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Knowledge, Modal Robustness, and Mathematical Platonism

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Abstract

The intuition that knowledge requires the satisfaction of some sort of anti-luck condition is widely shared. I examine the claim that modal robustness is sufficient for satisfying this condition: for a true belief to be non-luckily true, it is sufficient that this belief is safe and sensitive. I argue that this claim is false by arguing that, at least when it comes to beliefs in necessary truths, satisfying the anti-luck condition requires satisfying a non-modal condition. I also advance a plausible candidate for this condition and argue for the implausibility of mathematical Platonism on this basis.

Keywords: Modal robustness; epistemic luck; knowledge; explanationism; Benacerraf's dilemma; mathematical platonism

1. Introduction

The intuition that knowledge excludes luck – that is, that for a true belief to be knowledge, this belief must not be luckily true – is widely shared. I admit that this intuition is right: knowledge requires the satisfaction of some sort of anti-luck condition. What is much more debated is i) how exactly to articulate this condition, and ii) whether its satisfaction is just necessary, or also sufficient, for a belief to be knowledge.

I shall not address the second question here. Instead, I focus on the first, and more specifically on the claim that modal robustness is sufficient for satisfying this condition: for a true belief to be non-luckily true in the way that is required for it to be knowledge, it is sufficient that this belief is safe and sensitive – i.e. modally robust. In section 2 I shall argue that this claim is false by arguing that, at least when it comes to beliefs in necessary truths, satisfying the anti-luck condition requires satisfying a non-modal condition. I will stay neutral on whether satisfying this non-modal condition is sufficient for these beliefs to be non-luckily true, or for them to be knowledge. In other words, I will stay neutral on whether, when it comes to these beliefs, this non-modal condition should *supplement* or, more strongly, *replace* the modal robustness condition that safe and sensitive beliefs in necessary truths satisfy. My aims in this section then are, first, to show that, at least when it comes to beliefs in necessary truths, a modal robustness condition is insufficient for satisfying the anti-luck condition, and second, to advance a plausible candidate for the non-modal condition in question. In section 3, after clarifying the dialectics of the debate apropos Benacerraf's dilemma, I shall argue for the implausibility of mathematical Platonism on the basis of the foregoing considerations.

2. Lucky despite modally robust

Consider the following scenario. Suppose that:

a) Mathematical truths and physical laws of our universe are necessary.
b) God exists and, when creating the universe, He decided that each human being would necessarily form at some point during their existence a given belief He arbitrarily attributed to them without considering the truth-value of the belief in question, and that they would form it in the way in which Norman the Clairvoyant forms his clairvoyant beliefs (i.e. they are not capable of articulating reasons for the beliefs in question other than the strong feeling that the propositions at issue are clearly true).
c) God decided, for example, i) that Michael Caine, when waking up on Sunday 12th May 2024, will have the belief that there was a flashing light above Cholmondeley Castle on Sunday 12th May 2024 at 21:15:02; ii) that Philippa Foot, when driving her car on Thursday 7th April 1960, will form the belief that equal volumes of all gases, at the same temperature and pressure, have the same number of molecules; or iii) that Jane Austen, when getting dressed on Tuesday 9th January 1810, will form the belief that no three positive integers a, b, and c satisfy the equation $a^n + b^n = c^n$ for any integer value of n greater than 2.

Michael Caine's belief is false, but Philippa Foot's and Jane Austen's beliefs are true: there was no flashing light above Cholmondeley Castle on Sunday 12th May 2024 at 21:15:02, the content of Austen's belief is Fermat's Last Theorem (which she had never heard about), and the content of Foot's belief is Avogadro's Law (which she also had never heard about).

Consider now Austen's and Foot's God-determined beliefs in particular. Intuitively, they do not amount to knowledge, as God arbitrarily attributed the beliefs in question to Austen and Foot without considering their truth-value – that is, God proceeded in a way that led Him to attribute true God-determined beliefs to Austen and Foot, but a false God-determined belief to Caine (and to many other people). Now, are Austen's and Foot's God-determined beliefs safe and sensitive?

Since Fermat's Last Theorem and Avogadro's Law are necessary truths, there is no possible world such that i) they are false ii) but Austen and Foot falsely believe that they are true. Their God-determined beliefs then cannot but satisfy the sensitivity condition, which states that a subject's belief that p is sensitive iff in the closest possible world where p is false, this subject does not believe that p.

What now about the safety of their God-determined beliefs? Since no given human being can exist without forming their idiosyncratic God-determined belief, Austen cannot exist without forming the belief that no three positive integers a, b, and c satisfy the equation $a^n + b^n = c^n$ for any integer value of n greater than 2, and Foot cannot exist without forming the belief that equal volumes of all gases, at the same temperature and pressure, have the same number of molecules. But, if so, it cannot be argued that, given the way in which the beliefs in question have been formed, or the method used to form them, Austen and Foot could easily have formed false God-determined beliefs. Why?

