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In Defense of Proper Functionalism: Cognitive Science Takes on Swampman

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Abstract. According to proper functionalist theories of warrant, a belief is warranted only if it is formed by cognitive faculties that are properly functioning according to a good, truth-aimed design plan, one that is often thought to be specified either by intentional design or by natural selection. A formidable challenge to proper functionalist theories is the *Swampman objection*, according to which there are scenarios involving creatures who have warranted beliefs but whose cognitive faculties are not properly functioning, or are poorly designed, or are not aimed at truth.

In this paper, we draw lessons from cognitive science in order to develop a novel argument for the conclusion that the Swampman objection fails against proper functionalist theories of warrant. Our argument not only shows that the underlying, central intuition motivating Swampman-like scenarios is false but also motivates proper function as a necessary condition for warrant, thereby lending support to the claim that any theory of knowledge that lacks a proper function requirement is false. [Word Count: 162]

Keywords: Swampman, Warrant, Knowledge, Proper Functionalism

Introduction

Let ‘warrant’ denote whatever precisely it is that makes the difference between knowledge and mere true belief. According to proper functionalist theories of warrant, a belief is warranted only if it is formed by cognitive faculties that are properly functioning according to a good, truth-aimed design plan, one that is often thought to be specified either by intentional design or by natural selection. Alvin Plantinga (1993a) has been the most prominent proponent of a proper functionalist account of warrant in recent years, though Ruth Millikan (1984) also developed such an account of warrant prior to Plantinga. More recently, proper functionalist theories of other epistemic concepts have

been developed, such as Michael Bergmann's (2006) and Peter Graham's (2012) proper functionalist theories of, respectively, justification and entitlement.

A formidable challenge to these proper functionalist theories is the *Swampman objection*. According to it, there are possible scenarios involving creatures who appear to have warranted beliefs but whose cognitive faculties are not properly functioning, are poorly designed, or are not aimed at truth. In this paper, we draw lessons from cognitive science to develop a novel argument for the conclusion that the Swampman objection fails against proper functionalist theories of warrant.¹ Our argument not only shows that the central intuition underlying that objection is false but also motivates proper function as a necessary condition for warrant, thereby lending support to the claim that any theory of knowledge that lacks a proper function requirement is false.

1. The Swampman Objection

The most well-known version of the Swampman objection was presented by Ernest Sosa (1993), who adapts Donald Davidson's (1987) original Swampman scenario against teleological theories of mental content and uses it against proper functionalism. In that scenario, Davidson is standing next to a swamp when lightning strikes a nearby dead tree, thereby obliterating Davidson. Simultaneously, by sheer accident, the lightning also causes the molecules of that tree to arrange themselves into a perfect duplicate of Davidson as he was at the moment of his demise. The Davidson duplicate leaves the swamp, acting and talking as if it were Davidson, being in all of the same physical states

¹ Although we are specifically responding to the Swampman objection as it applies to a proper functionalist theory of *warrant*, our response also provides resources for someone who is defending a proper functionalist theory of justification. See footnote 15 for more discussion of this point. Furthermore, the Swampman objection could be applied to *any* etiological theory of any epistemic property; our response may provide resources for defending those theories as well.

that Davidson would have been in had he left the swamp without having had his unfortunate encounter. According to Sosa, “it ... seems logically possible for ... Swampman to have warranted beliefs not long after creation if not right away” (p. 54). Yet, not being the product of intentional design, and not having any evolutionary history, it would seem that Swampman has no design plan. And so we have what appears to be a counterexample to proper functionalism.

Sosa is only one of many who has used the Swampman objection as a reason to reject proper functionalism. Earlier than Sosa, for example, James Taylor (1991, pp. 187-88) proposed a scenario in which there is a person, Theodore, whose creation was an “unintended side-effect of an intentional action.” In spite of his origins, however, Theodore “acquires beliefs as others do ... by perception, reason, deductive and inductive reasoning, memory, introspection, testimony, etc.” He is such that “the operation of his cognitive faculties is just like that of a normal human to whom it is natural to attribute many and various warranted beliefs” (pp. 187-188). Laurence Bonjour (2002, p. 255) asks us to imagine a being called “Frank”, whose cognitive faculties are created by chance. Against the odds, Frank’s faculties are exactly like an ordinary human being’s. “Frank,” Bonjour says, “might receive what would appear to be a normal education, might obtain a job in some cognitively demanding field ... and might eventually make, or at least appear to make, important contributions to human knowledge.” Richard Feldman (1993, p. 47) describes a case in which two scientists, Drs. Frank and Stein, design a belief-forming creature named “Igor”. Unfortunately, when they install Igor’s induction module, “they neglect to put in an element that would make him consider several examples (when feasible) before drawing inductive generalizations. As a result, Igor is a

