant. This is because Billy’s belief-forming process does *not* seem to be reliable in 3b. But I contend that when we fill in the case with 3a, it is significantly less obvious that Billy lacks warrant. I think the intuitive appeal of the *no-warrant* verdict in Case 3 has its pull because one might be inclined to tacitly build in background information like 3b (2021a, S1731–S1732).

Tolly then argues that intuitive judgements about these cases can be better explained in reliabilist terms by way of the following condition:

**Content-Basis Reliability (CBR):** Necessarily, where S’s token process t involves forming a belief that p on the (complete) basis of mental states m, t confers warrant only if the type T, [forming beliefs in propositions sufficiently similar to p on the basis of mental states sufficiently similar to m] has a high reliability measurement across a reference class of all possible belief-forming events sufficiently close to t in which S undergoes T processes (2021a, S1732).

Roughly, Billy’s belief in Case 3b lacks warrant because it is not reliably formed. In enough nearby worlds, worlds where he is forming beliefs about red balls outside of the lab, he is forming false beliefs with contents that are sufficiently similar to *the ball no longer exists* on the basis of sufficiently similar experiences. Tolly’s reply lends credence to the view that Billy’s belief in Case 3b lacks warrant not because of lack of proper function, but because of lack of reliable belief formation. On the other hand, there is more pull to think that Billy’s belief in Case 3a *has* warrant, and this could be because of the reliable belief formation.

**A.3 Our Reply to Tolly**

To help remember the cases, let us call Case 3a ‘Forever-Lab’ and Case 3b “One-Week-Lab”. We agree that the intuition that Billy’s belief lacks warrant is stronger in One-Week-Lab than in Forever-Lab. However, we disagree that the no-warrant verdict about our Case 3 depends on our tacitly building information of the sort found in One-Week-Lab and the unreliability of Billy’s belief-forming process in that case.

To see this, consider the following case:

*The Sally Case*

Sally is a typical human infant living in a normal household. In a week, the same evil scientists running Billy’s facility will abduct Sally and place her in a facility with the same sort of lifetime conditions in which Billy finds himself in Forever-Lab. For example, they will destroy every red object she sees once it is obscured without any evidence that they are doing this. Sally will thereby spend the rest of her life with numerous false but undefeated beliefs to the effect that various red spheres that she has seen obscured continue to exist. The scientists will be so competent in carrying out this scheme that the possible worlds in which they don’t are quite distant from actuality. In the meantime, however, while at home, Sally sees a red ball roll out of sight behind her couch and forms the belief that it still exists.

Intuitively, Sally knows that the red ball still exists.

Our earlier claim was that the no-warrant verdict about Case 3 is not due to tacitly building in information from One-Week-Lab and the unreliability of Billy’s belief-forming process in that case. We can now defend this claim. Sally’s belief forming tendency at home is just as unreliable as Billy’s belief forming tendency is in the laboratory in One-Week-Lab. In both cases, in a week’s time, they’ll form false beliefs about red balls. Yet it seems both that Sally’s belief is warranted and also that Billy’s belief lacks warrant in One-Week-Lab. So, the unreliability of Billy’s belief forming tendency in One-Week-Lab cannot be what explains the no-warrant verdict about Billy’s belief, and hence, cannot be what explains the initial no-warrant verdict in Case 3.

What does explain the no-warrant intuitive verdict in One-Week-Lab? Here, we can appeal to our explanationist proper functionalism, which we have developed and defended in the main part of the chapter. The fact that Billy formed a true belief was not the non-coincidental result of the fact that truth-aimed cognitive proper function of some set of cognitive faculties were jointly sufficient for the production of his belief. This is what Sally’s belief has and Billy’s belief lacks.

Our explanationist proper functionalism also has the verdict that Billy’s belief lacks warrant in Forever-Lab. Now, it is true that there is more pull to say that Billy’s belief has warrant in Forever-Lab. And this could be because Billy’s belief in Forever-Lab is better, by way of reliable belief formation, than his belief in One-Week Lab. But having more pull to think his belief has warrant does not amount to any clear intuition that the belief has warrant. At the end of the day, it will still be by coincidence that he formed a true belief. And reflection on this fact should lead us to think his belief lacks warrant.[[27]](#footnote-27)

**References**

Baillargeon, Renee 1987: “Object permanence in 3 ½ and 4 ½- month-old infants.” *Developmental Psychology*, 45, pp. 655-64.