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Because, if forming the belief about positive integers is a necessary property of Austen, and if forming the belief about gases is a necessary property of Foot, then Austen and Foot simply would not exist if they did not form these particular God-determined beliefs. So, if a subject S's true belief *B* is safe when, in most nearby possible worlds in which S forms beliefs in the way in which S formed *B* in the actual world, these beliefs are true, then Austen's and Foot's respective God-determined beliefs are not unsafe but safe, because there is no possible world in which Austen and Foot would have formed other, possibly false, God-determined beliefs.

Since Austen's and Foot's respective God-determined beliefs are also sensitive (because they are beliefs in necessary truths), and so are modally robust, while they intuitively are luckily true, the moral of the foregoing is the following: for a belief to be non-luckily true, it is not sufficient that it is modally robust. Because being non-luckily true is necessary for a belief to be knowledge, this means that being modally robust is not sufficient for a belief to be knowledge. The epistemological moral of our scenario then is as follows: because beliefs can be safe and sensitive, and so modally robust, while luckily true, it follows that being modally robust is not sufficient for a belief to be non-luckily true, and so for it to be knowledge (assuming that being non-luckily true is necessary for a belief to be knowledge).[1]

This differs from the view defended by Pritchard (2012, 2014), which is that being safe – and hence, according to Pritchard, non-luckily true – is insufficient for a belief to be knowledge. From this Pritchard concludes that, in addition to an anti-luck condition, another condition must be satisfied for a belief to be knowledge, and then defends the claim that this other condition is a cognitive achievement condition. In other words, while for Pritchard safety is sufficient for satisfying the anti-luck condition (but insufficient for knowledge), our scenario shows that this is not the case: it can be that a belief is safe (and also sensitive) while luckily true. This means that satisfying a modal robustness condition is insufficient for a belief to be non-luckily true and so to satisfy the anti-luck condition on knowledge.

The question then is: what could explain why beliefs, like those held by Austen and Foot, can be luckily true despite being modally robust? I see only one clear candidate for this role: there is no explanatory connection between the truthmakers of Austen's and Foot's respective God-determined beliefs and the fact that Austen and Foot hold these beliefs. Indeed, there clearly is no explanatory connection between the fact that no three positive integers a, b, and c satisfy the equation $a^n + b^n = c^n$ for any integer value of n greater than 2 and the fact that Austen believes this, or between the fact that equal volumes of all gases, at the same temperature and pressure, have the same number of molecules and the fact that Foot believes this. This provides abductive support for the claim that, at least when it comes to true beliefs in necessary truths, for these beliefs to be non-luckily true, their being held must be explanatorily connected to their truthmakers.[2] When this is not the case, it can be said that it is a lucky coincidence that these beliefs are true, even when they are safe and sensitive – which prevents them from being knowledgeable.

Note that this is not to say that satisfying the anti-luck condition is sufficient for knowledge. Pritchard may be right that satisfying a cognitive achievement condition that is irreducible to the anti-luck condition is also necessary for knowledge. My aim in this section was simply to show that, even if Pritchard is right about this last claim, his

[1]Admittedly, the property of forming a particular belief during one's lifetime is not in general a plausible candidate for a list of necessary properties of human individuals. But what matters for the purpose of this paper is just that i) there is a conceivable scenario in which this property is part of the list, and that ii) this reveals the fact that modal robustness is not sufficient for satisfying the anti-luck condition.

[2]A claim is abductively supported when, if true, it can nicely explain a certain fact (here, the fact is that some beliefs are luckily true while modally robust).

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(widely shared) idea that safety or modal robustness is sufficient for satisfying the anti-luck condition is wrong because our scenario shows that there can be beliefs that are luckily true despite being modally robust. Moreover, the fact that these beliefs are luckily true despite being modally robust can be explained by the lack of any explanatory connection between their truthmakers and the fact that the concerned subjects hold these beliefs. So the claim that satisfying an explanatory connection condition of this sort is necessary for satisfying the anti-luck condition is abductively supported.

Our scenario then speaks in favour of explanationist analyses of knowledge according to which, minimally, it is necessary that there is some sort of explanatory connection between beliefs and their truthmakers for them to count as knowledge. However, our scenario is neutral on whether satisfying this non-modal condition is i) *sufficient for beliefs to be non-luckily true*, or ii) *sufficient for beliefs to be knowledge*. This contrasts with explanationists such as, e.g., (Bogardus and Perrin 2022), who argue that knowledge does not require modal conditions, and that a certain sort of explanatory connection that is irreducible to modal conditions is both necessary and sufficient for knowledge.[3]

3. The implausibility of mathematical Platonism

As we have just seen, at least when it comes to true beliefs in necessary truths, for these beliefs to be non-luckily true – which is necessary for them to be knowledge – it is insufficient that they satisfy safety and sensitivity conditions. In other words, it is insufficient that their match with reality is modally robust. A plausible candidate for the non-modal condition that these beliefs must satisfy to be non-luckily true is that there is an explanatory connection between them and their truthmakers. My aim in this section is to show that it is possible to mount a convincing argument against mathematical Platonism on the basis of these claims. Let us see how.