‘hasty generalizer’” (p. 47). Then Feldman asks us to imagine that Igor acquires a brain lesion that makes him look for positive instances before making inductive generalizations. “As a result,” Feldman stipulates, “Igor is making good inferences ... but he’s not performing as designed. I don’t believe that the fact that he’s not performing as designed lends any support at all to the idea that his beliefs are not warranted” (p. 48).²

There are various responses to the Swampman objection. Plantinga and Graham have argued, albeit for different reasons, that it is doubtful that some of these Swampman-like scenarios are metaphysically possible.³ They have also suggested, again for different reasons, that perhaps the creatures in question can acquire conditions for proper functioning without natural selection or intentional design.⁴ Kenneth Boyce and Alvin Plantinga have also recently suggested that if we consider that it is in some sense merely by luck that the beliefs of the creatures in Swampman-like scenarios are true (since they weren’t produced by properly functioning faculties), we can think of such cases as Gettier cases and thereby deny that the beliefs have warrant.⁵

It is not our purpose in this paper to assess the relative merits of these responses. Nor will we directly argue that the beliefs of creatures in Swampman-like scenarios are *not* warranted. Rather, our purpose is to *undermine* these alleged counterexamples by arguing that the underlying, central intuition motivating them is false.

² Peter Klein (1996), Peter Markie (2004, p. 538), and Alvin Goldman (2009, p. 248) also wield versions of the Swampman objection to proper functionalism.

³ Plantinga (1991, pp. 206-208), Plantinga (1993b, pp. 76-77), and Graham (2012, pp. 466-467). They are joining a chorus of philosophers of mind who doubt that Swampman could have representational contents and beliefs in the first place. Indeed, this is what Davidson was arguing for when he first presented the Swampman scenario! However, many in both the philosophy of mind and epistemology literatures think that Swampman would have beliefs, and so our paper engages with those philosophers. Thanks to a referee for a helpful note on this point.

⁴ Plantinga (1991), pp. 208-209, Plantinga (1993b), p. 78 and Graham (2014)

⁵ Boyce and Plantinga (2012, pp. 130-131). Cf. McNabb (2014, p. 4).

2. What Lies Beneath: The Central Intuition

Why are we initially inclined to affirm that the beliefs of creatures in Swampman-like scenarios are warranted? We can answer this question by taking a closer look at some of the intuitive appeals made by those who propose these purported counterexamples. Here Taylor and Bonjour are the most explicit and helpful.

Concerning his “Theodore” case, Taylor stipulates that “Theodore is like other cognizers in many respects ... He acquires beliefs as others do.” Taylor further informs us that “the operation of [Theodore’s] cognitive faculties is *just like* that of a normal human to whom it is natural to attribute many and various warranted beliefs” (p. 187, emphasis added). Taylor later adds that even “though Theodore has not been designed, *given that his cognitive functioning is like that of a normal human*, it seems possible that he have warranted beliefs” (p. 188, emphasis added). Concerning his “Frank” case, Bonjour says that it is implausible to deny that Frank’s beliefs have warrant given that “*Frank might be indiscernible in every way from the rest of us* as regards his cognitive functioning” (p. 255, emphasis added).

We believe that Taylor and Bonjour have put a finger on what drives our intuitive response to the Swampman-like scenarios. Our intuitive inclination is to believe that if we were to form our beliefs in the way that these creatures do, in similar environments, then *our* beliefs would be warranted. And we are also inclined to infer from this fact that *their* beliefs are warranted.

Thus, it seems that the central intuition underlying our intuitive responses to Swampman-like scenarios may be stated (roughly) as follows:

(CI) If a belief B is warranted for a subject S and another subject S* comes to hold B in the same way that S came to hold B in a relevantly similar environment to the one in which S came to hold B, then B is warranted for S*.

CI is vague in at least two ways. First, it mentions one creature coming to hold her belief “in the same way” that another creature does. But of course, whether we judge one creature to have come to hold her belief in the same way as another creature depends on how we individuate ways of belief formation. Second, CI refers to “relevantly similar environments” without specifying any criteria for relevant similarity.

In the present context, however, such vagueness is unproblematic so long as we remember two things. First, we *do* have the intuition that creatures in Swampman-like scenarios come to hold their beliefs “in the same way” that normal humans do (under some relevant typing of ways of belief formation), and that the environments in which they do so are relevantly similar to ones in which human beings form warranted beliefs. Second, “in the same way” must be understood so that a mere difference in design plan or species membership is not sufficient to make creatures *not* hold their beliefs *in the same way*. Otherwise, CI would not be able to motivate the intuitive responses necessary for the Swampman objection to count against proper functionalism. Beyond these remarks, any further specification risks biasing CI toward some particular epistemological theory rather than leaving it as it is intended to be: a formulation of the naïve, untutored intuition that underlies our responses to Swampman-like scenarios.

