Is Every Theory of Knowledge False?*

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Abstract: Is knowledge consistent with literally any credence in the relevant proposition, including credence 0? Of course not. But is credence 0 the *only* credence in *p* that entails that you don't know that *p*? Knowledge entails belief (most epistemologists think), and it's impossible to *believe* that *p* while having credence 0 in *p*. Is it true that, for every value of '*x*,' if it's impossible to know that *p* while having credence *x* in *p*, this is simply because it's impossible to believe that *p* while having credence *x* in *p*? If so, is it possible to believe that *p* while having (say) credence 0.4 in *p*? These questions aren't standard epistemological fare—at least in part because many epistemologists think their answers are obvious—but they have unanticipated consequences for epistemology. Let 'improbabilism' name the thesis that it's possible to know that *p* while having a credence in *p* below 0.5. Improbabilism will strike many epistemologists as absurd, but careful reflection on these questions reveals that, if improbabilism is false, then all of the most plausible theories of knowledge are also false. Or so I shall argue in this paper. Since improbabilism is widely rejected by epistemologists (at least implicitly), this paper reveals a tension between all of the most plausible theories of knowledge and a widespread assumption in epistemology.

In his 2010 paper "Value Matters in Epistemology," Ernest Sosa rejects the threshold view of belief on the basis of its conflict with platitudes about the value of knowledge, justified belief, and apt belief. Sosa presents a case where two subjects are identical except for a small difference in their credences, and he shows how this case is a counterexample to the value platitudes if the threshold view of belief is true. I agree with Sosa that we should reject the threshold view of belief, but I think his case has much deeper implications for epistemology. Let 'improbabilism' name the thesis that it's possible to know that *p* while having a credence in *p* below 0.5, and let 'probabilism' name the negation of this thesis.[1] Improbabilism will strike many epistemologists as absurd, but careful reflection on the relationship between knowledge, credences, and beliefs reveals that, if *probabilism* is true, then Sosa's case is a counterexample to all of the most plausible theories of knowledge. Or so I shall argue in this paper.

Here I should warn readers that, while I am concerned with literally every theory of knowledge in this paper, I pay disproportionate attention to Sosa's specific theory of

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[1] More carefully, let 'improbabilism' name the thesis that, for at least one value of '*S*' and one value of '*p*,' possibly, *S* knows that *p* while having a credence in *p* below 0.5, and let 'probabilism' name the thesis that, for every value of '*S*' and every value of '*p*,' necessarily, if *S* knows that *p*, then she doesn't have a credence in *p* below 0.5. Formal epistemologists use 'probabilism' to name the view that our credences ought to conform to the axioms of the probability calculus. Obviously, this view isn't equivalent to the thesis I am calling 'probabilism.'

knowledge. I do this for a number of reasons. My arguments are hard to follow in the abstract, Sosa's view is already salient from reflection on Sosa's case, Sosa's view is very easy to wield, and so on. In an earlier draft, I focused on an imaginary view that I called 'naïve reliabilism.' That draft gave roughly equal attention to every extant theory of knowledge, but it forced readers to pay extended attention to a view that nobody actually holds. As a result, that draft was boring. By focusing first on Sosa's view and then generalizing to every other view, I make it tangible throughout that I am not arguing against a straw person.

In §§1–2, I show how Sosa's case might figure into an argument against his own view, and, in §§3–4, I show that the best way to resist this argument requires accepting improbabilism. This conclusion won't faze epistemologists who reject Sosa's view, but, as I show in §§5–6, Sosa's case doesn't cause any *special* problem for Sosa's view. His case might figure into an analogous argument against any plausible theory of knowledge, and, for any plausible theory of knowledge, the best way to resist this argument will require accepting improbabilism. In §§7–8, I ask how we should respond to Sosa's case, explain why the answer isn't obvious, and tentatively conclude that, instead of accepting improbabilism, we should either revise our favorite theory of knowledge or formulate a new one. The main point of this paper, though, isn't that all of the most plausible theories of knowledge are false. It's simply that probabilism conflicts with all of the most plausible theories of knowledge. Since probabilism is widely accepted by epistemologists (at least implicitly), this paper reveals a tension between all of the most plausible theories of knowledge and a widespread assumption in epistemology.

1. A Preliminary Argument Against Sosa's View

Probabilism comes in two versions: what I will call 'moderate probabilism' and 'radical probabilism.' According to the latter, it's impossible to know that *p* while having a credence in *p* below 1. According to the former, it's impossible to know that *p* while having a credence in *p* below 0.5, but it *is* possible to know that *p* while having a credence in *p* below 1. By 'credence 1,' I mean the highest possible credence. On this usage, if it's possible that anyone's credence in any proposition is higher than your credence in *p*, then you don't have credence 1 in *p*. So, on this usage, radical probabilism entails that, for any value of '*p*,' you don't know that *p* unless your credence in *p* is at least as high as your credence in the proposition that 1 = 1, at least as high as *my* credence in the proposition that I exist, and so on, for every proposition in which anyone could have any credence. In contrast, if moderate probabilism is true, you might know that *p* even though it *is* possible that

someone's credence in some proposition is higher than your credence in *p*. So moderate probabilism is consistent with the idea that you know that you have hands (for example) even though your credence in the proposition that you have hands is lower than my credence in the proposition that I exist. Moderate probabilism seems implicit in nearly all non-skeptical epistemological theorizing, so assume that it's true.[2]

Given this assumption, what should we say about specific credences between 0.5 and 1? What should we say about credence 0.8, for example? Assuming that moderate probabilism is true, is it possible to know that *p* while having credence 0.8 in *p*? Of course it's vague how confident you must be in order to know that *p*, if moderate probabilism is true. So assume for the moment that epistemicism is true. (I will drop this assumption below, but in the meantime it helps illustrate a point.) Given this assumption, vagueness is simply a matter of ignorance. In the case at hand, epistemicism posits a fixed, context-independent value of '*x*' for which it's possible to know that *p* while having credence *x* in *p*, but not possible to know that *p* while having any credence lower than *x* in *p*, and it says that this fixed value of '*x*' is the exact lowest credence consistent with knowing that *p*. It's vague how confident you must be if you know that *p*, not because there *is* no fixed value of '*x*' that satisfies this description, but because we have no way of knowing which fixed value of '*x*' does satisfy it. This is the epistemicist picture. So now let '*K*' name the fixed value of '*x*' that satisfies this description if epistemicism is true, whatever it happens to be. Then, if epistemicism and moderate probabilism are *both* true, it's possible to know that *p* while having credence *K* in *p*, but it's not possible to know that *p* while having any credence below *K* in *p*, and knowing that *p* is consistent with credences below 1 in *p* since *K* (whatever it is) is below 1.

Assuming that epistemicism and moderate probabilism *are* both true, Sosa's case looks like a counterexample to his own view. Here is my rendition of Sosa's case.

> Kim tells Tom that she has asthma and Tom accepts her testimony. As a result, Tom acquires a disposition to act as if Kim has asthma, affirm that she has asthma,

[2] Throughout, I will use words like 'confident' and 'confidence' to talk about credences. If I say that someone is highly confident in *p*, for example, I will mean just that she has a high credence in *p*; if I say that she is more confident in *p* than she is in *q*, I will mean just that her credence in *p* is higher than her credence in *q*; and so on. There are natural uses of the word 'confidence' on which a person's level of confidence in a proposition needn't equal her credence in that proposition, but in this paper I will use 'confidence' and related words strictly to talk about credences. What do I mean by 'credence,' then? The same thing formal epistemologists mean: so-called "subjective probabilities" or "degrees of belief" (though see Moon forthcoming). I am sympathetic to Eriksson and Hajek's (2007) argument that there isn't any successful analysis of credences, and that we should therefore take the concept as a primitive. But for purposes of this paper, we can plug in whatever theory we like. It only matters that the standard considerations (actual betting behavior, counterfactual betting behavior, dispositions to accept bets as fair, *etc.*) can at least be defeasible guides to a person's credences.

> assert that she has asthma, judge that she has asthma, rely on the proposition that she has asthma in his theoretical and practical reasoning, and so on. And in fact, on the basis of Kim's testimony, Tom comes to know that Kim has asthma. But Tom is just slightly overconfident in the proposition that Kim has asthma. While his ideal credence in this proposition is exactly *K*, his actual credence in this proposition is $K + n$, for some very small value of '*n*.' Now Kim also tells Jerry that she has asthma, and Jerry accepts her testimony just like Tom. As a result, Jerry acquires the disposition to act as if Kim has asthma, the disposition to affirm that she has asthma, *etc.*, just like Tom. And in fact, Jerry is identical to Tom in every epistemically relevant respect except that, whereas Tom winds up slightly overconfident in the proposition that Kim has asthma, Jerry winds up slightly underconfident in this proposition. While Jerry's ideal credence is exactly *K*, just like Tom's, his actual credence is $K - n$ instead of $K + n$, for the same value of '*n*.' This difference in their credences is the only difference in their affirmative attitudes toward the proposition that Kim has asthma.[3]

Let 'ASTHMA' name the proposition that Kim has asthma. By hypothesis, Tom knows that Kim has asthma while Jerry's credence in ASTHMA is below *K*. Since *K* is the lowest credence consistent with knowledge (we are assuming), Tom knows that Kim has asthma while Jerry does not. But our assumption that Tom and Jerry are identical except for the stipulated difference in their credences seems to entail that Jerry's belief that Kim has asthma is at least as apt as Tom's, in the sense familiar from Sosa's version of virtue epistemology. Consider the following argument.

According to Sosa (2007, 2009, 2011), knowledge is apt belief, beliefs are apt just in case they are accurate because adroit, beliefs are accurate just in case they are true, and beliefs are adroit just in case they are products of intellectual virtues, competences or skills possessed by the people who have them. Kim does have asthma, so Tom and Jerry both have accurate (*i.e.* true) beliefs. Jerry isn't Gettiered, so, if Jerry's belief is at least as adroit as Tom's, then it's at least as accurate *because* adroit as Tom's, and thus at least as apt as Tom's. So the only question is whether Jerry's belief is at least as adroit as Tom's. And given the stipulated details of the case, the answer seems clearly, 'yes.'