3.1. Benacerraf's argument against mathematical Platonism

Paul Benacerraf's original challenge to mathematical Platonism in "Mathematical truth" (Benacerraf 1973) can be formulated as follows, in the form of a *reductio*:

P1. If mathematical Platonism is true, then if there is mathematical knowledge, it is knowledge of mind-independent *abstracta*.

P2. We have mathematical knowledge.

P3. Knowing something that is mind-independent requires being causally connected to it.

P4. One cannot be causally connected to *abstracta*.

C1. Our mathematical knowledge cannot be that of mind-independent *abstracta*. (From P2, P3 and P4)

C2. Mathematical Platonism is false. (From P1 and C1)

[3]Many thanks to an anonymous reviewer for *Episteme* due to whom the thought experiment above and its epistemological moral have been much clarified.

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The reasoning is valid, so to escape its conclusions mathematical Platonists must show that at least one of these premises is false. P1 cannot be false because it is definitional of mathematical Platonism that the truthmakers of our mathematical beliefs are mind-independent *abstracta* (mind-independent abstract *objects*, *facts*, *states of affairs*, or *properties*). Mathematical knowledge therefore must consist in knowing these abstracta. P4 cannot be false either as it is definitional of *abstracta* that they lack spatiotemporal location and are causally inert. As Jonathan Lowe puts it, they are neither "subject to causality" nor "denizens of space-time" (which "perhaps amounts to the same thing", as he remarks), so that nothing can be causally connected to them (Lowe 1998: 51).

Mathematical Platonists then have only two options: they can either reject P2 and become sceptics about mathematical knowledge – the truthmakers of our mathematical beliefs are *abstracta* that we do not know – or reject P3. In other words, in order to escape the sceptical view that we have no mathematical knowledge, mathematical Platonists have no other choice but to reject P3. P3 says that, for a subject's true belief to be knowledge, there must be a causal connection between the true belief and its mind-independent truthmaker. As this is far from being epistemologically obvious, it would be preferable to attack mathematical Platonism without relying on this premise.

3.2. A better argument against mathematical Platonism

Mathematical Platonism can be attacked without relying on P3, on the basis of (Field 1989):[4]

P1. If mathematical Platonism is true, then if there is mathematical knowledge, it is knowledge of mind-independent *abstracta*.

P2. We have mathematical knowledge.

P3*. If we have mathematical knowledge, our mathematical beliefs are true (or at least most of the mathematical beliefs of mathematicians are true). In other words, if we have mathematical knowledge, there is a vast concordance (hereafter designated by "CONCORDANCE") between these beliefs and the abstract mathematical realities in virtue of which they are true.

P4*. If our mathematical knowledge were that of mind-independent *abstracta,* CONCORDANCE would be an inexplicable coincidence.

P5*. If CONCORDANCE were an inexplicable coincidence, our true mathematical beliefs would not be mathematical knowledge.

C1. Our mathematical knowledge cannot be that of mind-independent *abstracta*. (From P2, P3*, P4* and P5*)

C2. Mathematical Platonism is false. (From P1 and C1)

[4]Note that this is just *inspired* by Hartry Field's epistemic challenge for platonism, as he explicitly wants his challenge not to be based on any assumptions about necessary conditions for knowledge. Thanks to an anonymous reviewer for pressing me to underline this.

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Once again, the reasoning is valid, so mathematical Platonists must reject one of these premises. P1 is, again, definitional of mathematical Platonism, so non-sceptical mathematical Platonists, who accept P2, must then reject at least one of the other three premises. Because P3* follows simply from the triviality that, if one knows that *p*, one's belief that *p* is true, these Platonists have to reject P4* and/or P5*.

3.3. Rejecting P4*?

Let us first consider P4*. Can non-sceptical mathematical Platonists reject P4* by explaining CONCORDANCE in a way that would not make it a coincidence? As Field remarks, there is for them "a difficulty in principle" in explaining the "striking correlation between mathematicians' mathematical beliefs (at least up to a certain level of complexity) and the mathematical truths" (Field 1989: 230). Indeed, due to the causal inertness of *abstracta*, these Platonists cannot explain CONCORDANCE "in any of the standard ways of explaining such a correlation – by invoking a causal [. . .] connection from the first factor to the second, or from the second to the first, or from some third factor to both", as David Enoch writes (2011: 158). In short, non-sceptical mathematical Platonists cannot give a *causal* explanation of CONCORDANCE in a way that would not make it a coincidence.