With the above formulation in hand, we are in a position to examine this intuition in a more clear and critical light. But first, in section 3, we will examine Michael Bergmann’s response to the Swampman objection and argue that it fails. We will use our

discussion of Bergmann, however, to motivate our own response in section 4. There we will directly attack CI, and hence, the intuition behind the Swampman objection.

3. Bergmann VS. Swampman

3.1 Background

We will begin with a couple of preliminary remarks. First, Bergmann is interested in defending a proper functionalist theory of *justification*. Recall that we are using ‘warrant’ as a technical term for whatever it is that makes the difference between knowledge and mere true belief. Most epistemologists take justification to be necessary for warrant, but they do not take it to be sufficient, at least because of Gettier cases. Fortunately, Bergmann’s discussion is easily extended to apply to proper functionalism about warrant.

Second, Bergmann argues for a thesis that is presupposed in his discussion of Swampman-like scenarios – namely, the thesis that we have *unlearned* doxastic responses to experiences that are *contingently fitting* or *appropriate*. “An *unlearned* doxastic response to experience,” as Bergmann characterizes matters, “is a hardwired or automatic response that occurs (perhaps only after a certain level of cognitive development) without the subject first independently finding out that there is a correlation between the truth of the belief in question and the experience to which it is a response” (p. 117).

Bergmann illustrates the *fittingness* of some unlearned doxastic response to one’s experience using a case involving tactile phenomenology. He asks us to consider the sort of tactile experience we have when we grab a billiard ball (he labels this experience “ME1”) and the sort of belief that a normal human being will form in these circumstances

– namely, “the first person belief: ‘There is [a] smallish hard round object in my hand’” (p. 115) (he labels this belief “B1”). Bergmann says that, for humans, B1 is a fitting, unlearned doxastic response to ME1. He then asks us to consider the sort of olfactory experience we have when we smell a meadow full of flowers (he labels this experience “ME2”). Bergmann says that, for humans, B1 is an *unfitting* doxastic response to ME2.

He then illustrates *contingent* fittingness (or appropriateness) by noting that “tactile sensations do not seem to be any more suited than olfactory sensations to being indicators of hardness” (p. 119).⁶ He asks us to consider a species of cognizers who, upon grabbing a billiard ball, both experience ME2 and also form the natural, unlearned, doxastic response B1 upon experiencing ME2. Bergmann concludes that it is possible for B1 to be a fitting unlearned doxastic response to ME2 for some species, even though B1 is not a fitting unlearned doxastic response to ME2 for humans (pp. 119-121).

3.2 Bergmann’s Description of Our Intuitions

Before discussing the Swampman case, Bergmann asks us to consider his *Swampwoman* case. In that case, lightning strikes a swamp resulting in a configuration of matter that constitutes a woman. This “Swampwoman” looks and acts like a human woman, but she has a silicon-based brain and nervous system, not a carbon-based one. Furthermore, when she grabs a billiard ball in the dark, she experiences ME1 and forms unlearned doxastic response B1 as a result. Bergmann asks us to consider two ways of thinking about Swampwoman: “(i) Swampwoman has our design plan and is believing in accord with proper function and (ii) Swampwoman has design plan B and is malfunctioning” (p.

⁶ In addition to Bergmann, a number of epistemologists have endorsed the claim that fittingness is contingent, including Plantinga (1993a, pp. 98–99), John Greco (2000, pp. 173–174), Peter Markie (2004, pp. 530–533; 2006, pp. 118–119) and Jack Lyons (2013, pp. 13-21). Its roots can be traced as far back as Thomas Reid (1764/1997, p. 57).

147). Bergmann notes that *we* are inclined to take option (i) because we impose *our* design plan on Swampwoman; we are thereby inclined to think that B1 is a fitting response to ME1 for her. On the other hand, *silicon-based creatures* who had design plan B would be inclined to take option (ii) because they would impose *their* design plan on Swampwoman; they would thereby be inclined to think that B1 is not a fitting response to ME1 for them.

One lesson that Bergmann suggests we learn from Swampwoman is that our intuitions about fittingness depend on which design plan we impose. If we fail to impose any design plan on Swampwoman, if we think there is no such thing as proper functioning for her, then there is no fitting doxastic response she could have to ME1, and hence, B1 is also not a fitting response; it is thereby not justified. And if B1 is not justified for Swampwoman, it is also not justified for Swampman, since he has no design plan either.