Tom and Jerry have both made a small epistemic mistake. Neither has exactly the credence in ASTHMA that he ought to have. Tom is slightly overconfident in ASTHMA while Jerry is slightly underconfident in ASTHMA. So either (a) Tom has made a smaller

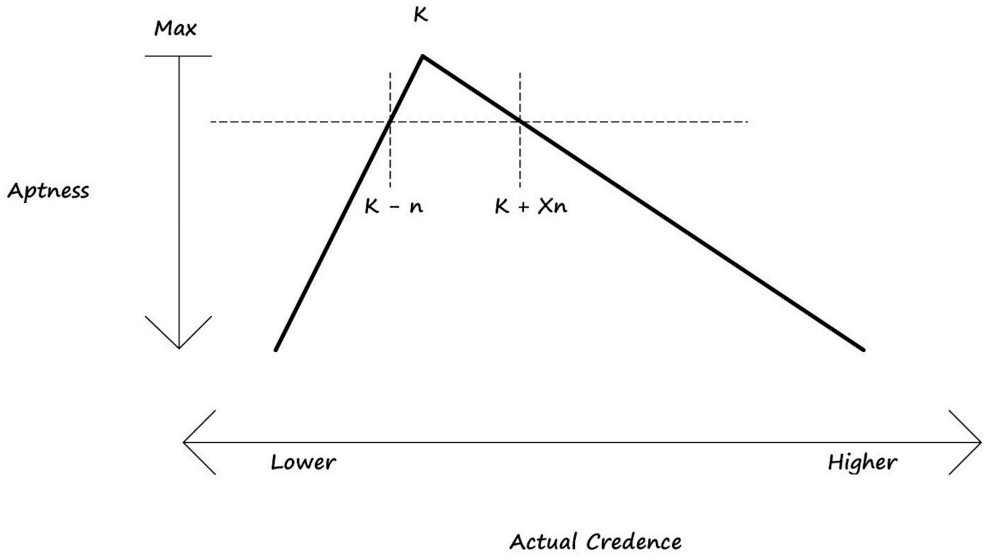
[3] As readers familiar with Sosa's work will recognize, this exact case doesn't appear anywhere in Sosa's corpus. I'm calling it 'Sosa's case' because it's inspired almost entirely by Sosa's discussion of the threshold view of belief, and especially his discussion of the people he calls 'Assertive' and 'Diffident' in his argument against the threshold view of belief (2010: 167–73).

epistemic mistake than Jerry, (b) Tom has made a larger epistemic mistake than Jerry, or (c) Tom and Jerry have made epistemic mistakes of the same size. Since Tom's overconfidence in ASTHMA is exactly proportionate to Jerry's underconfidence in ASTHMA, and since overconfidence in a proposition is at least as bad epistemically as the same amount of underconfidence in that proposition, (a) is false.[4] So Tom's mistake is at least as large as Jerry's. Now, either Tom and Jerry's mistakes detract from the adroitness of their beliefs, or they do not. If the latter, then our stipulation that Tom and Jerry are identical in every epistemically relevant respect except for the difference in their credences entails that Tom and Jerry have equally adroit beliefs. But if the former, then either Tom has made a larger epistemic mistake than Jerry and Tom's belief is consequently *less* adroit than Jerry's, or they have made epistemic mistakes of the same size and their beliefs are consequently equally adroit. Either way, Jerry's belief that Kim has asthma is at least as adroit as Tom's. (And of course, if Tom and Jerry *haven't* made epistemic mistakes in their credences in ASTHMA, or if they have made epistemic mistakes in their credences in ASTHMA but their mistakes don't detract from the adroitness of their beliefs, then the stipulation that Tom and Jerry are identical in every epistemically relevant respect except for the difference in their credences entails *straightaway* that they have equally adroit beliefs.) Since their beliefs are equally true and equally un-Gettiered, it follows that Jerry's belief that Kim has asthma is at least as apt as Tom's. But Tom knows that Kim has asthma while Jerry does not. So either Jerry has apt belief without knowledge, or Tom has knowledge without apt belief.

Now someone might object that, even though Tom and Jerry have made epistemic mistakes of the same size, Jerry's mistake detracts *more* from the aptness of his belief, so his belief is consequently *less* apt than Tom's. But actually, it doesn't matter whether Jerry's mistake detracts more from the aptness of his belief. To see why, compare Tom's belief that Kim has asthma to Diana's belief that Kim has asthma. Diana, we can suppose, is identical to Tom and Jerry in every epistemically relevant respect except that her actual credence in ASTHMA matches her ideal credence exactly; it's precisely K, just as it should be. Indeed, we can suppose, in the circumstances in which she finds herself with Tom and Jerry, Diana's intellectual performance is literally unimprovable—her belief is literally is as apt as a belief *could* be in these circumstances. Given these suppositions and the fact that Tom's credence is ASTHMA is $K + n$ (rather than K, as it should be), what should we say about Tom's belief that Kim has asthma? How does it compare to Diana's? It's clearly less apt. So even if Jerry's mistake detracts *more* from the aptness of his belief than Tom's

[4] Notice also that, if we like, we can consider a version of this case where Tom's overconfidence in ASTHMA has exactly the same expected accuracy as Jerry's underconfidence in ASTHMA. (Though see Carr 2017.)

mistake detracts from the aptness of his, Tom's mistake still detracts *something* from the aptness of his belief. Why does this matter? Because it means that, even if Jerry's mistake detracts more from the aptness of his belief, in spite of the fact that his mistake isn't any larger than Tom's, we can simply consider a version of Sosa's case where Tom's mistake is sufficiently *larger* than Jerry's (a case where Jerry's credence in ASTHMA is $K - n$ while Tom's credence in ASTHMA is $K + 4n$, if that's what it takes) and then run the argument in terms of *this* version of the case. So there seems no point in objecting that, even though Tom and Jerry have made epistemic mistakes of the same size, Jerry's mistake detracts more from the aptness of his belief. Whatever the relationship between underconfidence in a proposition, overconfidence in that proposition, and the aptness of one's belief in that proposition, there will be some value of 'X' for which Jerry's credence in ASTHMA is $K - n$ while Tom's credence in ASTHMA is $K + Xn$ and Jerry's belief is consequently *exactly* as apt as Tom's.



But again, Tom knows that Kim has asthma while Jerry does not. So there will be some version of Sosa's case where either Jerry has apt belief without knowledge or Tom has knowledge without apt belief.[5]

[5] According to Sosa (2010: 168: fn. 3), "[i]f your evidence warrants a departure of a certain length from 0.5, then it warrants any shorter departure about as well." If Sosa is right about this, then Tom has arguably made a *larger* epistemic mistake than Jerry, in which case his belief is arguably *less* apt than Jerry's, even though Tom knows that Kim has asthma while Jerry does not. This conclusion clearly *helps* the argument we are considering, but it seems to rely on a false premise. For example, we can easily imagine a scenario where your evidence warrants credence 0.01 in the position that your lottery ticket will win, but does not warrant credence 0.49 in this proposition. But 0.01 is a much larger departure than 0.49 from 0.5. So it seems false that, if your evidence

What should we make of this argument? It fails in several interesting ways, but before I comment on each of them, I want to consider a response suggested by Sosa's discussion of the threshold view of belief (2010: 170). We are assuming that epistemicism is true, and it's natural to think that, if epistemicism really *is* true, then *K* is the lowest credence consistent with knowledge because it's the lowest credence consistent with *belief*. If *K* is the lowest credence consistent with belief, however, then Jerry doesn't believe that Kim has asthma. And of course, if Jerry doesn't believe that Kim has asthma, then it's not true that Jerry's *belief* is just as apt as Tom's. So Sosa's case isn't a counterexample to Sosa's view if *K* is the lowest credence consistent with belief. Since *K* is plausibly the lowest credence consistent with both knowledge *and* belief if epistemicism is true, Sosa's case doesn't cause any trouble for Sosa's view.

This response contains an important idea, and I will return to it below. But for now notice that, if epistemicism and moderate probabilism are both true, Sosa can't help himself to this response. On Sosa's view of belief (2015: 54), *S* believes that *p* just in case she is disposed to judge that *p*, where judging that *p* consists in affirming that *p* in the endeavor to affirm not just correctly but aptly. The problem is, on this account of judgment, it's possible to judge that Kim has asthma while having a credence in ASTHMA below 0.5. To see why, suppose I want to know whether Kim has asthma, but, unlike Tom and Jerry, I can't just ask her whether she has asthma. Suppose I can be certain that she has one of four conditions: asthma and three others (A, B, and C). But since I don't have any direct way of knowing whether Kim has asthma, I must rely on complicated reasoning based on limited knowledge of Kim's symptoms. As a result, let's suppose, I wind up with credence 0.4 in ASTHMA and a flat credence distribution across the other three possibilities. This credence distribution is perfectly rational, let's suppose, but then I reason as follows.

> Kim has condition A, condition B, condition C, or she has asthma. It's definitely one of these four. The probability that she has condition A is 0.2, the probability that she has condition B is 0.2, the probability that she has condition C is 0.2, and the probability that she has asthma is 0.4. So the probability that she has asthma is twice as high as the probability that she has condition A, it's twice as high as the probability that she has condition B, and it's twice as high as the probability that she has condition C. So she has asthma.

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warrants a departure of a certain length from 0.5, then it warrants any shorter departure about as well. In any case, Jerry's belief still seems at least as apt as Tom's, so the argument we are considering needn't rely on the idea that, if your evidence warrants a departure of a certain length from 0.5, then it warrants any shorter departure about as well.