The question then is whether non-sceptical mathematical Platonists can give a satisfactory *non-causal* explanation of CONCORDANCE according to which it would not be, in fact, a coincidence. What about invoking a reliable or truth-conducive non-causal relation of *intuition* of those mind-independent abstract mathematical realities that determine the truth value of our mathematical beliefs? The fundamental problem with this explanatory strategy is that we have absolutely no evidence of the existence of this non-causal relation (nor of any other non-causal relation) between us and these realities. Admittedly, if a non-causal relation is obtained, CONCORDANCE would not be an inexplicable coincidence, and our having mathematical knowledge would be explained. But this mere fact is no evidence at all that a non-causal relation exists. Non-sceptical mathematical Platonists therefore do not seem to be in a position to give an intellectually satisfactory explanation of CONCORDANCE that would not make it a coincidence.

Let us see now if they can reject P4* by opting for another strategy: arguing that even though CONCORDANCE is, in their view, a coincidence, it is nevertheless possible to argue that this coincidence is *not accidental*, and hence *explicable*.

The strategy would go like this: CONCORDANCE is not a coincidence *that could have easily not been obtained* because, if it is admitted that mathematical truths are necessary, they could not easily have been different. And the same goes for our true mathematical beliefs if it is admitted that evolutionary, cognitive, and/or sociological factors make our having these beliefs nearly inevitable. If so, CONCORDANCE is a non-accidental, modally robust coincidence, and this is sufficient to explain CONCORDANCE.

Let us concede that it is sufficient. This sort of explanation of CONCORDANCE thus consists, as Sharon Berry puts it, in "'stapling together' two unrelated explanations for each half of the coincidence" (2020: 699) – where these two explanations themselves consist in explaining why the two halves of the coincidence could not have easily not obtained. In this view, there is no explanatory connection between our mathematical beliefs and the mind-independent abstract mathematical realities that make them true or false. CONCORDANCE just is a modally robust coincidence between two disconnected facts – the fact that we have the mathematical beliefs we have, and the fact that these realities are what they are. If this lack of explanatory connection between these beliefs and these realities is what is meant by P4*'s claim that mathematical Platonism makes CONCORDANCE an inexplicable coincidence, then P4* is correct.

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The crucial question then is: if, as mathematical Platonism implies, CONCORDANCE is an inexplicable coincidence in the sense just indicated (i.e. if there is no explanatory connection between our true mathematical beliefs and their truthmakers), does it follow that our true mathematical beliefs are not knowledge? In other words, is P5* correct? This would make non-sceptical mathematical Platonism, which accepts P2's claim that we have mathematical knowledge, incoherent.

3.4. Rejecting P5*?

Existing debates about whether P5* is correct are largely about justification and its underminers.[5] If the two claims I defended in section 2 are correct, it is possible to argue for the correctness of P5*, and so for the incoherence of non-sceptical mathematical Platonism, without entering into these debates. These claims were:

i) at least when it comes to true beliefs in necessary truths, for these beliefs to be non-luckily true – which is necessary for them to be knowledge – they must satisfy a non-modal condition;
ii) plausibly, this condition is an explanatory connection condition.

Now, if it is admitted that

iii) mathematical truths are necessary truths,

and that (as we have just seen)

iv) there can be no explanatory connection between our true mathematical beliefs and their truthmakers if mathematical Platonism is true,

it follows that,

v) plausibly, mathematical Platonism makes mathematical knowledge impossible.

If it is admitted that we have mathematical knowledge – that is, that mathematical scepticism is false – this conclusion (v) makes mathematical Platonism implausible.

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[5]Field's way of arguing for P5 is that if 'it can only be a coincidence if our mathematical or logical beliefs are right, [. . .] this undermines these beliefs' (Field 2005: 81), so that 'we should view with suspicion any claim to know [mathematical or logical] facts' (1989: 232). His reasoning seems to be the following: one cannot *both* claim that we have mathematical knowledge *and* admit that CONCORDANCE is an an inexplicable coincidence, in the sense that there is no explanatory connection between each half of the coincidence. This is because 1) admitting that CONCORDANCE is an an inexplicable coincidence suffices to undermine any justification one could have had for mathematical beliefs, and 2) unjustified beliefs cannot be knowledge. It seems that, for Field, whatever justification one has for one's beliefs can be undermined without one's being given any evidential reason to doubt their safety or sensitivity. Dan Baras and Clarke-Doane deny this and defend a 'modal security' principle according to which (in its simplest formulation) '[i]f evidence, E, undermines our belief that P, then E gives us reason to doubt that our belief is sensitive or safe' (Baras and Clarke-Doane 2021: 162).

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