On the other hand, suppose we think that Swampman *can* have properly functioning cognitive faculties. Bergmann suggests we might think this for two reasons. First, it seems that Swampman has a healthy heart and lungs. It is thereby intuitive that they are functioning as they are *supposed* to. Second, since Swampman has similar DNA to humans, we are inclined to think of Swampman as human; we are thereby inclined to think that he is supposed to function as humans do. For the reasons that Swampman seems both healthy and also a member of humankind, it also seems that his cognitive faculties can function properly. But then it seems that his beliefs could *fit* his evidence.

Thus, Bergmann argues that we are pulled in two directions when considering Swampman. Insofar as we are pulled to think that he is properly functioning (due to

DNA similarity and seeming healthiness), we are inclined to think his beliefs can be justified. But when we consider the Swampwoman case, we are pulled to think that he cannot have justified beliefs (due to his not having a design plan). Bergmann draws the following conclusion:

So which way should we go in interpreting the Swampman case? ... I won't try to answer that question. However, I will point out that either way, we are preserving the connection between proper function and justification. For our intuitive judgments about whether Swampman has lots of justified beliefs or none waver together with our intuitive judgments about whether ... it makes sense to say the concept of proper function applies. (p. 149).

We can formulate Bergmann's description of our intuitions as follows:

Bergmann's Description: In the Swampman-like scenarios, when we believe that the creature is properly functioning (according to a good, truth-aimed design plan), then our intuitive judgment is that the creature has justified beliefs; and when we believe that the creature is not properly functioning (according to a good, truth-aimed design plan), then our intuitive judgment is that the creature does not have justified beliefs.

And if Bergmann's Description is true, then this vindicates proper functionalism.

3.3 Argument Against Bergmann's Description

In the following, we will argue that Bergmann's Description is false; he thereby fails to adequately defend proper functionalism from the Swampman objection. We will also show how CI explains our intuitions about both Swampman and Swampwoman.

Although CI is about *warrant*, it is easy to extend it to explain our intuitions about the presence or lack of *justification* of Swampman or Swampwoman's beliefs.

The argument against Bergmann's Description is simple. Convince yourself that Swampman's heart and lungs are not properly functioning because there is no such thing as proper function for him. Put at the forefront of your mind that neither he, nor any of his parts, has a design plan. Now imagine him walking around, having conversations, forming beliefs, and acting just as ordinary humans do. Contra Bergmann, the intuition that he has warranted (and justified) beliefs remains.⁷ We can add Bonjour's considerations about Frank and imagine that Swampman also writes philosophy papers and contributes to academic scholarship. It is difficult not to attribute warranted beliefs and knowledge to him. So, Bergmann's Description is false.

Why are we still inclined to attribute knowledge to Swampman? CI explains our intuitive responses. It seems that Swampman has warranted beliefs because he forms them in the same way that normal humans do when they have warranted beliefs in an environment that is relevantly similar to the environments in which human beings come to have those beliefs. The fact that Swampman is a molecule-for-molecule duplicate of a normal human being strengthens our confidence that Swampman comes to hold the beliefs he does "in just the same way" that normal human beings with warranted beliefs do.

More reason to reject Bergmann's Description arises when we consider Swampman-like scenarios that Bergmann does not discuss. Consider again, for example, Feldman's "Igor" case, in which Drs. Frank and Stein create a creature who, were he functioning according to design, would form beliefs via hasty generalization. However,

⁷ From here on, we will leave the "and justified" implicit.

owing to a lesion, he refrains from hastily generalizing and comes to form many of his inductive beliefs via a process that would result in warranted beliefs for beings like us. We may also suppose that Igor does not belong to any natural biological kinds (having been cobbled together, we might gruesomely suppose, from a number of body parts taken from various animal species). Given this, our intuitive inclination is to think that either there is no proper function for Igor, or (given that he is acting contrary to Frank and Stein's design plan) that he is malfunctioning. Nevertheless, contra Bergmann, given the stipulation that Igor forms his inductive beliefs in the same sorts of ways that we ordinary human beings do, we have a strong inclination to affirm that these beliefs are warranted. And we can see that CI explains our intuitions about this case as well.

What, then, should we say about Bergmann's *Swampwoman* case? When we are first introduced to Swampwoman, we are told that she "in outward appearance and behavior almost exactly resembles a human woman." This provides us with some inclination to think that Swampwoman forms her beliefs "in the same way" that ordinary human beings do, and (given our pre-reflective commitment to CI) this inclines us to say that her billiard-ball belief is warranted. But we are also told that Swampwoman differs from us in having a silicon-based brain and nervous system. Once told this, we are not certain whether the neuro-physical processes by which Swampwoman forms her beliefs are sufficiently similar to ours for us to say that she comes to hold her beliefs "in the same way" that ordinary human beings do. So our intuition that many of her beliefs are warranted is not as strong as our intuition that many of Swampman's beliefs are warranted. Once again, this is easily explained by the hypothesis that the primary intuition underlying our inclination to say that Swampman has warranted beliefs is CI.