My reasoning here isn't exactly compelling, but I *am* trying to answer the question whether Kim has asthma, I *have* affirmed that she has asthma, and we can just stipulate that I have affirmed that she has asthma in the endeavor to affirm aptly. Of course, we can't just stipulate that I have *rationally* affirmed that Kim has asthma in the endeavor to affirm aptly. After all, by my own lights, I have probably affirmed a falsehood, and this arguably entails that I am irrational for affirming that Kim has asthma in the endeavor to affirm aptly. But the question here isn't whether I have rationally affirmed that Kim has asthma in the endeavor to affirm aptly; it's whether I've done this *at all*, whether rationally or not. Since I might be completely mistaken about apt affirmation—what it amounts to, whether it's possible in combination with a 0.4 credence in the relevant proposition, *etc.*—we can just stipulate that, when I conclude that Kim has asthma, I affirm that she has asthma in the endeavor to affirm aptly. So, on Sosa's account of judgment, when I affirm that Kim has asthma, I thereby judge that she has asthma.

What about my credence in ASTHMA, then? It's just 0.4 during the stretch of reasoning that leads me to affirm that Kim has asthma, but can it stay this low when I *do* affirm that she has asthma? The answer seems clearly 'yes.' For suppose we just stipulate that, when I affirm that Kim has asthma, my credence stays at 0.4. Does anything impossible follow? Perhaps it follows that I'm a strange person. Perhaps I will assert that Kim has asthma and then accept a bet where I lose $4.00 if she has asthma and gain $6.00 if she doesn't. Or perhaps it follows that I will assert that Kim has asthma, and then, without blinking, assert that she probably doesn't have asthma. I doubt the stipulation that my credence stays at 0.4 when I affirm that Kim has asthma entails either of these things. I might be embarrassed by my mental life and thus unwilling to assert what I have affirmed, or unwilling to reveal my credences by accepting the bets that they sanction as fair. Or I might be proud of my mental life but so disgusted by gambling that I won't even think about it, much less actually accept any bets (Christensen 1996, Eriksson and Hajek 2007, *etc.*). But even if the stipulation that my credence stays at 0.4 when I conclude that Kim has asthma entails both of these things (or entails that I will exhibit other forms of strange behavior), it just follows *at most* that something's gone wrong with me. Perhaps it follows that I've gone completely mad. But even so, by stipulating that my credence stays at 0.4 when I affirm that Kim has asthma, we don't stipulate anything literally impossible.

Since Sosa's account of judgment entails that I *judge* that Kim has asthma when I affirm that she has asthma, Sosa's account of judgment entails that it's possible to judge that Kim has asthma while having credence 0.4 in ASTHMA. But this means that, if Sosa's theory of belief is true, then there is at least one value of '*p*' for which it's possible to believe that *p* while having credence 0.4 in *p*. Perhaps Sosa's view rules out the possibility of *rationally*

believing that Kim has asthma while having credence 0.4 in ASTHMA. But this isn't the question. Irrational belief is still belief, and on Sosa's view of belief, it's possible to believe that Kim has asthma while having credence 0.4 in ASTHMA.

But now we wind up exactly where we were before. If epistemicism is true and there is any value of '*p*' for which it's possible to believe that *p* while having credence 0.4 in *p*, then the lowest credence consistent with belief (whatever it happens to be) isn't higher than 0.4. If any version of probabilism is true, however, then *K is* higher than 0.4, since probabilism entails that *K* is at least as high as 0.5. Thus, epistemicism, moderate probabilism, and Sosa's theory of belief jointly entail that the lowest credence consistent with belief is lower than *K*. And this means that, if epistemicism, moderate probabilism, and Sosa's theory of belief are all true, then our stipulation that Tom and Jerry are identical in every epistemically relevant respect except that Tom's credence in ASTHMA is $K + n$ while Jerry's credence in ASTHMA is $K - n$ entails that Tom and Jerry *both* believe that Kim has asthma.[6] So, if epistemicism, moderate probabilism, and Sosa's theory of belief are all true, then either Jerry has apt belief without knowledge, or Tom has knowledge without apt belief. Either way, on the assumption that epistemicism, moderate probabilism, and Sosa's theory of belief are all true, Sosa's case looks like a counterexample to Sosa's theory of knowledge.[7]

2. Rejecting Epistemicism

Of course, this conclusion won't bother proponents of Sosa's view who reject epistemicism. But epistemicism isn't the heart of the problem, since analogous worries arise even if epistemicism is false. To see why, consider the following argument.

If epistemicism is true, then there is some fixed value of '*x*' for which it's possible to know that *p* while having credence *x* in *p*, but not possible to know that *p* while having any credence lower than *x* in *p*, and this fixed value of '*x*' is the exact lowest credence consistent with knowing that *p*. Since epistemicism is *false*, there is no reason why any fixed value of '*x*' should satisfy this description. So we can't continue to stipulate that *K* is the minimum

[6] More carefully, if *n* is smaller than the difference between *K* and 0.4, *then* our stipulation that Tom and Jerry are identical in every epistemically relevant respect except that Tom's credence in ASTHMA is $K + n$ while Jerry's credence in ASTHMA is $K - n$ entails that Tom and Jerry both believe that Kim has asthma. Since we can make *n* as small as we please, I will take it for granted that *n* is smaller than the difference between *K* and 0.4.

[7] Sosa also defends something he calls "purely functional belief," which is just sufficient confidence in the relevant proposition, where what counts as sufficient varies from person to person depending on "what conduct the belief would prompt given suitable desires" (2015: 91). Since Tom and Jerry are (by hypothesis) willing to engage in all of the same conduct relevant to the question whether Kim has asthma, Sosa's account of purely functional belief entails that Tom and Jerry *both* have this kind of belief in ASTHMA.

credence consistent with knowledge. But we *can* continue to stipulate that Tom and Jerry's ideal credence in ASTHMA is exactly K, and we can also stipulate that, because Tom and Jerry have very good evidence that Kim has asthma, $K - n$ is well above 0.5. Why is this important? Because, with these stipulations in place, someone might run essentially the same argument as before.

Even though epistemicism is false, moderate probabilism is still true. Since $K - n$ is closer than $K + n$ to being below 0.5, it follows that Jerry is closer than Tom to having a credence in ASTHMA that entails that he doesn't know that Kim has asthma. Thus, since Tom and Jerry are identical in every epistemically relevant respect except that Tom's credence in ASTHMA is $K + n$ while Jerry's credence in ASTHMA is $K - n$, it follows that Jerry is closer than Tom to failing a necessary condition on knowledge. So even though epistemicism is false and Tom and Jerry presumably *both* know that Kim has asthma (at least given our stipulation that *Tom* knows that Kim has asthma), Jerry is still closer than Tom to failing a necessary condition on knowledge. As we saw above, however, Jerry's belief is at least as apt as Tom's. So Jerry's belief that Kim has asthma is at least as apt as Tom's, even though Jerry is closer than Tom to failing a necessary condition on knowledge.

But (the argument continues) this conclusion isn't consistent with Sosa's view. Suppose mansions are just big houses, consider two mansions that are equally clearly houses, and assume that the first is closer than the second to falling short of being a mansion. Given these assumptions, we can infer that the first mansion is smaller than the second. After all, this is the only way the first mansion *could* be closer than the second to falling short of being a mansion, given that both mansions are equally clearly houses and mansions *just are* big houses. But analogous considerations apply to Tom and Jerry. If knowledge is apt belief, if two mental states are equally clearly beliefs, and if the first mental state is closer than the second to falling short of knowledge, it follows that the first mental state isn't as apt as the second. For if knowledge is just apt belief, this is the only way the first mental state *could* be closer than the second to falling short of knowledge. On Sosa's theory of belief, however, Tom and Jerry's attitudes toward ASTHMA are equally clearly beliefs.[8] And as we saw above, Jerry's belief that Kim has asthma is at least as apt as Tom's. Since Jerry's belief that Kim has asthma is closer than Tom's to falling short of knowledge even

[8] Jerry's disposition to judge that Kim has asthma is just as strong as Tom's disposition to judge that she has asthma, we can suppose. Of course, this supposition might require the further supposition that Jerry places higher value than Tom on producing instances of apt affirmation while Tom places higher value than Jerry on *avoiding* instances of *inapt* affirmation. But of course, we can build this detail into the case. Indeed, I take it Sosa himself has roughly this possibility in mind when he says that, on the affirmative view of belief that he is discussing in Sosa 2010, "the threshold can be allowed to vary *from subject to subject* and to be set by when the subject acquires the relevant disposition to affirm" (p. 173, my italics).

though it's at least as apt as Tom's, it follows that knowledge can't be *identical* to apt belief. It might be apt belief *plus something else*. Or it might be something else entirely. But it can't *just* be apt belief. So even though epistemicism is false, moderate probabilism and Sosa's theory of belief jointly entail that Sosa's case is a counterexample to his own theory of knowledge.

3. Dependence

What should we make of *this* argument? Again, it fails. But it does show that defending Sosa's view requires more than simply rejecting epistemicism.

