

Can Hardcore Actualism Validate S5?

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Abstract

Hardcore actualism (HA) grounds all modal truths in the concrete constituents of the actual world (see, e.g., Borghini and Williams (2008), Jacobs (2010), Vetter (2015)). I bolster HA, and elucidate the very nature of possibility (and necessity) according to HA, by considering if it can validate S5 modal logic. Interestingly, different considerations pull in different directions on this issue. To resolve the tension, we are forced to think hard about the nature of the hardcore actualist's modal reality and how radically this departs from possible worlds orthodoxy. Once we achieve this departure, the prospects of a hardcore actualist validation of S5 look considerably brighter. This paper thus strengthens hardcore actualism by arguing that it can indeed validate S5—arguably the most popular logic of metaphysical modality—and, in the process, it elucidates the very nature of modality according to this revisionary, but very attractive, modal metaphysics.

KEYWORDS

actualism, hardcore actualism, logic, modality, possible worlds, potentiality, S5

1 | INTRODUCTION

Hardcore actualism grounds all modal truths in the concrete constituents of the actual world (see, e.g., Borghini and Williams (2008), Jacobs (2010), Vetter (2015)). The hope, then, is that modality can be accounted for without appeal to possible worlds, be they abstract or concrete, or any other ontologically suspicious entities. Furthermore, since empirical scientific methods are best placed to tell us about the concrete constituents of actuality, hardcore actualism is well placed to naturalize the metaphysics and epistemology of modality.

In this paper, I bolster hardcore actualism and elucidate the very nature of possibility (and necessity) according to hardcore actualism by considering whether it can validate S5 modal logic,

characteristic of which is the 5 axiom: $\Diamond\phi \rightarrow \Box\Diamond\phi$. According to many (e.g., Williamson (1999, 2013), Ruffitt (2010), Hale (2015)), S5 is the correct logic for *metaphysical* modality. So, arguably, it would be a plus if hardcore actualism could validate the 5 axiom. But different considerations pull in different directions: on one way of viewing things, it seems that hardcore actualism can validate S5 and on another it seems that it cannot. To resolve this tension, we are forced to think hard about the nature of the hardcore actualist's modal reality and how radically this departs from possible worlds orthodoxy. Once we achieve this departure, however, it seems that hardcore actualism can indeed validate S5. This paper thus aims to show that hardcore actualism can validate perhaps the most popular logic of metaphysical modality and, in the process, it elucidates the very nature of modality according to this this revisionary, but very attractive, modal metaphysics.

My discussion proceeds as follows. In section 2, I provide some background discussion of hardcore actualism. In section 3, I discuss the appeal of S5 as a logic of metaphysical modality. I then provide a reason to think that hardcore actualism can validate S5 and a reason to think that it cannot, thus setting up a tension. In section 4, I argue for a resolution of the tension in favour of hardcore actualism's ability to validate S5 and thereby present a clearer picture of what hardcore actualism implies about nature of possibility and how this departs from possible worlds orthodoxy. The problem that S5 poses for hardcore actualism is related to the problem of iterated modalities for actualism more generally. Thus, in section 5, I'll describe how another prominent actualist view validates S5 and avoids the problem of iterated modalities. This will serve to further emphasise the distinctive features of the *hardcore* actualist responses to these problems. In section 6, I argue that beyond the mere theoretical ability to validate S5, it is in fact quite plausible that S5 is the correct logic for a hardcore actualist modal metaphysics.

2 | FROM ACTUALISM TO HARDCORE ACTUALISM

Actualism and *possibilism* are opposing views in the metaphysics of modality. In a nutshell, actualists believe that everything is actual, where 'everything' is completely unrestricted. Possibilists, on the other hand, think that besides the actual things, there are some merely possible things. Historically, actualists and possibilists alike have been enamoured with the theoretical utility of possible worlds semantics, which has inspired both sides to appeal to possible worlds in their modal metaphysics. But where possibilists may avail themselves of all manner of merely possible individuals, properties and so on out of which to construct possible worlds and thereby account for the truth of modal propositions, actualists are limited by the resources of the actual world (though this may include *abstracta*).

Hardcore actualism (HA) imposes the further restriction that only the *concrete* constituents of the actual world are relevant to the metaphysics of modality.¹ More specifically, it is the dispositional properties of concrete individuals that serve as truthmakers for modal propositions (or perhaps modal statements. In what follows, I'll talk in terms of modal propositions being made true, but this shouldn't be read as my taking a stance on what the primary bearers of truth are). Characteristic of extant versions of HA is the idea that possible worlds have little to nothing to do with modality—they certainly do not *make* modal propositions true. Unlike some more traditional versions of actualism, then, it is no part of HA's ambitions to provide an account of abstract possible worlds.

Various articulations of HA all roughly start with the idea that dispositions are connected with possibilities, either via a link with counterfactuals (Jacobs, 2010) or directly (Borghini & Williams, 2008; Vetter, 2015). Thus, if *x* has a disposition whose manifestation is or includes some state of affairs ϕ ,

¹Perhaps with some exceptions – Pruss (2002) appeals to God in his version of HA, and Vetter (2015, pp. 278–280) considers ascribing potentialities to abstract mathematical objects to account for the modal status of propositions of mathematics.

then the proposition \langle possibly φ \rangle is true. According to HA, it is the dispositional properties of concrete, actual individuals that are the truthmakers for modal propositions. For example, for a given vase, v , \langle it is possible that v breaks \rangle is true. And what makes this true, according to HA, is v 's *fragility*, whose manifestation is *breaking*. The general hardcore actualist idea can be captured as follows:

HA schema: It is possibly the case that φ iff there exists some (actual, concrete) x , which instantiates a dispositional property whose manifestation is, or includes, φ .

Necessity can then be defined as follows: It is necessarily the case that φ iff nothing has a disposition for it to be the case that not- φ .