Furthermore, we are told that Swampwoman instantiates the same physiological type as another species whose members typically form their beliefs in response to their experiences in a manner that is quite different from the way we do. This strengthens our doubts about whether Swampwoman forms her beliefs “in the same way.” Furthermore, CI entails a parallel claim about *lack of warrant* (i.e. a claim that could be expressed by replacing every occurrence of ‘warranted’ in CI with ‘unwarranted’):

(CI*) If a belief B is unwarranted for S*, and S comes to hold B in the same way that S* came to hold B in a relevantly similar environment to the one in which S* came to hold B; then B is unwarranted for S.⁸

And we are told that there are creatures (of the same physiological type as Swampwoman) who are such that if they were to form the billiard-ball belief in the same way that Swampwoman does, their belief would not be warranted. Thus CI* provides us with some inclination to deny that Swampwoman’s billiard-ball belief is warranted.

(This counterbalances the inclination to affirm that Swampwoman’s billiard-ball belief is warranted from being told that Swampwoman resembles a human being in appearance.)

Once again, it is CI that accounts for our intuitive responses to the Swampwoman scenario. Thus, it appears that CI motivates our intuitions in Swampman-like scenarios and that Bergmann’s Description is false. And if this is so, then Bergmann has failed to adequately defend proper functionalism.

⁸ Proof: Assume for conditional proof that S* comes to hold belief B in the same way that another subject S does in a relevantly similar environment and that B is not warranted for S*. Assume for reductio that B is warranted for S. It follows from CI that B is warranted for S* (since S* forms her belief in the same way that S does in a relevantly similar environment). Contradiction! It follows by reductio ad absurdum that B is not warranted for S. It further follows by conditional proof that if S* comes to hold B in the same way that S does in a relevantly similar environment and B is not warranted for S*, then B is not warranted for S.

Against the case we have just made, some might object that they do not share our intuitions and that they *do* find Bergmann's response to the Swampman objection to be adequate.⁹ To them, we have two responses. First, the force of our main response to the Swampman objection, to be presented in the next section, does not require the falsity of Bergmann's Description. Hence, those who find Bergmann's response to the Swampman objection to be plausible can supplement it with ours. Second, there will likely be many proponents of the Swampman objection who, like us, disagree with Bergmann's Description and find their intuitions motivated by CI. Proper functionalist proponents of Bergmann's response to the Swampman objection should welcome an alternative defense of proper functionalism.

So, we disagree with Bergmann's response. However, his focus on the contingent appropriateness (or lack thereof) of various unlearned doxastic responses points us in the direction of the response to the Swampman objection that we develop in the next section. Rather than appealing to the contingent appropriateness of unlearned doxastic responses as a way of trying to show that proper functionalism accommodates our intuitions concerning Swampman-like scenarios, we will draw lessons from both cognitive science and also our everyday commonsense attributions of knowledge to argue that the intuition that primarily informs our responses to those Swampman-like scenarios, CI, is false.

4. Dissolving the Swampman

4.1 Unlearned, Warrant-Appropriately Formed Beliefs

⁹ This includes a referee, who provided significant and helpful contribution to the contents of this paragraph, including the following two responses.

In this section, we will propose a counterexample to CI. To explain it, we must first explain what an unlearned, *warrant-appropriately formed* belief is. As mentioned earlier, warrant is what turns true belief into knowledge. A belief is warranted only if conditions both within the believer (bodily mechanisms responsible for the belief) and outside the believer (environmental conditions) are met. It is the *former* conditions, and not the latter, that are required for a warrant-appropriately formed belief.

For example, beliefs in typical Gettier-cases are not warranted, but they are warrant-appropriately formed. When Smith believes that *Jones owns a Ford or Brown is in Barcelona*, the belief is warrant-appropriate; Smith formed the belief in the right way required for knowledge; yet, the belief is not *warranted* because of environmental factors. Now, consider two cases of warrant-*inappropriately* formed belief. In the first, I do not believe on the basis of my evidence properly. I gain strong evidence that my favored political candidate has taken bribes, yet, due to my wishful thinking and stubbornness, I believe he is innocent. The belief is not formed in the right way required for knowledge; it is warrant-inappropriate. In the second case, due to schizophrenia I am unaware of, I hallucinate, and it visually appears to me that a statue is in front of me. Even supposing that this appearance is good evidence that a statue is in front of me, and I believe this on the basis of this evidence, the belief is still unwarranted. I do not *know* that a statue is in front of me, even if there happens to be a statue in front of me. And the reason is because of *how the belief was formed*; it is a warrant-inappropriately formed belief. Hence, even if one's belief is a fitting response to one's evidence (e.g., my believing that a statue is in front of me on the basis of its appearing to me so), this does not suffice to make the belief

warrant-appropriate. In this case, my evidence also needed to be formed in a proper manner necessary for warrant.