Sosa's case isn't a problem for Sosa's view if radical probabilism is true. For if radical probabilism is true, K equals 1, Tom's credence in ASTHMA *can't* be higher than K, and Sosa's case is consequently impossible. We get the same result if idealism is true. By 'idealism,' I mean the thesis that a person cannot know that p while there is any mismatch at all between her actual credence in p and her ideal credence in p. Since Tom's ideal credence in ASTHMA is exactly K, idealism entails that Tom can't know that Kim has asthma while his actual credence in ASTHMA is $K + n$. Thus idealism says the same thing as radical probabilism: Sosa's case is impossible. We also get this result if radical knowledge-first epistemology is true. By 'radical knowledge-first epistemology,' I mean the view that, because a person's total knowledge is identical to her total evidence, and because a person's ideal credence in a proposition equals the probability of that proposition conditional on her total evidence, a person cannot know that p unless her ideal credence in p is 1. Given that radical knowledge-first epistemology is true, there is no possible scenario where Tom knows that Kim has asthma and his actual credence in ASTHMA is higher than his ideal credence in ASTHMA, since his actual credence can't be higher than 1. But assuming that skepticism is false (as I have been throughout), radical probabilism, idealism, and radical knowledge-first epistemology all have false consequences. Let 'PARIS' name the proposition that Paris is the capital of France. If radical probabilism is true, then it's impossible to know that p while having a credence in p below 1. Since I am more confident that I exist than I am that Paris is the capital of France, my credence in PARIS is below 1. Thus, radical probabilism entails that I don't know that Paris is the capital of France. And since I *should* be more confident that I exist than I am that Paris is the capital of France, I shouldn't have credence 1 in PARIS, so my *ideal* credence in PARIS is lower than 1. Thus, radical knowledge-first epistemology says the same thing as radical probabilism. And since there is surely at least *some* slight mismatch between my actual credence in PARIS and my ideal credence in PARIS, idealism presumably also entails that I don't know that Paris is the capital of France. Yet, assuming that skepticism is false (as I

will continue to assume for the remainder of this paper), I *do* know that Paris is the capital of France, and I know many similar things.[9]

Now, *dogmatism* doesn't entail that I don't know that Paris is the capital of France. By 'dogmatism,' I mean the thesis that, if you are antecedently justified in holding some view, then you can appropriately deduce *from that view* that an apparent counterexample to that view must not have the properties it seems to have. If dogmatism is true, then someone who's antecedently justified in holding Sosa's view can simply deduce *from Sosa's view* that, despite appearances, Jerry's belief must be less apt than Tom's. So, if dogmatism is true, Sosa's case isn't a problem for any proponent of Sosa's view unless nobody has any justification for holding Sosa's view. But of course, dogmatism is itself unacceptable. If it were true, epistemologists could have deduced *from the JTB theory of knowledge* that the subjects in Gettier's cases don't have justified true belief without knowledge, my intro students could often deduce from their own views that my comments in the margins of their papers must be mistaken, and so on. Sosa's view compares favorably to competing views, but no epistemologist has so much justification for holding Sosa's view that she can simply deduce *from Sosa's view* that, despite appearances, Jerry's belief must be less apt than Tom's. So dogmatism doesn't give us a satisfactory response to Sosa's case either.

How else might we defend Sosa's view from Sosa's case, then? The obvious strategy consists in accepting what I will call 'the complete dependence thesis,' or just 'Dependence' for short. According to this thesis, the question whether it's possible to know that Kim has asthma while having a certain credence in ASTHMA depends entirely on the question whether it's possible to *believe* that she has asthma while having that credence in ASTHMA. Take credence 0, for example. It's impossible to know that Kim has asthma while having credence 0 in ASTHMA. This isn't controversial. But why is it true? According to Dependence, it's true simply because you can't *believe* that Kim has asthma while having credence 0 in ASTHMA. More generally, Dependence says that, for any value of 'x,' if it's impossible to know that Kim has asthma while having credence x in ASTHMA, this is

[9] So far as I can tell, Williamson himself rejects radical knowledge-first epistemology. "We should question the association between evidential probability 1 and absolute certainty," he says (2000, pp. 213–14). "For subjective Bayesians, probability 1 is the highest possible degree of belief, which presumably is absolute certainty. If one's credence in p is 1, one should be willing to accept a bet on which one gains a penny if p is true and is tortured horribly to death if p is false. Few propositions pass that test. Surely complex logical truths do not, even though the probability axioms assign them probability 1. But since evidential probabilities are not actual or counterfactual credences, why should evidential probability 1 entail absolute certainty?" If my *ideal* credence in PARIS is 1, then presumably I *should* have credence 1 in PARIS, and thus I really *should* be willing to accept a bet on which I gain a penny if Paris is the capital of France and I'm tortured horribly to death if it isn't. But of course, I shouldn't be willing to accept this bet. So, on the view Williamson seems to defend here, even if I know that Paris is the capital of France and the evidential probability of this proposition is therefore 1, it doesn't follow that my ideal credence in this proposition is 1.

simply because it's impossible to believe that Kim has asthma while having credence x in ASTHMA. So now return to Tom and Jerry. Since $K - n$ is closer than $K + n$ to 0, and since Jerry is identical to Tom in every epistemically relevant respect except that his credence in ASTHMA is $K - n$ while Tom's credence in ASTHMA is $K + n$, it follows that Jerry is closer than Tom to not knowing that Kim has asthma. According to the argument in §2, this means that Jerry's *belief* is closer than Tom's to falling short of knowledge. But if Dependence is true, this conclusion doesn't follow. Instead, it only follows that Jerry is closer than Tom to not having the requisite belief in the first place. If Dependence is true, Jerry is closer than Tom to not knowing that Kim has asthma simply because he's closer than Tom to not *believing* that Kim has asthma, in the completely mundane way that a person who lives 1,000 miles from the Canadian border is closer to living in Canada than an otherwise identical person who lives 1,001 miles from the Canadian border. And of course, Sosa's theory of knowledge is perfectly consistent with the claim that, in Sosa's case, Tom and Jerry have equally apt beliefs, but Jerry is closer than Tom to not knowing that Kim has asthma simply because he's closer than Tom (in this completely mundane way) to not believing that she has asthma.

So proponents of Sosa's view can resist the argument in §2 by accepting Dependence. The more important point, though, is that they can't resist it *without* accepting Dependence. If Dependence is false, then the question whether it's possible to know that Kim has asthma while having a certain credence in ASTHMA *does not* depend entirely on the question whether it's possible to believe that Kim has asthma while having that credence in ASTHMA. If Dependence is false, it depends on something *in addition* to the question whether it's possible to believe that Kim has asthma while having that credence in ASTHMA, or it depends on something else entirely. If it depends on something in addition to the question whether it's possible to believe that Kim has asthma while having that credence in ASTHMA, or something else entirely, however, then Jerry can't be closer than Tom to not knowing that Kim has asthma *simply* in virtue of being closer than Tom to not believing that she has asthma. He might be closer than Tom to not knowing that she has asthma *partially* in virtue of being closer than Tom to not believing that she has asthma, but he must also be closer than Tom to failing some other necessary condition on knowledge. Jerry's belief that Kim has asthma is at least as apt as Tom's, however, so this other necessary condition on knowledge can't be the aptness of his belief. So there must be some necessary condition on knowledge other than apt belief. This follows if Dependence is false. But of course, on Sosa's view, knowledge *just is* apt belief. So Sosa's

case is a counterexample to Sosa's theory of knowledge unless Dependence is true. This seems the right conclusion to draw.[10]

4. From Dependence to Improbabilism

Together with Sosa's theory of *belief*, however, Dependence entails improbabilism. According to Dependence, the question whether it's possible to know that Kim has asthma while having a certain credence in ASTHMA depends *entirely* on the question whether it's possible to believe that she has asthma while having that credence in ASTHMA. So, if Dependence is true and it *is* possible to believe that Kim has asthma while having a certain credence in ASTHMA, then it's also possible to *know* that Kim has asthma while having that credence in ASTHMA. As we saw above, however, Sosa's theory of belief entails that it's possible to believe that Kim has asthma while having a credence in ASTHMA below 0.5. So, together with Sosa's theory of belief, Dependence entails that it's possible to *know* that Kim has asthma while having a credence in ASTHMA below 0.5. Since improbabilism is true if, for any value of '*p*,' it's possible to know that *p* while having a credence in *p* below 0.5, Dependence and Sosa's theory of belief jointly entail improbabilism. Thus, while Sosa's theory of knowledge entails Dependence, Dependence and Sosa's theory of belief jointly entail improbabilism. The upshot? We can't accept Sosa's theory of knowledge, accept Sosa's theory of belief, *and* accept probabilism. We must reject at least one of them.

What happens if we reject Sosa's theory of belief, then? Can proponents of Sosa's theory of knowledge continue to accept probabilism if they simply reject Sosa's theory of belief? In fact they can't. If Dependence is true and it's possible to believe that Kim has asthma while having a credence in ASTHMA below 0.5, then it's possible to know that Kim has asthma while having a credence in ASTHMA below 0.5. This is true even if Sosa's theory of belief is false. The problem is, it clearly *is* possible to believe that Kim has asthma while having a credence in ASTHMA below 0.5. Even if belief isn't the disposition to affirm in the endeavor to affirm aptly, there are clear cases of *irrational* beliefs coupled with

[10] Objection: Suppose the law considers you smart enough to vote only if your IQ is at least 100, so that 100 is the lowest IQ that you can have while being legally eligible to vote. Then someone with an IQ of 140 is closer than an otherwise identical person with an IQ of 150 to being ineligible to vote. But it doesn't follow that the person with the IQ of 140 is *less* eligible to vote, since voting eligibility doesn't come in degrees. Why is this important? Because aptness doesn't come in degrees either. Dependence is false, so Jerry *is* closer than Tom to having an inapt belief. Aptness doesn't come in degrees, however, so it *doesn't* follow that Jerry's belief is less apt than Tom's. So Jerry is closer than Tom to having an inapt belief even though his belief is at least as apt as Tom's. This means that Sosa's case isn't a counterexample to Sosa's view, even though Dependence *is* false. Reply: If aptness were relevantly analogous to voting eligibility, this objection would be exactly right. But of course, it isn't. Unlike voting eligibility, aptness clearly *does* come in degrees. (My belief that I have hands is apt, and so is my belief that Truman was the 33rd president, but the latter is less apt than the former.)

credences below 0.5. Since irrational beliefs are still beliefs, there are clear cases of beliefs coupled with credences below 0.5.

Return to the case where I conclude that Kim has asthma on the basis of my unimpressive reasoning. This time, suppose you and I have been given exactly the same evidence relevant to the question whether Kim has asthma, and suppose that, on the basis of this evidence, you and I rationally wind up with exactly the same credences: 0.4 in ASTHMA and a flat credence distribution across the other three possibilities (A, B, and C). Suppose you suspend judgment on ASTHMA (as seems perfectly rational), and suppose you expect that I am also suspending judgment on ASTHMA, since you know that we have exactly the same evidence. But suppose I then surprise you by asserting that Kim has asthma, and suppose our ensuing conversation goes as follows.