The hardcore actualist must be a realist about dispositional properties in the sense that they take them to be real, irreducibly modal, parts of our world. Reductionists about dispositional properties, by contrast, will seek to analyse dispositional properties away and, hence, locate the modality with which they are associated somewhere other than in the very properties themselves. Lewis, for example, analyses dispositions in terms of counterfactual conditionals (Lewis 1997) and he analyses counterfactuals in terms of possible worlds (Lewis 2001). So, any modality with which a disposition is associated ultimately has its source in possible worlds, according to Lewis's reductionism. While the reductionist might admit that, strictly speaking, the HA schema is true, this would not tell the whole story about the source of the relevant modality. For the reductionist, the source of modality is not the dispositional properties, but whatever it is in terms of which those properties are analysed—possible worlds, in Lewis's case. Instead of 'outsourcing', as Vetter (2011, p. 743) puts it, modality to other possible worlds, HA anchors all modality in the familiar properties of concrete, actual objects.

To get a better grip on HA, it will help to consider Vetter's particularly well-developed version of the view, which goes further than any other to explain how the hardcore actualist might account for the full range of modal truths that we intuitively would want to account for. Vetter notes that dispositions constitute too narrow a class of entities to capture the full range of modal truths. Some modal propositions, such as \langle possibly this vase breaks \rangle are true in virtue of a disposition, in this case, the vase's *fragility*, whose manifestation is the state of affairs *the vase's being broken*. But there are many other true modal propositions for which there appear to be no such dispositions grounding their truth. Consider \langle possibly this brick breaks \rangle , which is true even though we would not want to describe the brick as *fragile*. The brick surely *can* break and this is what makes the proposition \langle possibly this brick breaks \rangle true, but it does not seem correct to say that the brick is *disposed* to break. Vetter thus posits an ontology of modal properties that she calls *potentialities*. Potentialities admit of degrees and to qualify as possessing some *disposition*, an individual must possess the relevant potentiality to a sufficiently high degree (Vetter, 2015, p. 81). What counts as a 'sufficiently high degree', and hence what counts as a disposition for it to be the case that φ , will be determined by context, but whether or not x has a potentiality for it to be the case that φ is completely objective and context independent (ibid). By accounting for metaphysical modality in terms of potentialities as opposed to dispositions, Vetter's view achieves the necessary objectivity and is able to account for a suitably wide range of modal truths.

Vetter's hardcore actualism then seeks to ground all truths about metaphysical modality in the potentialities of actually existing concrete individuals such that, roughly, a modal proposition \langle possibly φ \rangle is true iff something has the potentiality for it to be the case that φ . It follows that \langle necessarily φ \rangle is true iff nothing has the potentiality for it to be the case that not- φ .

Two tricky cases: first, it is possible that I have a piano-playing granddaughter. As it happens, I currently have no children or grandchildren, so where is the relevant potentiality that could make it true that *possibly I have a piano-playing granddaughter*? To account for such cases as this, Vetter

introduces *iterated* potentiality: I have a potentiality to have a child who has the potentiality to have a daughter who has the potentiality to play the piano. I thus have an iterated potentiality to have a piano-playing granddaughter. Second, it is possible that I play a duet. But I cannot play a duet by myself. In this case, the relevant potentiality is a *joint* potentiality of me and Vetter (for example), to play a duet. The truth of <possibly I play a duet> is then grounded in the joint potentiality of me and Vetter to play a duet. Joint potentialities ground *extrinsic* potentialities. My potentiality to play a duet is extrinsic because it concerns an individual external to me, namely Vetter, and it is grounded in our joint potentiality to play a duet.

Given that *potentiality* includes joint, extrinsic and iterated potentialities, Vetter sums up her view as follows:

POSSIBILITY: It is possible that $p =_{df}$ Something has a [...] potentiality for it to be the case that p .

(Vetter, 2015, p. 247)

Modality in general is anchored in the potentialities of concrete, actual individuals.

3 | S5

By invoking potentialities, which admit of degrees, and by introducing joint, extrinsic and iterated potentialities, Vetterian HA is able to account for the truth of a very wide range of the modal propositions that we intuitively take to be true. Vetter also argues that her view can validate system T of modal logic,² which is characterised by the T axiom: $\varphi \rightarrow \Diamond\varphi$, and, according to Vetter, this is the minimal requirement on a logic of metaphysical modality (Vetter, 2015, Chapter 5), hence, Vetter argues that her view is *formally adequate*. But beyond this, Vetter argues that her view can validate S4 (2015, pp. 212–213), which is characterised by the 4 axiom: $\Diamond\Diamond\varphi \rightarrow \Diamond\varphi$ and, given some additional metaphysical assumptions (to be discussed shortly), that it can validate S5 (2015, p. 213), which is characterized by the 5 axiom: $\Diamond\varphi \rightarrow \Box\Diamond\varphi$.

I am interested in the prospects of a hardcore actualist validation of S5 because different considerations pull in different directions on this issue and in attempting to resolve the tension, we can gain a better understanding of a hardcore actualist modal metaphysics. In this section, I'll discuss S5 in a little more detail before presenting Vetter's hardcore actualist validation of the 5 axiom. I'll then show how certain iterated modal propositions (discussed by Leech (2017) and by Kimpton-Nye (2018)) would seem to pose a problem for HA's ability to validate S5.

The 5 axiom: $\Diamond\varphi \rightarrow \Box\Diamond\varphi$, characteristic of S5 modal logic, says that if something is possible, then it is necessarily possible. So, while we might ponder the modal status of various non-modal propositions, such as that unicorns exist or that Clinton won the election, S5 tells us that if it is indeed possible that Clinton won the election, then it is *necessarily* possible that she won.

It is tempting adopt S5 as one's logic for metaphysical modality because metaphysical modality, it is often said, is possibility *simpliciter* and possibility *simpliciter* is not affected by any contingencies. And this is just to say that if something is possible, then whatever happened to be the case, it would still be possible, i.e., it is *necessarily* possible, which is just what the 5 axiom tells us. Williamson, for example, endorses this kind of thought when he says that "an S5 logic is plausible for metaphysical

²Yates (2015) raises a doubt about this, to which Vetter (2018) responds.

modality, for in explaining the difference between metaphysical possibility and practical possibility we emphasize that the former, unlike the latter, does not depend on the contingencies of one's situation" (1999, p. 255).