Warrant-appropriate ways of belief formation can be *unlearned*. In Bergmann's example of a human grabbing a billiard ball and forming unlearned doxastic response B1 to ME1, the belief seems to not only be fitting and justified, but it also appears to be *warranted* (supposing this is not a Gettier-like situation). Although we find this example to be plausible, we will draw examples from literature in contemporary cognitive science on *initial knowledge*, which is the earliest knowledge that we form as cognitively unsophisticated subjects. From very early ages, infants appear to know that a set can have unconnected objects as members (Wynn, 1992, Spelke 1994, 434), that an object will move only on connected, unobstructed paths (Spelke 1994, 433), and that "an object-that-loses-its-support" is the *same object* as "the object-that-falls" (Spelke 1994, 439). Regarding the last example, we appear to come into the world with perceptual systems that represent objects as *the same object* across time. Spelke (1994, 439) argues that this would be very difficult to learn. These cases are a few of many in which we appear to have unlearned, warrant-appropriately formed beliefs.

To better direct our discussion, however, we will focus on knowledge that infants appear to have about the existence of occluded physical objects. Current scientific evidence indicates that infants have such knowledge. For example, infants as young as four months old can correctly predict the reappearance of a moving object behind an occlusion on the basis of its speed and path.¹⁰ As early as six months, some infants can

¹⁰ See Rosander & von Hofsten (2004) and von Hofsten, Kochukhova, & Rosander (2007). These experiments are on the basis of eye tests, where experimenters trace the infant's eye movement. See also Baillargeon (1987) for further evidence.

predictively reach out and grasp occluded objects.¹¹ And by nine months, infants can reliably engage in search behavior for missing objects.¹² These actions indicate that the infants both believe and know that there is an object, even when they cannot see it.¹³

Of course, even without the benefit of experimental data on early childhood development, it often appears obvious to parents and caretakers that infants exhibit, by their behavior, knowledge of the continued existence of occluded physical objects. This knowledge appears to be both unlearned and a part of natural development. Furthermore, upon reflection, the everyday intuitions of these parents and caretakers seem correct.

Note, however, that the processes by which infants form such beliefs are only *contingently* reliable. For example, suppose there were an alien environment in which certain kinds of objects regularly disappeared when unobserved. There could be non-human creatures in such an environment in which the common human belief-forming tendency to believe in occluded objects would yield a large number of false beliefs. And it is also possible that these creatures are adapted to their environment in such a way that their opposite, belief-forming tendency is reliable.

4.2 *The Cases of Billy and Zork*

With this background in mind, we now have the resources to formulate a counterexample to CI. Consider the following cases:

Case 1: Billy is a human infant who is an unknowing participant in an experimental program concerning early childhood cognitive development. In the process of being experimented upon, he sees a red ball go behind a screen, out of

¹¹ See Spelke, E.S. & von Hofsten, C. (2001) and Hespos, S.J., Gredeback, G., von Hofsten, C., & Spelke, E.S. (2009) for evidence and discussion.

¹² See Piaget's (1954) classic study on this topic. Many were influenced by Piaget to think that object permanence did not develop until 9 months. It is the more recent studies, cited in the previous footnotes, that swung the majority of developmental psychologists to believe otherwise.

¹³ There are interesting issues about the connection between the beliefs of these infants and the various behaviors indicating the presence of these beliefs. See Young (2005) and Hespos, S.J., Gredeback, G., von Hofsten, C., & Spelke, E.S. (2009) for interesting discussion.

sight, and, via an unlearned doxastic response, forms the belief that the round object he just saw is behind the screen.

It seems that Billy's belief is warranted.

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.

It is intuitively clear that Billy's belief is not warrant-appropriate in this case since Billy does not have the right sort of doxastic response required for knowledge.

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.

Like in Case 2, it is still intuitively clear that Billy's belief is not warrant-appropriate, even though Billy's belief-forming tendency is reliable in the experimental environment he is in. It is, in some knowledge-precluding way, "merely by accident"¹⁴ that Billy's belief-forming process reliably produces a true belief.