Bergmann, Michael 2006: *Justification without Awareness*. New York: Oxford University Press.

Beddor, Bob and Pavese, Carlotta (2018) “Modal Virtue Epistemology”. *Philosophy and Phenomenological Research*, 101, pp. 61-79.

Bhogal, Harjit 2020 “Coincidences and the Grain of Explanation”. *Philosophy and Phenomenological Research*, 100, pp. 677-694.

Bogardus, Tomas 2014: 'Knowledge Under Threat'. *Philosophy and Phenomenological Research*, 88, pp. 289–313.

Bogardus, Tomas and Perrin, Will (2020) “Knowledge is Believing Something Because It’s True”. *Episteme*, doi:10.1017/epi.2020.18, pp. 1-19.

BonJour, Laurence 1980 “Externalist Theories of Empirical Knowledge”. *Midwest Studies in Philosophy*, 5, pp. 53-73.

Boyce, Kenneth 2016: Proper Functionalism. *Internet Encyclopedia of Philosophy*. https://www.iep.utm.edu/prop-fun/ (last viewed January 28, 2020).

Boyce, Kenneth and Moon, Andrew 2016: ‘In Defense of Proper Functionalism: Cognitive Science Takes on Swampman’. *Synthese*, 193, pp. 2987–3001.

Boyce, Kenneth and Plantinga, Alvin 2012: “Proper Functionalism” in *Companion to Epistemology*, edited by Andrew Cullison (New York: Continuum Press), 124-140.

Burge, Tyler 2003: ‘Perceptual Entitlement.’ *Philosophy and Phenomenological Research*, 67, 503–548.

Burge, Tyler 2020: “Entitlement: The Basis for Empirical Warrant” in *Epistemic Entitlement*, edited by Peter Graham and Nikolaj Pedersen (Oxford: Oxford University Press), 37-142.

Davidson, Donald (1987) “Knowing One’s Own Mind” *Proceedings and Addresses of the American Philosophical Association*, 661, pp. 441-458.

Faraci, David (2019) “Groundwork for an Explanationist Account of Epistemic Coincidence” *Philosopher’s Imprint*, 19, pp. 1-26.

Feldman, Richard (1993) “Proper Functionalism” *Nous*, 27, pp. 34-50.

Garson, Justin 2019: *What Biological Functions Are and Why They Matter*. Cambridge: Cambridge University Press.

Ghijsen, Harmen 2016: ‘Norman and Truetemp Revisited Reliabilistically: a Proper Functionalist Account of Clairvoyance’. *Episteme*, 13, pp. 89–110.

Goldman, Alan H. 1984: “An Explanatory Analysis of Knowledge”. *American Philosophical Quarterly*, 21, pp. 101-108.

Graham, Peter 2012: “Epistemic Entitlement” *Nous*, 46, pp. 449-482.

Graham, Peter 2014: “Functions, Warrant, History” in *Naturalizing Epistemic Virtue* edited by Abrol Fairweather and Owen Flanagan (Cambridge University Press), pp. 15–35.

Graham, Peter 2019: “Why is Warrant Normative?” *Philosophical Issues*, 29, pp. 110-128.

Greco, John 2010: *Achieving Knowledge*. New York: Cambridge University Press.

Lehrer, Keith and Paxson Jr., Thomas 1969: ‘Knowledge: Undefeated Justified True Belief’ *The Journal of Philosophy*, 66, pp. 225-237.

McNabb, Tyler 2019: *Religious Epistemology*. Cambridge: Cambridge University Press.

Millikan, Ruth 1984a: *Language, Thought, and Other Biological Categories*. Cambridge, MA: MIT Press.

Millikan, Ruth 1984b: 'Naturalist Reflections on Knowledge'. *Pacific Philosophical Quarterly*, 4, pp. 315-34.

Moon, Andrew 2012: ‘Warrant *Does* Entail Truth’. *Synthese*, 184, 287–297.