If we were trying to explain metaphysical possibility to a non-philosopher friend, we could, for example, ask them the following: is possible that Hugh Grant won the 2016 US presidential election? To which they would probably answer "no", justifying their answer by citing such factors as that he was not a candidate, nor was he even born in the US, so he could not have been a candidate even if he had wanted to be one. To this we would respond that metaphysical possibility abstracts away from such contingencies as one's nationality and career choices. Insofar as we are interested in the *metaphysical* possibility that Hugh Grant won the election, we are not restricted to considering situations in which any contingencies, such as nationality, that would preclude him from winning the election obtain. We can say that it is possible *simpliciter* that Hugh Grant won the election because for any given factor that one might cite as preventing him from winning, that factor might not have obtained.

The possible worlds theorist can translate the question of the validity of the 5 axiom into a question about the nature of the relation of *relative possibility*, or *accessibility*, between possible worlds. It turns out that the 5 axiom corresponds to the accessibility relation being *Euclidean* (see, e.g., Lewis (1986, pp. 19–20)). According to the hardcore actualist, however, modality is not accounted for in terms of possible worlds. The hardcore actualist cannot say, then, that the accessibility relation between worlds is Euclidean as a means of accounting for the fact that matters of metaphysical possibility are themselves necessary. How, then, *can* HA validate S5?³

Recall that, according to (Vetterian) HA, it is possible that ϕ iff something has a potentiality for it to be the case that ϕ and it is necessary that ϕ iff nothing has a potentiality for it to be the case that not- ϕ . To begin to answer the question about HA's ability to validate S5, it helps to first translate the 5 axiom into the language of potentiality. The 5 axiom says that if it is possible that ϕ , then it is necessarily possible that ϕ . This can be translated into the language of potentiality as follows (see also Vetter (2015, p. 212)):

S5_{POT}: if something has a potentiality for it to be the case that ϕ , then nothing has a potentiality for nothing to have ever had a potentiality for it to be the case that ϕ .

In other words, "given [a] potentiality, there are no potentialities for that [...] potentiality never to be possessed." (Vetter, 2015, p. 212). If HA could validate S5_{POT}, then HA could validate S5. But can S5_{POT} be validated? The answer is far from obvious. Contrast the hardcore actualist's predicament with the possible worlds theorist's: the latter is able to translate the question of the validity of S5 in to a question about the nature of the accessibility relation between worlds, which is perhaps easier to get one's head around than the question of how we might go about validating S5_{POT}.

Nevertheless, Vetter has proposed a way in which HA might validate S5_{POT}. Vetter's proposal begins with what she calls the *triviality thesis*, the idea that "past-concerning potentialities are possessed if and only if their manifestation properties are, and hence are possessed to maximal

³As mentioned at the outset, S5 is probably the most popular logic of metaphysical modality. But why should HA be conservative in this respect, given (as I argue later) that it departs quite radically from standard modal metaphysics? (Thanks to an anonymous reviewer for raising this). The point here is just that there seem to be some intuitive reasons in favour of S5, and respecting these may be a good thing. Furthermore, HA isn't revisionary for the sake of it, so perhaps it would be good if its being revisionary in certain respects can be offset by being more conservative in others. Of course, it is not wholly uncontroversial that S5 is correct for metaphysical modality (see, e.g., Salmon (1989)). I thus don't want to pin much on the claim that an ability to validate S5 should count in favour of HA. My main interest in this paper is in addressing a question (can HA validate S5?) and, in the process, shedding further light on HA itself.

degree if they are possessed at all” (Vetter, 2015, p. 189).⁴ The thought here is that past-concerning potentialities can only be *maximal* potentialities for the past to be just as it is, where an individual x possesses the potentiality to F to the maximal degree if and only if x lacks the potentiality to not- F (Vetter, 2015, p. 95). For example, Clinton now has a maximal potentiality to lose the 2016 election, i.e., she *now* has no potentiality to not lose (nor does anything else *now* have a potentiality for Clinton to not lose). (It’s still metaphysically possible that Clinton won because before the election, Clinton herself had the potentiality to win. The metaphysical possibility that φ requires only that *at some time or other* there exists a potentiality for it to be the case that φ .) The triviality thesis captures the intuitive idea that the past is fixed and the future is open by ensuring that non-trivial potentialities are always ‘forward-looking’. In other words, for any time, t , there are no potentialities possessed at or after t for things before t to be different in any respect—after t , all potentialities concerning things before t are maximal potentialities for things to be exactly as they are.

A special instance of the triviality thesis is the following: there are no potentialities at any time after the first moment of the universe for those entities that existed at the first moment of the universe to be different in any respect. But since there was no time before the first moment of the universe, there are absolutely no potentialities at any time for those entities that existed at the first moment of the universe to be different in any respect. It follows that the potentialities of those entities at the first moment are well and truly fixed in the sense that there are no potentialities (at any time) for these potentialities to have never been possessed; these potentialities verify $S5_{\text{POT}}$. But that’s not job done yet. The full validity of $S5_{\text{POT}}$ requires that all potentialities are fixed in this way.

By making a further assumption about the relationship between the potentialities of the entity/entities present at the first moment of the universe and all other potentialities, we can fix all potentialities in the way required by $S5_{\text{POT}}$. Call the entity or entities that exist(ed) at the first moment of the universe NEC. Suppose now that NEC had iterated potentialities for all other potentialities that ever exist at any time, i.e., assume that “for every iterated potentiality that is ever possessed by anything, an iterated potentiality for the same ultimate manifestation is possessed by those objects at the first moment” (Vetter, 2015, p. 212).⁵ Since NEC’s potentialities are fixed (in the sense described above), it follows from the assumption that the potentialities of NEC are iterated potentialities for all other potentialities that exist at any time that all other potentialities are fixed too. That is to say, for any given potentiality, X , there is no potentiality for X never to have been possessed. This validates $S5_{\text{POT}}$ and hence validates $S5$; according to this argument, then, there is at least one way in which HA can validate $S5$.