You: Wait, you've already made up your mind? … How do you know it's asthma?

Me: Simple deduction. It's either A, B, C, or asthma. The probability that it's A is 0.2, the probability that it's B is 0.2, the probability that it's C is 0.2, and the probability that it's asthma is 0.4. So the probability that Kim has asthma is twice as high as the probability of anything else she might have. So she has asthma.

You: You really think you know what's wrong with Kim? … On the basis of just those odds?

Me: Yeah. I just *told* you what's wrong with her. She has asthma.

You: And you really think the probability that she has asthma is just 0.4?

Me: Yeah. I just told you that too. That's how I *know* that she has asthma.

You: But you realize that, if the probability that she has asthma is just 0.4, then she probably *doesn't* have asthma?

Me: Right. Obviously. She probably doesn't have asthma.

You: So … Kim *has* asthma, but she probably *doesn't* have asthma? That's what you think?

Me: Right. Exactly. The probability that she has asthma is 0.4. That's twice as high as the probability of anything else she might have. So she has asthma.

> Since the probability that she *doesn't* have asthma is 0.6, she probably doesn't have asthma.

At this point you're puzzled, so you start offering me all variety of bets to test my credence in ASTHMA, and I accept and reject exactly those bets that you would expect me to accept and reject if my credence in ASTHMA were 0.4. You then perform whatever other tests you think might reveal my credence in ASTHMA, and, on the basis of these tests, you become convinced that my credence in ASTHMA really is 0.4 (just as it should be). Now you still doubt that I *believe* that Kim has asthma, so you start asking me all kinds of questions that depend on Kim's condition, and you observe that I answer exactly the way you would expect me to answer if I believed that Kim has asthma. "Should Kim get an inhaler or start taking Sintanex," you ask. I reply: "She should get an inhaler. Since it's asthma, Sintanex won't help her breathing." After many more questions and answers like this, let's suppose, you become suspicious that I'm just pulling your leg. You're convinced that my credence in ASTHMA is 0.4, just like yours, but you doubt that I really believe that Kim has asthma, and you think I must be playing a practical joke, or something like that, since it seems a clear mistake to believe that Kim has asthma on the basis of evidence that only supports a 0.4 credence in ASTHMA. But when you suggest that I'm not being sincere, I get frustrated, and then eventually offended, and it's finally obvious that I'm being completely sincere. I'm wild-eyed at this point, let's suppose. My face is bright red, I look like I'm about to cry, and I'm nearly screaming at you. "Look, dammit! Kim *does* have asthma. I *know* that she does. The probability that she has asthma is 0.4, and that's twice as high as the probability of anything else she might have. That's how I know that she has it. So she has asthma and she probably doesn't have asthma. … Gosh! What's wrong with you? How many times can I repeat myself? … You know, this really isn't that hard to understand."

What should we say about this case? Behaviorism is false, so my behavior here doesn't *entail* that I believe that Kim has asthma while having credence 0.4 in ASTHMA. Someone might behave exactly this way while secretly thinking that Kim *doesn't* have asthma, or behave exactly this way while secretly having a credence in ASTHMA other than 0.4. But we can imagine that, from my own first-person perspective, there is neither any mismatch between my behavior and my credence in ASTHMA, nor any mismatch between my behavior and my belief about whether Kim has asthma. We can suppose that, when I consider the probability that Kim has asthma, it seems clear to me that the probability is exactly 0.4, and we can suppose that, when I consider the question whether Kim *does* have asthma, the answer seems clearly 'yes.' So, given these assumptions, what should we think about my attitudes toward the proposition that Kim has asthma? I think there's no serious

doubt about either of them. I believe that Kim has asthma and my credence in this proposition is just 0.4. This seems the obvious thing to say. Of course, there are serious doubts about my mental health. If you're my friend, you'll recommend that I see a therapist, or a priest, or perhaps an infallibilist. But there is little room for doubt about my beliefs and credences. I'm irrational or worse. Perhaps I've gone completely mad. But I do believe that Kim has asthma while having a credence in this proposition below 0.5.[11]

Now, at this point, many epistemologists will object that, because belief aims at truth, it's impossible to believe that *p* while having a credence in *p* below 0.5, so, as much as my attitude toward ASTHMA looks like a paradigm instance of irrational belief, it's really just an instance of mere acceptance, or something like that. I don't find this objection even remotely compelling. On any interpretation of the slogan 'belief aims at truth' where it's plausible that belief *does* aim at truth (see the essays in Chan 2013, for example), my attitude toward ASTHMA clearly aims at truth. I wanted to know whether Kim has asthma and I wound up concluding that she does have asthma because I thought the proposition that she has asthma was twice as likely to be *true* as the proposition that she has condition A, twice as likely to be *true* as the proposition that she has condition B, twice as likely to be *true* as the proposition that she has condition C, and that A, B, C, and asthma were the only possibilities. Perhaps I was unduly impressed by these ratios. Or perhaps I was insufficiently sensitive to the fact that, by my own lights, the probability of ASTHMA was lower than the probability of its negation. But even so, I didn't conclude that Kim has asthma for practical, prudential, or other non-epistemic reasons. I wasn't like Pascal's religious believer who concludes that God exists because she thinks believing in God maximizes expected utility, or anything at all like that. By hypothesis, I was genuinely interested in Kim's condition and completely unconcerned with the practical consequences of coming to believe that she has asthma. I concluded that Kim has asthma on the basis of *bad* epistemic reasons. I didn't conclude that Kim has asthma on the basis of *non*-epistemic reasons. Indeed, it's precisely because my attitude toward ASTHMA *does* aim at truth that I seem clearly irrational for having it.

[11] It's much easier to see how a person might believe a proposition while having a credence in that proposition below 0.5 than it is to see how someone might believe a proposition while simultaneously believing its negation. Yet as Davidson points out (1985: 353), even the latter looks possible, so long as the relevant person's mind is sufficiently fractured or "compartmentalized," to use his terminology. What needs emphasizing here is that, while it might be hard to see how a *mentally healthy* person's mind could be so fractured or compartmentalized that she could occurently believe that *p* and then occurently believe that probably ¬*p* in just the space of time it takes to *assert* '*p* and probably ¬*p*,' there seems no reason why someone with a severe psychological disorder couldn't do this, and there is even less reason why someone with a severe psychological disorder couldn't occurently believe that *p* and then either occurently believe that probably ¬*p* at a much later time or *never* thereafter occurently believe that probably ¬*p*. (Egan 2008 is also relevant here.)

So this objection fails. But doesn't *functionalism* say that it's impossible to believe ASTHMA while having credence 0.4 in ASTHMA? This is a second objection I have heard several times, and it also fails. Functionalism says that I don't have credence 0.4 in ASTHMA unless something in my brain (or my body, or my iPhone, depending on how far my mind extends) plays the functional role of credence 0.4 in ASTHMA, and it says that I don't believe that Kim has asthma unless something within the extension of my mind plays the functional role of belief in ASTHMA, *but it doesn't say what the functional role of either of these attitudes is*. This means that, all by itself, functionalism doesn't say nearly enough to rule out the possibility of believing ASTHMA while having credence 0.4 in ASTHMA.

Now, functionalism *and certain descriptions of functional roles* jointly entail that it's impossible to believe ASTHMA while having credence 0.4 in ASTHMA. But these descriptions aren't plausible. As Braddon-Mitchell and Jackson point out, functionalism emerged from the behaviourist's failure to "give a plausible analysis of a single psychological state in terms of behaviour and behavioural dispositions" (2006: 42). The problem was, for any mental state and associated behaviour, some constellation of background beliefs and desires would defeat the normal connection between that mental state and its associated behaviour. (The person who believes there's a tiger behind a tree will usually avoid it, while the person who believes there's a tiger behind the tree but wants to die might walk straight toward it.) The possibility of divorcing literally *any* mental state from its associated behaviour made it "impossible to pair individual mental states with behavioural dispositions," and behaviorism was consequently abandoned (p. 44). But the relationship between mental states and other mental states *also* depends on background beliefs and desires. (You and a Trump supporter both believe that a certain newspaper says that Trump lost the popular vote. On this basis, you conclude that Trump *did* lose the popular vote and you form the disposition to believe various things that follow. Meanwhile, the Trump supporter neither concludes that Trump lost the popular vote nor forms the disposition to believe anything that follows. Instead, he just concludes that the newspaper prints fake news.) For roughly the same reason that it's impossible to pair individual mental states with behaviours and behavioural dispositions, it's impossible to pair individual mental states with other mental states or mental dispositions. As a result—as Braddon-Mitchell and Jackson point out—functionalists are generally reluctant to say exactly what the functional role of a given mental state would be (p. 51), and when some functionalist *does* say what the functional role of a given mental state might be, she will customarily add words like 'typically' and '*ceteris paribus*' to her description, to safeguard against cases where someone has that mental state but doesn't have the other mental states, mental

dispositions, behaviours, or behavioural dispositions that we would usually associate with that mental state (p. 53). Without words like 'typically,' her description would almost certainly have counterexamples.[12]

But of course, for our purposes, nothing interesting follows form the fact that, *typically*, people who believe ASTHMA will behave in certain ways or believe certain things, while, *typically*, people who have credence 0.4 in ASTHMA *won't* behave in those ways or believe those things. And while something interesting *does* follow from (*e.g.*) the following descriptions of functional roles, there are obvious counterexamples to each conjunct of each of these descriptions.

- It's part of the functional role of belief in ASTHMA that anyone who believes ASTHMA will answer affirmatively if asked whether Kim has asthma, while it's part of the functional role of credence 0.4 in ASTHMA that anyone who has credence 0.4 in ASTHMA *won't* answer affirmatively if asked whether Kim has asthma.