Moon, Andrew 2018: ‘How to Use Cognitive Faculties You Never Knew You Had’. *Pacific Philosophical Quarterly*, 99, 251–275.

Nozick, Robert: *Philosophical Explanations.* Cambridge, MA: The Belknap Press of Harvard University Press

Plantinga, Alvin 1991: ‘Warrant and Designing Agents: A Reply to James Taylor’. *Philosophical Studies*, 64, 203–215.

Plantinga, Alvin 1993a: *Warrant: The Current Debate*. New York: Oxford University Press.

Plantinga, Alvin 1993b: *Warrant and Proper Function*. New York: Oxford University Press.

Plantinga, Alvin 1993c: ‘Why We Need Proper Function’. *Nous*, 27, 66–82.

Plantinga, Alvin 1995: ‘Reliabilism, Analysis, and Defeaters.’ *Philosophy and Phenomenological Research*, 55, 427–64.

Plantinga, Alvin 1996: 'Respondeo'. In *Warrant in Contemporary Epistemology*. Kvanvig, Jonathan (ed) Lanham, MD: Rowman and Littlefield, pp. 307–378.

Pritchard, Duncan 2012: 'Anti-Luck Virtue Epistemology'. *Journal of Philosophy*, 109, pp. 247–279.

Pust, Joel 2000: ‘Warrant and Analysis’. *Analysis*, 60, 51–57.

Sosa, Ernest 1993: ‘Proper Functionalism and Virtue Epistemology’. *Nous*, 27, pp. 51–65.

Sosa, Ernest 2015: *Judgment and Agency*. Oxford: Oxford University Press.

Sosa, Ernest 2017: *Epistemology*. Princeton, Princeton University Press.

Spelke Elizabeth 1994: ‘Initial Knowledge: Six Suggestions,’ *Cognition*, 50, pp. 431-445.

Taylor, James 1991: ‘Plantinga’s Proper Functioning Analysis of Epistemic Warrant’. *Philosophical Studies*, 64, 185–202.

Taylor, James 1995: ‘Plantinga on Epistemic Warrant’. *Philosophy and Phenomenological Research*, 55, 421–426.

Tolly, Jeff 2021a: ‘Swampman: A Dilemma for Proper Functionalism’. *Synthese*, 198, Suppl 7, S1725–S1750.

Tolly, Jeff 2021b: ‘Knowledge, Evidence, and Multiple Process Types’. *Synthese*, 198, 5625–5652.