The above considerations seem to suggest that it is at least possible for HA to validate $S5$. However, there is a line of thought originating in Leech (2017) and discussed in Kimpton-Nye (2018), which would seem to imply that it is *impossible* for HA to validate $S5$. Consider that among the possibilities that HA ought to be able to account for are possibilities of non-existence such as: *possibly Clinton does not (never has, never will) exist*. HA’s strategy for accounting for this possibility involves considering that out of which Clinton developed. In the past, well before Clinton’s conception, some ancestor of Clinton, call it AC, had a potentiality for Clinton’s existence, which manifested. But this potentiality might not have manifested, in which case Clinton would never have existed. In other words, AC had

⁴Vetter forwards the triviality thesis somewhat tentatively, rather than fully endorsing it, though she does argue that the triviality thesis is preferable to a total ban on past-concerning potentialities. I say more on the triviality thesis in section 6.

⁵Again, Vetter only tentatively forwards the considerations outlined here that would validate $S5$. I provide additional support in favour of these considerations in section 6.

the potentiality for Clinton's non-existence and this is what makes <possibly Clinton does not (never has, never will) exist> true.

Crucially, in order for AC to have the potentiality for *Clinton's* non-existence specifically, this strategy must be supplemented with an eternalist metaphysics of time, according to which if something exists at any time it exists at all times. If the eternalist assumption is not in place, then before Clinton's conception Clinton does not exist. And if Clinton does not exist, neither AC nor anything else can possess a potentiality for the specific individual *Clinton* to exist or not exist. AC could at best possess a purely qualitative potentiality for someone's existence or non-existence. The eternalist assumption makes available a future Clinton who can contribute content to AC's potentiality for *Clinton's* non-existence specifically. Although Clinton wasn't present back when AC possessed the potentiality for her non-existence, she nonetheless existed, at some future time. And it is this future Clinton which contributes to the content of Clinton's ancestor's potentiality for Clinton's non-existence (see Leech (2017)). Leech (2017) raises a challenge for this hardcore actualist strategy of accounting for possible non-existence to which Kimpton-Nye (2018) responds. But for present purposes, let's just assume that HA can successfully account for the truth of <possibly Clinton does not (never has, never will) exist> in the manner outlined.

A problem becomes apparent when we consider what would have been the case if in fact Clinton didn't exist. If Clinton didn't exist (because AC never manifested the potentiality for her existence) then it seems that it would not be *possible* that Clinton exists. This is because, in the absence of Clinton, there would be no individual available to contribute content to a potentiality for *Clinton's* existence specifically. In the absence of Clinton, there could at best be a potentiality for a democrat, former first lady, born in Chicago... etc. to exist, i.e., a purely *qualitative* potentiality, but there could be no potentiality for the individual *Clinton* to exist. And in the absence of a potentiality for Clinton to exist, it would not be possible that Clinton exists.

According to Leech, this kind of consideration forces the hardcore actualist to admit *mere possibilities*, for then, if Clinton didn't exist, a merely possible Clinton could contribute content to AC's potentiality for Clinton's existence (Leech, 2017, p. 464). But to posit mere possibilities is to relinquish the main selling point of HA, which is that it accounts for modality without any such ontologically suspicious things. Plausibly, the absence of possibilities, abstracta or what have you, in its account of modality, is definitive of a hardcore actualist modal metaphysics, so Leech's proposal really just constitutes the abandonment of HA.

The troublesome possibility: that Clinton exists if she didn't exist, is an *iterated* modality, it concerns a possibility–Clinton's existence–from the perspective of another possibility in which Clinton does not exist. *Actualist* modal metaphysics have had a notoriously difficult time accounting for iterated modalities (see McMichael (1983)). This leads Kimpton-Nye (2018) to argue that HA is no worse off than any other version of actualism in this respect and hence that the hardcore actualist is justified in just biting the bullet here. This would amount to admitting that if Clinton did not exist, it would not be possible that Clinton exists. At least this way there is no need to introduce possibilities and so HA can be salvaged. But this strategy seems to imply the invalidity of S5. It is possible that Clinton exists, because she actually exists. But it is not necessarily possible that Clinton exists, because if Clinton's ancestor had not manifested the potentiality for Clinton's existence and hence Clinton didn't exist, it would not be possible that Clinton exists because there would be no Clinton to contribute to the content of any potentiality for *Clinton's* existence specifically.

It appears, then, that different considerations pull in different directions on the question of S5's validity given HA. On the one hand, given some additional metaphysical assumptions about potentiality and time, it seems correct to say that for a given potentiality, there are no potentialities for that potentiality never to have been possessed, which, in turn, would seem to validate the 5

axiom. On the other hand, it seems that if some particular individual had not existed, then it would not have been possible that they exist, which provides a recipe for creating invalid instance of the 5 axiom.

4 | RESOLVING THE TENSION

So, can HA validate S5 or not? I think that it can and that the above considerations to the contrary, alluring though they may be, depend upon a failure to properly appreciate the hardcore actualist modal metaphysics. In this section, I will first consider a version of the previous section's argument against hardcore actualist S5 that invokes possible worlds. I will reject this argument on the grounds that HA need not take seriously an understanding of the metaphysics of modality in terms of possible worlds. I will then move on to consider an alternative version of the argument just in terms of a counterfactual, I will suggest a way in which this argument may be resisted, and then comment on the broader implications for hardcore actualist S5.

4.1 | A Possible Worlds Argument

One might reconstruct the previous section's argument against hardcore actualist S5 along the following lines. There is a possible world, *W*, in which Clinton does not exist (because there is some potentiality and, hence, possibility for it to be the case that she does not exist). As Clinton does not exist in *W*, there is no *potentiality* in *W* for it to be the case that Clinton exists (see the discussion of the previous section). Hence, in *W* it is not possible that Clinton exists (from POSSIBILITY). Since there is a world, *W*, in which it is not possible that Clinton exists, it is possibly not possible that Clinton exists and this conflicts with S5 given Clinton's actual, and hence possible, existence.

The hardcore actualist can resist the above argument by remaining steadfast in her conviction that reified possible worlds are not relevant to the metaphysics of modality. The hardcore actualist can maintain

1. It is possible that Clinton does not (never has, never will) exist. (This is because Clinton's ancestor had a potentiality for her non-existence.)

and

2. There is no possible world *in which* Clinton doesn't exist that is relevant to the metaphysics of modality—all that is relevant in this respect is the concrete actual world. (A large part of the motivation for HA is that it promises to do without such mysterious entities as possible worlds in its account of modality.)