- It's part of the functional role of belief in ASTHMA that anyone who believes ASTHMA will use ASTHMA as a premise in practical reasoning, while it's part of the functional role of credence 0.4 in ASTHMA that anyone who has credence 0.4 in ASTHMA *won't* use ASTHMA as a premise in practical reasoning.

- It's part of the functional role of credence 0.4 in ASTHMA that anyone who has credence 0.4 in ASTHMA will accept a bet where she gains $1 if Kim doesn't have asthma and loses $1 if she does, while it's part of the functional role of belief in ASTHMA that anyone who believes ASTHMA *won't* accept a bet where she gains $1 if Kim doesn't have asthma and loses $1 if she does.

So functionalism doesn't entail that it's impossible to believe that Kim has asthma while having credence 0.4 in ASTHMA. And while functionalism conjoined with certain descriptions of functional roles *does* entail that it's impossible to believe ASTHMA while having credence 0.4 in ASTHMA, we should expect these descriptions to have counterexamples. Indeed, on the "dualist" version of functionalism defended by Wiesberg (forthcoming), it isn't even *surprising* that a person might get herself into a weird cognitive state like mine, and, in that state, believe a proposition while having a credence below 0.5 in that proposition. Thus, there seems no tension at all between functionalism and what I

[12] For the record, I'm actually strongly opposed to the philosopher's habit of calling beliefs 'states' (see Roeber forthcoming, §2), but for ease of communication, I follow that convention here.

think is the obvious thing to say about my attitudes toward ASTHMA: I'm irrational or worse, but I *do* believe that Kim has asthma while having credence 0.4 in ASTHMA.

But of course, if I believe that Kim has asthma while having credence 0.4 in ASTHMA, then it's possible to believe that Kim has asthma while having a credence in ASTHMA below 0.5. And as we saw above, if Dependence is true and it's possible to believe that Kim has asthma while having a credence in ASTHMA below 0.5, then it's possible to *know* that Kim has asthma while having a credence in ASTHMA below 0.5. Since improbabilism is true if it's possible to know that Kim has asthma while having a credence in ASTHMA below 0.5, it looks like Dependence entails improbabilism all by itself.[13]

Here is the situation for Sosa's theory of knowledge, then. Jerry's belief that Kim has asthma is at least as apt as Tom's, even though Jerry is closer than Tom to not knowing that Kim has asthma. If Dependence is true, Jerry is closer than Tom to not knowing that Kim has asthma simply because he's closer than Tom to not believing that Kim has asthma. In this case, Tom and Jerry don't give us a counterexample to Sosa's theory of knowledge, but improbabilism is true. On the other hand, if Dependence is false, then Jerry might be closer than Tom to not knowing that Kim has asthma *partially* in virtue of being closer than Tom to not believing that she has asthma, but he must also be closer than Tom to failing some other necessary condition on knowledge. This other necessary condition on knowledge can't be the aptness of his belief, since Jerry's belief is at least as apt as Tom's. In this case, there must be some necessary condition on knowledge other than apt belief—from which it follows that Sosa's theory of knowledge is false. Thus, if Dependence is true, then probabilism is false, and if Dependence is false, then Sosa's theory of knowledge is false. So while Sosa's theory of knowledge entails Dependence, Dependence entails improbabilism—which means Sosa's theory of knowledge entails improbabilism.

[13] For examples of other philosophers who think it's possible to believe a proposition while having a credence in that proposition below 0.5, see Swinburne 1983, Maher 1993, Kaplan 1995, Melnyk 1997, and Hawthorne, Rothschild and Spectre 2016. Turri's (2015) discussion of explanatory inference suggests that Turri is another philosopher who thinks it's possible to believe a proposition while having a credence in that proposition below 0.5, but more on this below. Similar points apply to what Archer (2017) calls "belief-discordant implicit attitudes." And as Turri, Rose, and Buckwalter's (2018) empirical study on doxastic voluntarism suggests, the folk apparently think it's possible to believe a proposition while having a credence in that proposition as low as 0.05. (See their discussion of the experiment they call 'Experiment 3.')

5. Generalizing from Sosa's Theory

This is already an interesting result, but as I will now argue, Sosa's theory of knowledge just illustrates a broader point, since exactly the same considerations apply to *every* plausible theory of knowledge.

What factors make the difference between beliefs that amount to knowledge and beliefs that don't amount to knowledge? Epistemologists have given many different answers, but Jerry's belief that Kim has asthma scores at least as well as Tom's in terms of virtually all of them. By hypothesis, Tom's ideal credence in ASTHMA is exactly K, Jerry's ideal credence in ASTHMA is also exactly K, and Jerry is identical to Tom in every epistemically relevant respect except that his actual credence in ASTHMA is $K - n$ while Tom's actual credence in ASTHMA is $K + n$. So consider the claims below and ask whether they are consistent with the stipulated details of Sosa's case.

> **Truth**: Jerry's belief that Kim has asthma is true if Tom's belief that Kim has asthma is true.
>
> **Evidence**: Jerry's evidence that Kim has asthma is at least as strong as Tom's evidence that Kim has asthma.
>
> **Evidential Fit**: Jerry's belief that Kim has asthma *fits* his evidence at least as well as Tom's belief that Kim has asthma fits his evidence.
>
> **Grounds**: The grounds upon which Jerry bases his belief that Kim has asthma are at least as solid as the grounds upon which Tom bases his belief that Kim has asthma.
>
> **Reasons**: Jerry's reasons for believing that Kim has asthma come at least as close as Tom's reasons for believing that Kim has asthma to ruling out every possibility in which Kim doesn't have asthma.
>
> **Causes**: Jerry's belief that Kim has asthma was caused by the fact that she has asthma no less than Tom's belief that Kim has asthma was caused by the fact that she has asthma.
>
> **Reliability**: Jerry's belief that Kim has asthma is the product of a process that's at least as reliable as the process responsible for Tom's belief that Kim has asthma.
>
> **Competence**: Jerry's belief that Kim has asthma is at least as much the product of an intellectual competence as Tom's belief that Kim has asthma.

Attributability: Jerry's success at arriving at the true belief that Kim has asthma is at least as *attributable* to his intellectual competence as Tom's success at arriving at the true belief that Kim has asthma.

Proper Functioning: The cognitive faculties responsible for Jerry's belief that Kim has asthma are functioning at least as well as the cognitive faculties responsible for Tom's belief that Kim has asthma.

Safety: The nearest worlds where Jerry believes that Kim has asthma and he's wrong are at least as distant as the nearest worlds where Tom believes that Kim has asthma and he's wrong.

Sensitivity: If Tom doesn't believe that Kim has asthma in the nearest world where she doesn't have asthma, then Jerry doesn't believe that Kim has asthma in the nearest world where she doesn't have asthma.

Stakes: If Tom is in a low stakes practical situation with respect to his belief that Kim has asthma, then Jerry is also in a low stakes practical situation with respect to his belief that Kim has asthma.

Standards: If Tom's belief that Kim has asthma meets the epistemic standards operative in his context, then Jerry's belief that Kim has asthma meets the epistemic standards operative in his context.

We've already seen that, in Sosa's case, Jerry's belief that Kim has asthma scores at least as well as Tom's in terms of truth, competence, and attributability (this is what our conclusion that Jerry's belief is at least as apt at Tom's amounts to), so the eighth and ninth claims above are both true. And so far as I can tell, the rest of these claims are at least consistent with the details of Sosa's case, if they aren't straightforwardly entailed by our stipulation that Tom and Jerry are identical in every epistemically relevant respect except that Tom's credence in ASTHMA is $K + n$ while Jerry's credence in ASTHMA is $K - n$. If the rest of these claims are consistent with the details of Sosa's case, however, then there is no reason why Jerry's belief that Kim has asthma must score worse than Tom's belief that Kim has asthma in terms of any of the properties listed above. And this is true even though Jerry is closer than Tom to not knowing that Kim has asthma.

Now, of course, some epistemologists believe in defeaters, and some of these epistemologists think that we can't adequately account for defeaters in terms of any of the properties listed above. Is it plausible, then, that Jerry is closer than Tom to not knowing that Kim has asthma because he's closer than Tom to having some kind of defeater for

his belief that Kim has asthma? I think not. Consider the following series of objections and replies. *Objection 1*: Tom believes that the probability of ASTHMA is $K + n$ while Jerry believes that the probability of ASTHMA is $K - n$, so, if nothing else, Jerry has a partial doxastic defeater that Tom lacks. *Reply*: Tom's credence in ASTHMA is $K + n$ while Jerry's credence in ASTHMA is $K - n$, but on many theories of credence and belief, it neither follows that Tom believes that the probability of ASTHMA is $K + n$ nor follows that Jerry believes that the probability of ASTHMA is $K - n$. If neither of these conclusions follows, however, then we can just stipulate that Tom and Jerry don't have these beliefs. Indeed, given that these conclusions don't follow, the stipulation that Tom and Jerry are identical except that Tom's credence in ASTHMA is $K + n$ while Jerry's credence in ASTHMA is $K - n$ seems to entail that Tom and Jerry have exactly the *same* beliefs.

Objection 2: We needn't quibble about the correct theory of credence or belief. For even if we assume that Tom and Jerry don't have these beliefs, there is clearly some sense in which they *should* have these beliefs, and this means that Jerry has at least a partial *normative* defeater that Tom lacks. *Reply*: In what sense should Tom believe that the probability of ASTHMA is $K + n$, and in what sense should Jerry believe that the probability of ASTHMA is $K - n$? By hypothesis, Tom and Jerry have exactly the same ideal credence in ASTHMA: namely, K. If they should have any probabilistic beliefs about ASTHMA at all, shouldn't they both believe that the probability of ASTHMA is K, not $K - n$ or $K + n$?