1. This stipulative definition goes back to Plantinga (1993a, 3). Joel Pust (2000) argues that Plantinga, in his books, gives two incompatible definitions of ‘warrant’. On one, it picks out a property that comes in degrees (where a true belief needs *enough* warrant to count as knowledge). On another one, it doesn’t (where a true belief’s having warrant suffices for it to count as knowledge). We are using the second definition. We are thereby using ‘warrant’ differently from how some epistemologists use it, including Peter Graham in ch. 9 of this volume, who uses ‘warrant’ to pick out a property that comes in many grades or levels. A benefit of using ‘warrant’ our way is that it is easier to argue about warrant’s properties, e.g., whether warrant entails truth. (Moon (2012) argues that it does.) [↑](#footnote-ref-1)
2. There are precedents for our view among other epistemologists who also highlight the explanatory role played by proper function. See for example (Burge 2003, 2020), (Graham 2012, 2014, 2019, also this volume ch. 9), and (Millikan 1984b). [↑](#footnote-ref-2)
3. See (Plantinga 1993, 2008) and (Rea 2002). [↑](#footnote-ref-3)
4. See (Wright 1974), (Graham 2012, 2014, 2019), and (Garson 2019). See also Graham’s superb discussion and summary, in this volume (ch. 9), of various theories of functions and proper function, and how proper function might ground different epistemically valuable properties. [↑](#footnote-ref-4)
5. (Plantinga 1996, 347, 357, 368) is explicit about this point regarding his own proper functionalism, despite arguing for the view that there is no plausible, naturalistic account of proper function. That view, he says, “is not really part of the epistemology. Someone else could have the same epistemological views as mine even if he thought there *is* an accurate naturalistic analysis of proper function, or was agnostic about whether there is. I also believe that the existence of matter entails the existence of God… but I wouldn’t think of this claim as part of physics” (357). [↑](#footnote-ref-5)
6. Plantinga (1993b) goes on in-depth explorations of proper functionalism’s application to these and other faculties. [↑](#footnote-ref-6)
7. It is a replica of Donald Davidson because he (1987) most famously raised the Swampman scenario in support of teleological views of mental content. Millikan (1984a, 93) however was the first to raise this sort of scenario for that purpose (thanks to Peter Graham for the pointer). Ernest Sosa (1993) uses the case against proper functionalism. [↑](#footnote-ref-7)
8. Couldn’t you say that facts about proper function are not grounded in any of these historical facts? Perhaps proper function does not require a designer of any sort, whether intelligent or a mindless process. Unfortunately, to say ‘yes’ to this question is to grasp a deadly horn of *Taylor’s Dilemma* (Taylor 1991, 1995). If we say ‘yes’, then it seems that proper functionalism is not much different from reliabilism, according to which a belief’s warrant is solely a matter of its being formed reliably. It is the presence of some sort of designer, whether intelligent or nonintelligent, which seems to distinguish proper functionalism from reliabilism. We instead grasp the other horn of the dilemma and face potential counterexamples like Swampman. [↑](#footnote-ref-8)
9. See (Feldman 1993), (Greco 2010, 151-153). See (Boyce and Moon 2016, 2988–2989) for more references to these two types of putative counterexamples to proper functionalism. [↑](#footnote-ref-9)
10. By undermining it as a counterexample in the following sections, we will also be undercutting Tolly’s progressive-case argument against our (2016) response to the Swampman objection. See Appendix for more on our response to Tolly. [↑](#footnote-ref-10)
11. See (Plantinga 1991, 206–208; 1993c, 76–77; 1995, 460), (Graham 2012, 466–467), and ch. 9 of this volume. Proponents of teleological theories of mental content will be skeptical that Swampman could have beliefs in the first place. [↑](#footnote-ref-11)
12. Precision is an example of what Moon (2018) calls an *unfamiliar faculty case*, in which a believer is using a faculty she doesn’t know she has. (Paradigm versions of such cases are BonJour’s (1980) famous clairvoyance cases. See Ghijsen’s (2016) excellent overview of the literature on these cases.) Moon and others argue that adults in such cases have defeaters for beliefs formed by such faculties. (Here is Moon’s reasoning applied to Liz: Adults have background beliefs about which cognitive powers they, and other humans, have. Due to these beliefs, Liz should withhold judgment about whether her new, fine-grained color beliefs are formed reliably. Those beliefs thereby get a defeater.) Thus, we should not think Liz’s beliefs are warranted, and so the counterexample doesn’t get off the ground. However, Moon notes that this reasoning does not apply to young children since they don’t have the relevant background beliefs. (Cf. (Graham 2012, 465) and (Burge 2020, 84)) Hence, we’ll assume Liz is a young child. [↑](#footnote-ref-12)
13. Thanks to Jon Matheson for helpful discussion about this case and the contents of this paragraph and the previous one. [↑](#footnote-ref-13)
14. (Plantinga 2000, 110). [↑](#footnote-ref-14)
15. Our discussion echoes in certain respects Faraci’s (2019) explanationist account of avoiding epistemic coincidence. We make further comparisons between our account and Faraci’s in the final portion of this chapter. [↑](#footnote-ref-15)