The *possible worlds argument* depends on there being a world, *W*, from the perspective of which it is not possible that Clinton exists and which is relevant to the modal status of the proposition <possibly Clinton exists>. The counterexample to S5 according to which it is possibly not the case that possibly Clinton exists is supposedly true in virtue of the fact that there is a world, *W*, from the perspective of which it is not possible that Clinton exists. The argument can thus be resisted by maintaining, in accordance with 2, that possible worlds, if there are such things, are irrelevant to the metaphysics of modality. The proposition <possibly Clinton exists> is necessarily true so long as at the *actual world* there is no potentiality for nothing to have ever had a potentiality for it to be the case that Clinton exists (as per S5_{POT} and the

NEC-story in section 3). The hardcore actualist need not take seriously any attempt to cast doubt on HA's ability to validate S5 that appeals to possible worlds in the way that the *possible worlds argument* does.

Put another way, the *possible worlds argument* causes the problem for S5 by illicitly combining elements of the possible worlds modal metaphysics with elements of the hardcore actualist modal metaphysics. On the one hand, it considers a possible world in which Clinton doesn't exist and from the perspective of which it is not possible that Clinton exists, and it infers from the proposition that there is some world, *W*, in which it is not possible that Clinton exists, that it is possibly not-possible that Clinton exists. On the other hand, the justification for maintaining that in *W* it is not possible that Clinton exists turns on a hardcore actualist modal metaphysics; the argument says that in *W* it is not possible that Clinton exists because in *W* there is no *potentiality* for Clinton's existence. But it is illegitimate to draw conclusions about the axioms that HA can and cannot validate by considering this amalgam of a hardcore actualist and a possible worlds modal metaphysics.

Once we properly appreciate that, according to HA, all modality can be understood just in terms of potentiality and that possible worlds need not be taken seriously when doing modal metaphysics, the above recipe for invalidating the 5 axiom loses its bite. Potentiality is the basic notion in terms of which the metaphysics of modality in general is accounted for. Among the potentialities is a potentiality for Clinton's non-existence and this is what makes it true that possibly Clinton doesn't exist. But it doesn't follow that there is a possibility *in which* Clinton doesn't exist from the perspective of which we can ask about what's possible and then draw conclusions about what is possibly possible. To think otherwise is to slide from a hardcore actualist understanding of modality just in terms of potentialities back into an understanding modality in terms of possible worlds. Admittedly, this slide may be hard to resist given how engrained possible worlds are in our philosophical psyche, but such resistance is what proper appreciation of HA requires.

Strictly speaking, HA is committed only to the claim that possible worlds do no work in the *metaphysics* of modality, which is consistent with admitting the existence of possible worlds as, say, abstract entities. This may leave their use in model theories (for modal logic, for example) intact.⁶ But it is the metaphysics that we are interested in. So, the arguments of this section, according to which the problems for hardcore actualist S5 depend on (partially) understanding the metaphysics of modality in terms of possible worlds, are not affected by admitting abstract possible worlds whose *only* work is in model theory.

4.2 | A Counterfactual Argument

At this point, one may grant that understanding the metaphysics of modality partly in terms of possible worlds causes trouble for HA's ability to validate S5 but object that the problem for S5 does not *depend* upon any such understanding. It seems that the problem can be formulated quite simply (as in fact I did above) in terms of a counterfactual: if Clinton had not existed, there would have been nothing to contribute to the content of any potentiality for Clinton's existence specifically, and, hence, it would not have been possible that Clinton exists. From this it seems to follow that it is not necessarily possible that Clinton exists and hence that the 5 axiom is invalid.

Let's consider the argument in a little more detail:

- (i) Clinton exists. (Assumption).
- (ii) It is possible that Clinton doesn't (never has, never will) exist. (Assumption).

⁶My thanks to an anonymous reviewer for raising this point.

- (iii) If Clinton had not existed, there would have been no potentiality for Clinton's existence. (from Leech's argument, see sect. 3 above).
- (iv) If there were no potentiality for Clinton's existence and Clinton didn't exist,⁷ then it would not have been possible that Clinton exists. (From POSSIBILITY).
- (v) If Clinton had not existed, it would not have been possible that Clinton exists. (From (iii) and (iv)).
- (vi) it is not necessarily possible that Clinton exists. (From (ii) and (v)).

CONCLUSION since it is possible that Clinton exists because she actually exists, but it is not necessarily possible that Clinton exists, the 5 axiom has been invalidated.

Call this argument EXISTENCE. The crucial step in EXISTENCE is the inference from (v), a counterfactual about what would be the case if Clinton did not exist, to (vi), the proposition that it is not necessarily possible that Clinton exists. Premise (ii) allows for the non-vacuous truth of (v); (vi) would obviously not follow from (v) if (v) were only vacuously true. For simplicity in what follows, I'll talk just in terms of (v) implying (vi). But this should be read as short hand for (ii) and (v) – i.e., the non-vacuous truth of (v) – implying (vi).

Must we accept the crucial inference in EXISTENCE? Does it really follow from the truth of

- (v) If Clinton had not existed, it would not have been possible that Clinton exists

that

- (vi) it is not necessarily possible that Clinton exists?

My suggestion is that the hardcore actualist may reject this implication and retain S5. According to HA, the modal status of a modal proposition such as <possibly Clinton exists> depends on what grounds its truth, i.e., some potentiality. If the potentiality that grounds the truth of <possibly Clinton exists> exists contingently, then it is not necessarily possible that Clinton exists. But we are free to assume that the potentiality that grounds the truth of <possibly Clinton exists> itself exists necessarily. Indeed, we are free to assume that the same holds for *all* modal propositions, i.e., for any true modal proposition, *p*, the potentiality grounding *p*'s truth is itself *necessarily* instantiated. One way of doing this (as discussed in section 3) is by assuming that all true modal propositions, including <possibly Clinton exists>, ultimately have their truth grounded in the modally *fixed* potentialities of whatever existed at the first moment of the universe, and this serves to validate S5.