Case 4: Zork, unlike Billy, is an alien child who lives on another planet, although members of his species are very human-like (so human-like, in fact, that even down to the molecular level, it is difficult to distinguish them from human beings). Furthermore, Zork's planet is very much like Earth, with one important exception. Owing to some odd features of its magnetic field and some currently unknown (to Earth scientists) quantum phenomenon, strange, macroscopic sized, red, spherical particles frequently pop into existence in the presence of observers on Zork's planet and then disappear. These particles have a further odd property. If one of them pops into existence in the presence of a group of observers, then if any one of those observers stops observing that particle, it immediately ceases to exist. Zork (who is also an unknowing subject of cognitive experiments on early

¹⁴ Plantinga (1993a, pp. 33-37) has proposed that this sort of accidentality be analyzed in terms of lack of proper function. (See also Boyce and Plantinga (2012, pp. 127-128).) However, we needn't accept this *general* claim in order to accept the intuitive judgment that Billy's belief is accidentally true in a knowledge precluding way in this *particular* case.

childhood development being conducted by adult members of his species) sees one of these particles go behind a screen and via an unlearned doxastic response, forms the belief that the round object he just saw has ceased to exist.

It seems that this belief is warrant-appropriate for members of Zork's species. We think we should grant that if Billy's belief in Case 1 is warranted, then Zork's belief could also be warranted; any objection to thinking that one is warranted is also an objection to thinking that the other is. So we will stipulate that Zork's belief is warranted in this case.

Case 5: Billy has been abducted by aliens of Zork's species and taken to Zork's planet. Furthermore, Billy has exactly the same sorts of belief forming tendencies that he was stipulated to have in Case 3. Billy sees one of the strange, red, spherical particles from Zork's world pass behind a screen and believes that it has ceased to exist.

If we say of Case 3 that Billy's belief is not warrant-appropriate, then we should also say the same about Billy's belief in this case. So, given what we said in Case 3, we should also deny that Billy's belief has warrant in this case.

Case 6: Billy and Zork are both present in a laboratory on Zork's planet. Both simultaneously observe one of the strange, red, spherical particles from Zork's planet pass behind a screen. All goes for Zork as it did in Case 4 and all goes for Billy as it did in Case 5. Consequently, both Zork and Billy form the belief that the round object that they just saw has ceased to exist.

Given all of the above, we should accept that Zork's belief is warranted and Billy's is not.¹⁵

Case 6 is close to being a counterexample to CI. All we need to do is add a stipulation that Billy forms his beliefs "in the same way" (in the sense that is at issue in

¹⁵ Note that we are talking about *warrant*, not justification. Some internalists might think that both Billy's and Zork's beliefs are *justified* and still agree with us that the belief is unwarranted. For example, phenomenal conservatives will likely think that both beliefs are justified because it *seems* to both Billy and Zork that the round object they saw has ceased to exist (and they have no defeaters). In fact, phenomenal conservatives like Chris Tucker (2011) and Michael Huemer (2013: 747-748) have actually pointed to cases like these as instances of justified but unwarranted belief. On the other hand, externalists like Boyce and Plantinga (2012) and Michael Bergmann (2013) are likely to just think that the belief is also unjustified. Regardless of that debate between internalists and externalists about justification, we expect wide agreement from both camps about the *warrant*-appropriateness of these beliefs.

CI) that Zork does. Then we get a case in which Billy and Zork both come to hold the same belief in the same way in the same epistemic environment, but in which that belief is warranted for one of them (namely, Zork) but not the other (namely, Billy). And then we have our counterexample to CI.

Can we appropriately add the required stipulation to Case 6? Certainly we can add that there is no intrinsic difference between the internal physical processes relevant to the formation of Billy and Zork's beliefs, including those occurring in their brains and other parts of their nervous systems. We could stipulate that the birth defect that caused Billy's abnormal doxastic response made the process of his belief formation physically identical to Zork's normal doxastic response. One might deny that they form their beliefs "in the same way" on the grounds that they do not share the same design plan or belong to the same species. But recall from section 2 that "in the same way" in CI must be understood so that a mere difference in design plan or species membership is not sufficient to make creatures *not* hold their beliefs *in the same way*. Otherwise, CI would not be able to motivate the intuitive responses necessary for the Swampman objection to count against proper functionalism.

We conclude that we can sensibly add the stipulation to Case 6 that Billy and Zork form their beliefs "in the same way" (in the sense at issue in CI). This gives us our counterexample. But since CI is the central intuition involved in our inclination to regard Swampman-like scenarios as counterexamples to proper functionalist accounts of warrant, it follows that once we see CI is false, we lose any justification for thinking they are genuine counterexamples.