16. This aspect of our view resembles some virtue theories. We require for warrant that fulfillment of the aim of the faculties be *because of* or *attributable to* the goodness of the design plan. This is similar to Sosa’s (2015) view that warranted belief formation requires that the formation of true belief *manifests* her competence in attaining true beliefs, or Greco’s (2010, 71) view that S believes the truth *because* the belief was produced by intellectual ability. [↑](#footnote-ref-16)
17. Peter Graham has also suggested (in correspondence) that his own work (2012, 2014, this volume ch. 9) lends itself to yet another possible reading of Precision, one in which the changes to Liz’s visual processing system result in feedback mechanisms that explain why those changes persist, thereby causing that system to acquire new truth-aimed functions. We welcome this suggestion as yet another proper functionalist proposal, in keeping with our more general approach, for how Liz’s beliefs might be warranted. [↑](#footnote-ref-17)
18. For a similar response to alleged counterexamples to proper functionalism via cases in which knowledge results from cognitive malfunction, see (Boyce 2016).. [↑](#footnote-ref-18)
19. For views on which modal robustness, or something like it, is sufficient for knowledge, see (Beddor and Pavese 2018) and (Tolly 2021b). [↑](#footnote-ref-19)
20. In this case, someone happens to form the belief in the correct time by looking at a stopped clock; intuitively, the belief is not warranted even if it is justified and true. [↑](#footnote-ref-20)
21. We think it is *at least* as plausible that Gloria has unwarranted true belief as it is that a person in fake barn country who happens upon the one real barn has unwarranted true belief that there is a barn. Although the barn intuition has some disagreement, it is still widely held, and so our intuition in support of Spun Clock 1 should be at least as widely held. [↑](#footnote-ref-21)
22. What we say about Greco’s theory can be said about other virtue theories. This includes Pritchard’s (2012) theory: “S knows that p if and only if S’s safe true belief that p is the product of her relevant cognitive abilities (such that her safe cognitive success is to a significant degree creditable to her cognitive agency)” (273). Pritchard’s theory adds a safety component, but it should be clear that that will not help with Precision-B. The case also applies to Sosa’s (2015, 2017) theory, S knows that p if the fact that S truly believes p manifests an epistemic confidence (where an epistemic competence is a disposition to believe truly within a certain domain under appropriate conditions). For more criticism of Sosa’s theory, see (Boyce and Moon 2016, 2999–3000). [↑](#footnote-ref-22)
23. Goldman (1984) provides the classic precedent for such a view. [↑](#footnote-ref-23)
24. Bob Beddor first suggested to us that this example applies to Bogardus and Perin’s view. It was originally raised by Lehrer and Paxson (1969, 234) against Unger’s non-accidentality theory of knowledge, and later adapted to count against Nozick’s (1981, 190) theory. This is our adaptation. [↑](#footnote-ref-24)
25. Millikan (1984b, 244-245) also uses a case like this to argue for a similar conclusion. She argues that it is a requirement for a true belief’s being an item of knowledge that it be the fulfilment of truth-aimed cognitive proper function *and* that this fulfillment takes place in accordance with a “normal explanation,” where a normal explanation of the performance of a function specifies “how that organ or system or species historically managed to perform that function” (243). [↑](#footnote-ref-25)
26. Tyler McNabb (2019,1 7–18) also replies to Tolly and agrees that Zork’s beliefs in Cases 7 and 8 are unwarranted due to their being accidentally true. He supports this claim with a Case 9, in which Billy, due to a cognitive malfunction, believes that the objects in the lair he is born in have conscious souls. Coincidentally, a wizard inserted conscious souls into the objects in the lair. Due to a curse, Billy never leaves the lair. Intuitively, Billy’s beliefs lack warrant; furthermore, his beliefs are relevantly analogous to Zork’s beliefs in Cases 7 and 8, so we should deny warrant to Zork’s belief in those cases as well. McNabb’s reply to Tolly doesn’t engage with his progressive-case argument from Precision to Shade to Cases 7 and 8; he doesn’t address where Tolly’s argument goes wrong. This is our task. On the other hand, we agree with McNabb’s verdicts about Case 9 and welcome the additional reason to think Zorks’ beliefs in Cases 7 and 8 are unwarranted. We take our responses to be complementary. [↑](#footnote-ref-26)
27. Thanks to participants in the Southeastern Epistemology Conference, an online workshop hosted by Kevin Vallier and the Society of Christian Philosophers, an online workshop hosted by Domingos Faria and the LangCog group at University of Lisbon, and an epistemology reading group at Rutgers University. (All meetings were in 2020.) Thanks for helpful discussion to Matthew McGrath, Ernest Sosa, Jeff Tolly, Chris Willard-Kyle, and David Yates. Thanks also for helpful written comments by Peter Graham, Liz Jackson, and Luis Oliveira.

    [↑](#footnote-ref-27)