To deny the hardcore actualist this move would require an argument to the effect that the truth of (v) *does* indeed imply that it is not necessarily possible that Clinton exists. If it were maintained (in line with standard Stalnaker-Lewis semantics) that the (non-vacuous) truth of (v) entails that there is a possible world in which Clinton does not exist, then one could run the line of argument presented in the previous subsection: from the perspective of the world absent Clinton there is no potentiality for *Clinton* to exist, hence there is a world in which it is not possible that Clinton exists and hence it

⁷The second conjunct of the antecedent follows from the first given the axiom that Vetter calls ACTUALITY according to which "potentiality is implied by actuality" (2015, p. 182). Thus, Clinton's (actual) existence implies that there is a potentiality for her existence, from which it follows, by contraposition, that if there is *no* potentiality for Clinton's existence, then Clinton does not exist. The first conjunct of the antecedent of (iv) says that there is no potentiality for Clinton's existence, which, by contraposed ACTUALITY, implies that Clinton does not exist, hence the conjunctive antecedent in step (iv) of EXISTENCE and the validity of the inference from (iii) and (iv) to (v).

is not necessarily possible that Clinton exists. But, as already argued, the hardcore actualist can deny that possible worlds are relevant to the metaphysics of modality in the way necessary to make sense of this argument.

One may respond that the truth of (v) can be accounted for without possible worlds but in such a way as to guarantee the implication from (v) to (vi). Consider, for example, a potentiality-based account of counterfactuals along the following lines: a counterfactual, $A > C$, is made true by some iterated potentiality which includes A and C as stages. On this view, (v)'s truth would require an iterated potentiality for its consequent, that is, an iterated potentiality for it to not be possible that Clinton exists (see also Vetter (2015, pp. 226-27)). But in this case, by the hardcore actualist's own lights, the truth of (v) would imply that it is not necessarily possible that Clinton exists.⁸ Put another way, on this account of (v)'s truth, (v) is inconsistent with

S5_{POT}: if something has a potentiality for it to be the case that ϕ , then nothing has a potentiality for nothing to have ever had a potentiality for it to be the case that ϕ .

Because it requires a potentiality for nothing to have ever had a potentiality for it to be the case that Clinton exists. Hence, this potentiality-based account of the counterfactual requires us to give up Vetter's (tentative) proposal for a hardcore actualist validation of S5 (the *NEC-story* discussed in sect. 3).

More generally, it would seem that the hardcore actualist validation of S5 tentatively proposed by Vetter (2015, pp. 212–213), and discussed in section 3, is inconsistent with any account of the truth of (v) that admits some potentiality for (v)'s consequent, since a potentiality for (v)'s consequent would entail that something has a potentiality for nothing to have ever had a potentiality for it to be the case that Clinton exists, *contra* S5_{POT} and the *NEC-story*. What this suggests is that, if one wants to reconcile HA and S5 in the way discussed in section 3, the hardcore actualist brand of realism about modality may not be able to be extended to all counterfactuals. Just as a realistic possible worlds account of the truth of a counterfactual requires worlds in which the counterfactual's consequent obtains, perhaps, a realistic potentiality-based account of the truth of a counterfactual requires potentialities for that counterfactual's consequent to obtain. But the above considerations suggest that, if we wish to retain hardcore actualist S5, there can be no potentialities for the consequent of (v) to obtain.

The hardcore actualist proponent of S5 may thus be forced to treat troublesome counterfactuals such as (v) differently from other modal propositions. Perhaps (v) and its ilk could be given an epistemic (or anti-realist) reading, such that their "truth" needn't imply anything about what potentialities there are in the world and thus needn't conflict with the claim, required to validate S5, that if something has a potentiality for it to be the case that ϕ , then nothing has a potentiality for nothing to have ever had a potentiality for it to be the case that ϕ . Indeed, Vetter (2016) has argued that some 'would' counterfactuals are naturally read as epistemic and that epistemic modals fall outside the remit of a potentiality-based account of modality. So, an understanding of counterfactuals such as (v) as epistemic may well be a promising avenue for the proponent of hardcore actualist S5 to pursue.

5 | PROXY ACTUALISM AND ITERATED MODALITY

The problem that the 5 axiom poses for HA is a problem of accounting for certain *iterated* modal truths. McMichael (1983) famously raised iterated modalities as problem cases for traditional actualists. It is

⁸Thanks to a reviewer for raising this.

thus worth briefly considering how another version of actualism, one that has gained a lot of attention in recent years, can respond to the problem of iterated modalities and avoid the purported counterexamples to S5.

First, to understand the problem that iterated modalities pose for traditional actualism (*actualism*, from now on), consider the following:

(*iterate*): Clinton could have had a son who could have been a Republican.

We can regiment *iterate* in a standard modal language like so:

(*iterate*): $\Diamond \exists x(Sxc \& \Diamond Rx)$

McMichael argues that explaining the truth of iterated modalities, such as *iterate*, commits us to mere possibilities. There are ways of explaining the truth of $\Diamond \exists x Sxc$ in terms of actualistically acceptable possible worlds. But *iterate* forces us to “track” the same individual, x , from the possible world in which it is a son of Clinton to that in which it is a Republican in order to explain the nested possibility, $\Diamond Rx$. Hence, *iterate* appears to commit us to *possibilia*—some merely possible son of Clinton that *could* have been a Republican (see McMichael (1983) for details).

In order to render actualism consistent with the simplest quantified modal logic (SQML), Linsky and Zalta (1994, 1996) and Williamson (1998, 2013) have defended a form of actualism according to which everything exists necessarily. Following Bennett (2006), I’ll refer to this view as *proxy actualism*. While all individuals exist necessarily, according to proxy actualism, not all individuals are *concrete*—some are contingently non-concrete, which is to say that they aren’t concrete but they could have been.⁹ And conversely, most (perhaps all) of the concrete individuals are only contingently concrete, they could have been non-concrete. Thus, while you and I exist necessarily, according to proxy actualism, we are not necessarily concrete, and this is supposed to rescue some of the intuition that our existence is a contingent matter. The proxy actualist’s *contingently non-concretia* effectively play the role of the possibilist’s possibilities; the possibility of a talking donkey, for example, is explained by the existence of some actual contingently non-concrete individual which is a possible talking donkey.