Objection 3: Even if Tom and Jerry should both believe that the probability of ASTHMA is K, it's still *true* that Tom's credence in ASTHMA is $K + n$ while Jerry's credence in ASTHMA is $K - n$. So, if nothing else, Jerry has a partial *propositional* defeater that Tom lacks. *Reply*: Perhaps, but even if Jerry *does* have a partial propositional defeater that Tom lacks, it doesn't follow that Jerry's belief scores worse than Tom's *overall* in terms of propositional defeat. After all, there are various truths unknown to Tom that at least partially defeat *his* belief that Kim has asthma. (For example, Tom doesn't know that his credence in ASTHMA is *too high*.) So even if Jerry's actual credence in ASTHMA gives him a partial propositional defeater that Tom lacks, it's hard to see why Tom would score better than Jerry *overall* in terms of propositional defeat.

Objection 4: But Jerry is closer than Tom to having credence 0 in ASTHMA! If nothing else, this means that Jerry is closer than Tom to believing that Kim *doesn't* have asthma. But if Jerry were to believe that Kim doesn't have asthma, then he would have a full-blown doxastic defeater for his belief that Kim has asthma. So there must be *some* sense in which Jerry's belief scores worse than Tom's overall in terms of *some* kind of defeat. *Reply*: Perhaps, but even if there is some sense in which Jerry's belief scores worse than Tom's overall in terms of some kind of defeat, it's implausible that the kind of defeat in question

would be inconsistent with knowledge. After all, Tom and Jerry are identical in every epistemically relevant respect except that Tom is slightly overconfident in ASTHMA while Jerry is slightly underconfident in ASTHMA, and Jerry surely can't improve the epistemic status of his belief by simply trading his level of underconfidence in ASTHMA for Tom's level of *overconfidence* in ASTHMA. For again, as we've noted many times, Tom's overconfidence in ASTHMA seems at least as large an epistemic mistake as Jerry's underconfidence in ASTHMA.

Granted, from a purely internal perspective, Tom seems to have a better combination of mental states than Jerry, since Tom's credence in ASTHMA coheres with his belief that Kim has ASTHMA better than Jerry's credence in ASTHMA coheres with his belief that Kim has ASTHMA. But of course, Tom's credence in ASTHMA would cohere *even better* with his belief that Kim has ASTHMA if he were irrationally *fully certain* that Kim has asthma, and, on any plausible epistemological view, one cannot bootstrap one's way into higher and higher epistemic statuses by *irrationally* increasing one's credence in the relevant proposition. This, at least, is true for any epistemic status that we should care about.

With all of the relevant considerations in view, it seems clearly false that Tom is doing better than Jerry epistemically *overall*, and this is the very heart of the problem. So, on any notion of defeat where it's plausible that *S* knows that *p* only if she doesn't have this kind of defeater for her belief that *p*, it's implausible that Jerry is closer than Tom to having this kind of defeater for his belief that Kim has asthma. Thus, the following claim seems consistent with the details of Sosa's case.

> **Defeaters**: Jerry's belief that Kim has asthma scores at least as well as Tom's in terms of any kind of defeat that is plausibly inconsistent with knowledge.

But this means that, even though Jerry is closer than Tom to not knowing that Kim has asthma, there is no reason why we can't fill out the details of Sosa's case in such a way that Jerry's belief that Kim has asthma scores at least as well as Tom's in terms of truth, evidence, evidential fit, basing, reasons, causes, reliability, competence, attributability, proper functioning, safety, sensitivity, stakes, standards, and defeaters. This list virtually exhausts the properties that appear in contemporary theories of knowledge. And this means that, for all of the most plausible theories of knowledge, we can reason as follows: *Either Dependence is true, or it's false. If it's false, then Sosa's case is a counterexample to the theory of knowledge in question. If it's true, then so is improbabilism. Thus, either improbabilism is true or the theory of knowledge in question is false.* So all of the most plausible theories of knowledge face exactly the same challenge as Sosa's theory of knowledge. Since there seems no reason why we can't fill out the details of Sosa's case in such a way that Jerry's belief that Kim has

asthma scores at least as well as Tom's in terms of virtually all of the properties that appear in contemporary theories of knowledge, Sosa's case seems to force a choice between accepting improbabilism and concluding that all of the most plausible theories of knowledge are false.

6. Epistemic Normativity to the Rescue?

How should we respond to this choice, then? In §§7–8, I'll explain why I have a slight preference for the latter option. But first, I want to consider a final attempt to avoid this choice entirely.

Which norms govern belief? Epistemologists defend different answers to this question, but whatever norms govern belief, it seems fairly uncontroversial that at least the following norm governs belief.

(N1) One shouldn't believe *p* on the basis of credence 0 in *p*.

As one reader pointed out, however, someone might be tempted to reason as follows. *Since Jerry believes ASTHMA on the basis of credence K – n in ASTHMA while Tom believes ASTHMA on the basis of credence K + n in ASTHMA, Jerry is closer than Tom to violating N1. Thus, Jerry is doing worse than Tom epistemically. But Tom and Jerry are doing equally well in terms of truth and Gettier considerations, so Jerry must be doing worse than Tom in terms of intellectual competence. Since Sosa's case isn't a problem for Sosa's view if Jerry is doing worse than Tom in terms of intellectual competence, Sosa's case isn't a problem for Sosa's view.* Moreover, as a different reader pointed out, epistemologists who accept competitors to Sosa's view might be tempted to run analogous arguments in terms of different epistemic properties. Thus, it's worth asking whether this or any analogous argument constitutes an adequate response to Sosa's case.

While I'm happy to agree that N1 is true, I don't think it helps anyone avoid the choice between accepting improbabilism and concluding that all of the most plausible theories of knowledge are false. First, Sosa's case doesn't say that Tom and Jerry believe ASTHMA on the *basis* of their respective credences in ASTHMA, and there seems no reason why we can't stipulate that they do not. With this stipulation in place, however, it's unclear why Jerry must be closer than Tom to violating N1. Second, N1 isn't the only norm that governs belief, and, presumably, the following norm is also one of the norms that govern belief.

(N2) One shouldn't believe *p* on the basis of irrational certainty in *p*.

But of course, if Jerry is closer than Tom to believing ASTHMA on the basis of credence 0 in ASTHMA, then Tom is closer than Jerry to believing ASTHMA on the basis of irrational certainty in ASTHMA. So, if Tom and Jerry *do* believe ASTHMA on the basis of their respective credences in ASTHMA, then Tom is closer than Jerry to violating N2, and we have at least one respect in which Tom is doing *worse* than Jerry epistemically. So, even *if* Tom and Jerry both believe ASTHMA on the basis of their respective credences in ASTHMA, it's still not clear that Jerry is doing worse than Tom epistemically *overall*.

Third, and most important, even if Jerry *is* doing worse than Tom epistemically overall, one can't just *assume* in this context that, because Tom and Jerry are doing equally well in terms of truth and Gettier considerations, Jerry must be doing worse than Tom in terms of intellectual competence. After all, the stipulated details of Sosa's case make Jerry's belief look at least as competent as Tom's, and this is precisely why the case is interesting. Again, by hypothesis, Tom and Jerry are identical except that Tom's credence in ASTHMA is $K + n$ while Jerry's credence in ASTHMA is $K - n$. Since Tom's level of overconfidence in ASTHMA isn't any smaller than Jerry's level of underconfidence in ASTHMA, it's hard to see how Jerry's belief that Kim has asthma could be less competent than Tom's. Intuitively, in fact, his belief is *more* competent than Tom's, since, intuitively, the intellectually virtuous person errs in the direction of intellectual caution before she errs in the direction of dogmatism or unjustified certainty. But even if this intuition is mistaken, it's *still* hard to shake the impression that Jerry's belief is at least as competent as Tom's. Of course, given other assumptions, Sosa's theory of knowledge entails that Jerry's intellectual shot is less skillful than Tom's. From a theory-neutral perspective, however, it seems intuitively obvious that Jerry's intellectual shot is at least as skillful as Tom's. Or, at least, this is how the case strikes me, and this is how it has struck most of the people who have read drafts of this paper. Since Tom and Jerry are in exactly the same shape in exactly the same situation (Sosa 2015: 26–30), it's hard to avoid the impression that Jerry's belief is at least as adroit as Tom's. Thus, if it really is clear that Jerry is doing worse than Tom epistemically—and again, I don't think this *is* clear—it looks like Jerry is doing worse than Tom epistemically *even though* his belief is at least as adroit as Tom's. So the reply that we are considering seems to rely on an illicit inference. And of course, analogous considerations would apply to alternative versions of the reply we are considering. If it's clear that Jerry is doing worse than Tom epistemically, it looks like he's doing worse than Tom epistemically even though his cognitive faculties are at least as *reliable* as Tom's, it looks like he's doing worse than Tom epistemically even though his belief is at least as *sensitive* as Tom's, and so on. Again, this seems guaranteed by the stipulation that Tom and Jerry are identical except that Tom's credence in ASTHMA is $K + n$ while Jerry's credence

in ASTHMA is $K - n$. Thus, it's hard to see how N1 helps anyone avoid the choice between accepting improbabilism and concluding that all of the most plausible theories of knowledge are false. So, again, probabilism seems to entail that Sosa's case is a counterexample to all of the most plausible theories of knowledge.

7. A Tentative Argument for Improbabilism

How should we respond to this conclusion? Instead of rejecting probabilism, we might concede that Sosa's case is a counterexample to all the most plausible theories of knowledge and either revise our favorite theory of knowledge or formulate a new one. Or we might concede that Sosa's case is a counterexample to all the most plausible theories of knowledge and completely abandon the project of analyzing knowledge. I am sanguine about our prospects for analyzing knowledge, so I will set this latter response aside. Which is more preferable, then: rejecting probabilism or conceding that Sosa's case is a counterexample to all the most plausible theories of knowledge and either revising our favorite theory of knowledge or formulating a new one?