At this point, the defender of the Swampman objection might protest that CI is more plausible than the intuitions that we employ to generate our counterexample. But we do not believe this to be the case.¹⁶ We appealed both to intuitions about infants in scientific experiments and also to our ordinary, pre-reflective knowledge attributions to infants in everyday life. The former are based on very careful observations about the behaviors of infants in controlled environments; the latter are based on the sorts of observations humans have made throughout their history. Combined, these intuitions are much “closer to home” and thereby more likely to be reliable than any intuitions we might have about the warrant (or lack thereof) of the beliefs of creatures accidentally formed in swamps or cobbled together in a laboratory. Where we venture a little farther from home in our assertions, we do so by grounding them in intuitions that are close to home. For example, we noted that any plausible objection to thinking that Zork’s belief in Case 4 is warranted would be an objection to thinking that Billy’s belief in Case 1 is warranted, but we have a firm intuition that Billy’s belief in Case 1 is warranted.

We will conclude the paper by pointing out that Case 6 can also be used to provide evidential support for proper functionalism and against alternative theories of knowledge. Since Billy and Zork form beliefs in the same cognitive environment and in “the same way”, it seems that the only facts left to explain the differences in warrant-appropriateness in their beliefs are facts about proper function and species membership. This indicates either that proper function is necessary for warranted belief or that the appropriate process of belief-formation required for warrant is relative to the species of the believer. Either way, we are left with new evidence in favor of proper functionalism.

¹⁶ We thank a referee for help thinking through the contents of this paragraph.

On the other hand, theories that do not require proper function for knowledge will find themselves with a potential counterexample.¹⁷ For example, in the dialectic in which Sosa (1993) originally proposed his version of the Swampman objection, he was intending to show the superiority of his virtue epistemology over Plantinga's proper functionalist epistemology. The developed version of Sosa's view (2015) states that if one forms a true belief that manifests one's competence in attaining true beliefs, then one has knowledge. An analogy for this sufficient condition is someone who manifests her competence in archery when hitting a bull's eye. Similarly, someone who manifests her competence in attaining true beliefs, when forming a particular true belief, has a warranted belief. If the Swampman objection were successful, then we'd have a reason to accept Sosa's view over Plantinga's.

However, if Sosa's theory is true, then it would seem that Billy and Zork should both have knowledge in Case 6 since they both form a true belief that manifests their competences. But we argued earlier that Zork has knowledge and Billy does not. Hence, Case 6, and the example of Billy in particular, is a potential counterexample to Sosa's theory. One could reply that Billy's belief does not manifest a competence. However, we must then ask why Billy's belief does not manifest a competence, but Zork's belief does. This leads us into further interesting questions about Sosa's theory, including what it is to manifest a competence. Regardless of how we answer that question, Sosa is left with a dilemma. Either manifesting a competence depends on proper function or species membership, or it does not. If it does, then we welcome that result and happily include Sosa's theory as a version of proper functionalism. If it does not, then there appears to be

¹⁷ We thank a referee for help in clarifying the moves made in these final paragraphs of the paper.

no suitable basis for distinguishing Billy and Zork.¹⁸ Hence, Sosa's theory faces a problem as long as it does not become a version of proper functionalism.

We are under no illusion in thinking that the above criticism is the final word on Sosa's theory of knowledge. Rather, our overall goal is to use this criticism as a schema for how Case 6 presents a *challenge* to Sosa's theory and any other theory of knowledge that does not have a proper function requirement. Of course, we predict that proponents of the various theories of knowledge will have responses to the challenge that Case 6 presents, but it *is* a challenge and should be reckoned with. We conclude that, ironically, reflections on Swampman do not give us reason to think that proper functionalism is false but instead provide a significant challenge to its many competitor theories of knowledge.¹⁹

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¹⁸ One could also reply that we are inclined to say that Billy doesn't know because he doesn't have what Sosa calls *reflective knowledge* or *knowing full well*, even though he does in fact have *animal knowledge*. But we have argued that Billy does not have *knowledge*, and since animal knowledge is a type of knowledge, it follows that he also does not have animal knowledge. Furthermore, this reply does not do justice to the fact that it seems that Zork *does* know and Billy doesn't, despite the fact that *neither* has the higher-level reflective competences required for reflective knowledge and knowing full well. So, one cannot explain why we are inclined to think that Billy doesn't know by appealing to his lacking higher levels of knowledge, since Zork lacks those levels too.

¹⁹ We are grateful to Sarah Boyce, Matthew Lee, Josh May, Matthew McGrath, Alvin Plantinga, Ted Poston, and Ernie Sosa for helpful correspondence and conversation concerning these matters. We are also thankful to the audience at the 2015 MidSouth Philosophy conference, including Matthew Frise, Derek Jones, Kevin McCain, Alex Radulescu, Josh Smart, and especially our commentator Nick Byrd.

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