Proxy actualism can provide straightforward truth conditions for iterated modalities such as $\Diamond \exists x(Sxc \& \Diamond Rx)$: there is some contingently non-concrete object, which at some world is a son of Clinton and at yet some other world is a Republican (see also Menzel (2017)).¹⁰ Some contingently non-concrete entity plays the role of the possibilist’s merely possible entity. Returning to S5, since, according to proxy actualism, Clinton, like all other individuals, exists necessarily (though she is not necessarily concrete), proxy actualism is not susceptible to the purported counterexamples to S5 that troubled HA. Recall that the trouble arose because it seemed to be the case that if Clinton didn’t exist it would not be possible for her to exist. But according to proxy actualism, Clinton exists necessarily, so it is necessarily possible that she exists.

Proxy actualism responds to McMichael-type cases by appeal to contingently non-concretia, which can be “tracked” across different possible worlds. Furthermore, proxy actualism is not susceptible to

⁹There may also be some *necessarily* non-concrete things too—e.g., numbers and universals.

¹⁰Plantinga’s *haecceitism* (1974) provides a similar response to the problem of iterated modalities, one in which, roughly speaking, individual essences—*haecceities*—do the work that possibilities do for the possibilist and contingently non-concretia do for the proxy actualist. One and the same haecceity can be *tracked* across different possible worlds in the analysis of, e.g., $\Diamond \exists x(Sxc \& \Diamond Rx)$.

the kinds of counterexamples to S5 discussed in this paper because it maintains that all individuals exist necessarily.

Definitive of hardcore actualism is its commonsensical ontology of concrete objects and their properties and the disavowal of possible worlds in its account of modality. It would thus be antithetical to HA to admit contingently non-concreta that may be tracked across possible worlds in the analysis of iterated modalities. But the hardcore actualist really has no need to admit contingently non-concreta or any other suspicious ontological categories. Most iterated modalities can be straightforwardly captured via iterated potentialities. The truth of $\Diamond\exists x(Sxc\&\Diamond Rx)$ can be explained along the following lines: Clinton has a potentiality to have a son who has a potentiality to be a Republican. Some iterated modalities concerning *existence*, such as the possibility that Clinton existed if she didn't exist, appear more troublesome and are at the root of the concern regarding HA's consistency with S5. Perhaps the hardcore actualist could take a leaf out of the proxy actualist's book here and respond with the claim that Clinton exists necessarily. But what I hope to have shown in the previous section is that this is not necessary. The purported counterexample to S5 can be resisted so long as we deny that the counterfactual *if Clinton had not existed, it would not have been possible that Clinton exists* implies that it is not necessarily possible that Clinton exists, and so long as we resist the temptation to think about modality in terms of possible worlds. It is the thoroughgoing rejection of possible worlds in the analysis of modality that really distinguishes *hardcore* actualism from other kinds of actualism.

6 | DEFENDING THE NEC-STORY

Even if HA *can* validate S5, is Vetter's tentative proposal for doing so something that one could really believe in? Recall that the proposal posits some necessary existent, or collection of existents, what I have been calling NEC, with iterated potentialities for all other potentialities—I call this the *NEC-story*. Is the NEC-story something that the hardcore actualist could really believe? In this section, I hope to add some additional plausibility to the NEC-story so that beyond claiming a mere theoretical ability to validate S5, it might be claimed that S5 is among the more plausible logics for a hardcore actualist modal metaphysics.

To evaluate the plausibility of the NEC-story, I will consider its two constituent assumptions:

- i) NEC exists necessarily and has all of its potentialities necessarily.
- ii) All potentialities are iterated potentialities of NEC.

Assumption i) requires more extensive commentary, so I shall discuss assumption ii) first.

Assuming for now, then, that i) is the case, the falsity of ii) requires that there is at least one potentiality, call it P, with manifestation, M, which is such that NEC does not have an iterated potentiality for M. This is tantamount to the claim that P pops into existence at some point in time after the first moment of the universe, completely independently of any of the potentialities of NEC. But if P's popping into existence is not an iterated potentiality of NEC, it is a mystery why P should just pop into existence.

The concern can be put more concretely and in a way that shows the denial of ii) to be in conflict with POSSIBILITY—the central thesis of HA. If a potentiality, P, pops into existence then it is possible that P pops into existence (actuality implies possibility), and according to POSSIBILITY, it is possible that ϕ if, and only if, something has a potentiality for it to be the case that ϕ . The negation of ii), implies that there is some potentiality, call it P, which pops into existence and is such that NEC doesn't have a potentiality for P's popping into existence. But if NEC doesn't have a potentiality for P's popping into existence, then what does?

P couldn't be a potentiality for *itself* to pop into existence because for P to manifest this potentiality, P would have to already exist, but if P already existed, it could not be understood as manifesting any potentiality for itself to 'pop' into existence because it would already exist and so no *popping in* would be possible. The claim here isn't that a potentiality for X must temporally precede X—perhaps a potentiality need not be possessed prior to, but only (at least) simultaneously with, its manifestation. But in this *particular* case, in which the manifestation is *popping into existence*, the instant a thing exists, it has no potentiality to pop into existence because it exists and so cannot go from not existing to existing as *popping in* requires. So as soon as P exists it cannot have a potentiality for itself to pop into existence.

Perhaps there exists some other potentiality, call it X, for P's popping into existence. But now the same question arises with respect to X; does NEC have a potentiality for X's popping into existence? If NEC has a potentiality for X's popping into existence, then NEC also has a potentiality for P's popping into existence, because X has the potentiality for P's popping into existence and potentiality is transitive, in which case, we have no counterexample to ii). If X is not an iterated potentiality of NEC then either X popped into existence completely independently of the manifestation of any potentiality, in which case POSSIBILITY is violated, or we must say that there is some further potentiality, call it Y, for X's popping into existence. But in the latter case, the same questions can be asked with respect to Y. It is plain to see, then, that unless we admit that all potentialities are iterated potentialities of NEC, i.e. unless we endorse ii), we are forced to abandon POSSIBILITY. But since the latter is tantamount to the rejection of HA all together, the hardcore actualist *must* endorse ii). Of course, this leaves open questions about the plausibility of assumption i) regarding NEC itself, to which I turn next.

Assumption i) was motivated by appeal to two auxiliary assumptions about potentiality and time, namely:

- Ai) nothing has a potentiality for the past to be different in any respect (triviality thesis)
- Aii) there was something at the very first moment of the universe.