This much seems clear enough: we can't respond to Sosa's case by simply tacking a high-credence condition to our favorite theory of knowledge. We can't, for example, respond to Sosa's case by simply saying "Aha! So knowledge must be apt belief *with a high credence*." This response would be about as philosophically satisfying as responding to Gettier's counterexamples by saying that knowledge must be justified true belief *outside Gettier cases*. If we're going to respond to Sosa's case by revising our favorite theory of knowledge, our revision can't be entirely *ad hoc*.[14] What should we think about improbabilism, then? It might seem horribly unattractive. At the very least, if accepting it requires saying that I know that Kim has asthma in the case above, where I've gone completely mad, then we should definitely reject it. But fortunately for Sosa's view—and

[14] A referee suggested that we simply restrict our favorite theory of knowledge to normal human beings. The idea would be that, because normal humans wouldn't believe that p while having a credence in p below 0.5, Dependence doesn't entail that any *normal* person would ever know that p while having a credence in p below 0.5. This is an interesting suggestion, but I don't find it entirely satisfying. First, it's unclear why responding to Sosa's case by restricting our theories of knowledge to normal people would be any better than responding to Gettier's counterexamples by restricting our theories of knowledge to normal circumstances. Most epistemologists are interested in knowledge *itself* (I think), and not just the properties that covary with knowledge in normal circumstances. Second, it would be hard to say when a person is or isn't *normal*, and I suspect that, on many plausible answers to this question, normal people *will* sometimes believe that p while having a credence in p below 0.5. For example, I'm inclined to think that, in a scenario that I will discuss below, a normal person believes a proposition while having a credence in that proposition below 0.5. In any case, whatever we think about these worries, the crucial point is that the referee's suggestion *concedes* the main thesis of my paper—that Sosa's case forces us to either revise our favorite theory of knowledge, formulate a new one, or accept improbabilism—so I won't spend more time arguing against the referee's suggestion here.

for every other theory of knowledge—there are much more plausible routes to improbabilism.

One route takes its cue from Sosa's eye exam case (2015: 74–7). In this case, as you make your way further and further down the eye chart, you eventually start guessing what letters you are seeing. At some point, your relevant credences drop below 0.5. But year after year, your guesses are always right. You don't know this, but you're a perfectly reliable guesser, as the technician's records confirm. So consider one of your guesses—your guess that the first letter on the last row of the chart is a P. Given your perfect reliability, do you *know* that it's a P? According to Sosa, the affirmative answer is intuitively correct, and your guess does count as a kind of subcredal animal knowledge.

Since improbabilism is true if there is a single case where someone knows something while having a credence in the relevant proposition below 0.5, improbabilism is true if you know that the letter is a P. And since you're clearly not crazy for guessing that the letter is a P, this route to improbabilism is an obvious improvement over any route that says I know that Kim has asthma in the case above, where I've gone mad.

Not everyone agrees that your guess constitutes knowledge, of course,[15] but there are other routes to improbabilism. One route that I find interesting takes its cue from Turri's discussion of the TV show *House* (2015: 536–40). Suppose I'm a doctor, Kim is seriously ill, and she has a highly unusual and complicated collection of symptoms. Her symptoms are so bizarre that I'm literally considering 1,000 mutually exclusive causes. Since I'm being very thorough (Kim's my daughter, it turns out, so it matters a lot that I correctly diagnose her illness), it's nearly certain that my list contains the actual cause of her symptoms. As my investigation proceeds, the evidence points increasingly towards a very rare form of asthma—the only form of asthma that could possibly explain her symptoms. As a result, I wind up extremely confident that condition A *isn't* the cause, extremely confident that condition B isn't the cause, and so on, for every alternative to asthma on my list. But I never wind up literally certain that a given condition isn't the cause, since I know that, for literally all of them, there is some possible scenario (even if it's an extremely far-fetched scenario) in which the condition in question *is* the cause. As a result (let's suppose), I wind up with roughly credence 0.4 in the proposition that Kim has asthma, and I wind up with a flat credence distribution across the other 999 conditions, so that, for each of them, I have roughly credence 0.0006 that the condition in question is the cause. Given this assumption, even though my credence that Kim has asthma is below 0.5, it's still more than 650 times higher than my credence that A is the cause, more than 650 times higher than my credence that B is the cause, and so on, for the rest of the conditions that might

[15] See Carter 2016, for example.

be causing Kim's symptoms. So now suppose that my credence distribution is rational, suppose I have probabilistic beliefs that match my credences, and suppose that, on the basis of these beliefs, I reason as follows: *The cause is either asthma or one of the other conditions on my list, and it's at most one of the conditions on my list. The cause isn't* ***not****-asthma. After all, there's no such thing as not-asthma. And even though there is such a thing as the disjunction of all of the other conditions on my list, this* ***disjunction*** *isn't the cause. After all, disjunctions don't cause things. So the cause is exactly one of the specific conditions on my list. Since asthma is more than 650 times more likely to be the cause than each other condition on my list, it's gotta be asthma.* Suppose, finally, that I'm right (Kim *does* have asthma), and suppose I've exhibited sheer brilliance in correctly diagnosing her condition. Suppose even the world's best doctors would have been completely stumped, and suppose that I am literally the only one who could have done it.

In this case, I have arrived at the correct answer to my question, I'm not just guessing that Kim has asthma, it's not just a matter of luck that I have arrived at the correct answer to my question, and my arriving at the correct answer to my question looks like a remarkable intellectual achievement. (Much *more* of an intellectual achievement, mind you, than many paradigm instances of knowledge.) And if we want, we can add the further stipulation that I'm actually extremely reliable when I form conclusions like this. We can even add the stipulation that, when I affirm that Kim has asthma, I affirm it in the endeavor to affirm not just correctly but *aptly*. But then the virtue-epistemological considerations that Turri employs in his argument for unreliable knowledge only provide *more* support the conclusion that I know that Kim has asthma, even though my credence in this proposition is just 0.4.[16]

Of course, these considerations don't *prove* that it's possible to know something while having a credence in the relevant proposition below 0.5. Far from it. By merely supporting this conclusion, however, these considerations go some way toward undermining probabilism. At the very least, I think, they make it impossible to continue taking probabilism completely for granted. Since we must either accept improbabilism or conclude that all of the most plausible theories of knowledge are false, perhaps the best response to Sosa's case consists in accepting improbabilism.[17]

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[16] By 'unreliable knowledge,' Turri means instances of knowledge where the belief in question is the product of a process, ability or disposition that is less than 50% reliable.

[17] And in fact, there are more routes to improbabilism than just these two. For example, a version of interest-relativism that counts a person's need-for-closure as a relevant part of her practical interests might help us warm up to the conclusion that improbabilism is true. (See, for example, Kruglanski and Webster 1996, Kruglanski 2004, and Nagel 2009.) Some of the considerations that support Schaffer's (2007) contrastivism might also have this result, and there are moves we might make in response to Williamson (2009) where the resulting picture supports improbabilism. It's also worth emphasizing that improbabilism is a thesis about a person's *actual* credence in the relevant proposition, not a thesis about a person's *ideal* credence in the relevant proposition. This

8. Sosa's Puzzle

Sosa's case highlights tension between the value of knowledge and the threshold view of belief, but it does a lot more. If it's possible to believe that Kim has asthma while having a credence in ASTHMA below 0.5 and Dependence is false, then Sosa's case is a counterexample to all of the most plausible theories of knowledge, including Sosa's own theory of knowledge. On the other hand, if it's possible to believe that Kim has asthma while having a credence in ASTHMA below 0.5 and Dependence is *true*, then it's possible to *know* that Kim has asthma while having a credence in ASTHMA below 0.5 and improbabilism is true. There are clear cases where someone believes that Kim has asthma while having a credence in ASTHMA below 0.5, and the theoretical reasons for doubting our intuitions about these cases aren't convincing, so Sosa's case is a counterexample to all of the most plausible theories of knowledge unless improbabilism is true. Since most epistemologists at least tacitly assume that improbabilism is false, reflection on Sosa's case reveals a tension between all of the most plausible theories of knowledge and a widespread assumption in epistemology.

I don't see any wholly satisfying way to resolve this tension, so I think Sosa's case presents us with a genuine puzzle. And since I am already convinced that epistemologists have paid insufficient attention to the implications of knowledge for one's *credence* in the relevant proposition, I am comfortable concluding that no theory of knowledge gets things exactly right. So, on my preferred response to Sosa's case, we should concede that Sosa's case is a counterexample to all of the most plausible theories of knowledge and get to work either revising our favorite theory or formulating a new one. I am at least open to the suggestion that improbabilism is true, however, since together with Turri-style arguments for improbabilism, Sosa's case suggests that improbabilism might be true. Thus, while I think that Sosa's case at least partially undermines all of the most plausible theories of knowledge, I think it also provides some support for improbabilism. Either way—

is important because someone might defend a strongly externalist version of improbabilism on which it's only your ideal credence in the relevant proposition that matters for knowledge. Externalists of this stripe might say that it's possible to know that *p* while your actual credence in *p* is below 0.5, but then add that it's *not* possible to know that *p* while your *ideal* credence in *p* is below 0.5, since your ideal credence depends on your evidence, and knowing that *p* requires that the probability of *p* conditional on your evidence is higher than 0.5. Someone might even defend improbabilism by agreeing both that knowledge entails belief and that belief entails a credence in the relevant proposition above 0.5, but then insisting that it's possible to simultaneously have one credence in *p* above 0.5 and another credence in *p* below 0.5 (cf. Wedgwood 2012), and adding that, in certain circumstances, having a credence in *p* below 0.5 needn't prevent you from knowing that *p*. The person who held this version of improbabilism could perhaps even insist that you can't believe that *p* without having credence 1 in *p*. In any case, these are long and complicated stories, and it's not obvious that any of them will work. I mention them here simply to emphasize that improbabilists have many options.

whatever we want to say about the conflict between probabilism and all of the most plausible theories of knowledge—Sosa's case does a lot more than raise a new problem for the threshold view of belief.

I know of no book or article that even mentions Sosa's case. This is a shame. Even if I am mistaken that Sosa's case undermines literally *all* of the most plausible theories of knowledge, it clearly deserves more attention than it has received.[18]

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