Ai) and Aii) together yield the result that whatever was present at the first moment of the universe exists necessarily and has all of its potentialities necessarily. Now perhaps Ai) *could* be denied, we could posit backwards causation, say, and justify this by appeal to the fact that physics is yet to rule it out. But we are certainly no more justified in believing in backwards causation than in denying it, to the contrary, the latter option would seem to enjoy more intuitive support than the former because in our experience of the world, facts about the past are all fixed. It certainly seems reasonable to accept Ai), then.

What about Aii)? Perhaps we ought not believe that that there was something at the first moment of the universe, in which case we ought to deny assumption i) in the NEC-story. There are two ways of reading the previous sentence, so let's briefly address these in turn. First reading: perhaps we ought not believe that that there was *something* at the first moment of the universe. This might be motivated by a belief that *thing* is synonymous with *particle*¹¹ and hence that for there to be *something* at the first moment of the universe is for there to be some particle or particles. But if there were just quantum fields or "foam", or some other non-particulate entity, at the first moment of the universe, then there would be no *thing* at the first moment. The obvious response is that we shouldn't be so restrictive about what we mean by "thing"—let the scope of "something" be absolutely unrestricted so as to include any entities whatsoever, including fields, quantum foam or what have you, and it no longer

¹¹Ladyman and Ross (2007) seem to have this in mind when they claim that every *thing* must go, and Krauss (2012) assumes that "thing" is synonymous with "particle", which is the basis of Albert's (2012) critique of Krauss's argument for "a universe from nothing".

seems plausible to deny that there was *something* at the first moment of the universe. Second reading: perhaps we ought not think that that there was something at the *first* moment of the universe. But I think we can add plausibility to the claim that there was something at the *first* moment of the universe by noting that in the true absence of anything (where “thing” is completely unrestricted) there is no universe. Once there is something there is a universe. The universe’s coming into existence must be simultaneous with something’s coming into existence because these events are *identical*, hence, something must exist at the first moment of the universe. So, it is plausible that there was something at the *first* moment of the universe.

Another way to resist Aii) would be to claim that the universe stretches back infinitely in time, such that there is no *first* time or event. However, modern cosmology would seem to tell against this—current estimates have the age of the universe at about 13.8 billion years. Thus, one might defend Aii) against the claim that the universe stretches back infinitely in time on the grounds that such a view is at odds with our current best science. Indeed, this would be consistent with the broader naturalistic motivations for HA.

The two auxiliary assumptions Ai) and Aii) that yield i) in the NEC-story enjoy some plausibility. But one might remain unimpressed if one is simply filled with incredulity by i) itself—perhaps we should take it as a *reductio* of Ai) and Aii) that they lead to i). After all, i) says that something, i.e. NEC, exists *necessarily*. But surely it is a contingent matter whether there exists anything at all, surely there could have been nothing.

I have two things to say in response to this. Firstly, HA would not be the first modal metaphysics to make it necessary that there is something rather than nothing. Lewis’s modal realism has this result too. For Lewis, possibility is a matter of truth at some concrete, spatiotemporally isolated, possible world. But there is no possible world at which there is nothing, so it is not possible that there is nothing and it is necessary that there is something, on Lewis’s view (see Lewis (1986, pp. 73-74)). As Lewis notes, Armstrong’s combinatorial view, according to which elements of the world recombine to make different possibilities (Armstrong, 1989), *also* makes it necessary that there is something because “there is no way to combine elements to make nothing at all” (Lewis, 1986, n. 53). The implication that it is necessary that there is something is thus not peculiar to the present view.

Secondly, and more radically, I think it may well be a *benefit* of an account of the metaphysics of modality if it makes it necessary that there is something because this addresses the perennial question: *why is there something and not nothing?*

Lewis is keen to emphasize that he does not think that his own view *explains* why there is something and not nothing in virtue of making the latter necessary. This is because, for Lewis, “explanation [...] is an account of etiology: it tells us something about how an event was caused [...] Or it explains an existential fact by telling us something about how several events jointly make that fact true, and then perhaps something about how those truthmaker events were caused”, none of which he takes his modal realism to achieve (Lewis, 1986, pp. 73-74).

If one’s modal metaphysics makes it metaphysically necessary that there is something and not nothing, then perhaps this does not constitute a *causal* explanation of there being something. However, it would be misguided to expect a causal explanation of why there is something rather than nothing in the first place. Most philosophers would agree that causation is a diachronic relation between entities (events or facts, perhaps—what, exactly, these entities are doesn’t matter for the present point); causes are entities that precede their effects. For this reason, there could be no explanation of why there is something and not nothing along the lines of “A caused there to be something” because the cause of the “something” namely A, is itself something, existing at a time, and so the question as to why there is something and not nothing remains with respect to A. One cannot explain why there is something and not nothing in terms of something else because then the question remains as to why there is that

something else and not nothing. Since causal explanations explain one thing in terms of another, the notion of a causal explanation of why there is something and not nothing is incoherent and so not something that we should seek. If all explanation *must* be causal, as Lewis seems to think, then the implication is that we give up the search for an explanation of why there is something rather than nothing. Some may find this line of thought somewhat therapeutic in a similar way to that in which one might find it therapeutic to notice the incoherence of the question “what is the meaning of life?”.

If, however, we appreciate the incoherence in the notion of a causal explanation of why there is something and not nothing and yet we do not instantly find ourselves purged of all curiosity regarding this fact, then an independently plausible modal metaphysics that makes this fact necessary may provide some solace. If HA makes it necessary that there is something, then perhaps this constitutes a *non-causal* explanation of that fact, similar to, for example, the explanation of the existence of the set whose sole member is Socrates in terms of the man, Socrates. Or perhaps by making it necessary that there is something, a metaphysics of modality can be understood as dissolving the mystery of why there is something and not nothing, if not solving it. Perhaps we shouldn’t seek answers as to why necessary facts obtain—after all, we don’t typically lose sleep over why it is that two plus two equals four and not five. Once we learn that some fact is necessary, perhaps that should constitute all the “explanation” of that fact that we could hope for.

Unfortunately, it would be well beyond the scope of this article to properly address the issues surrounding explanation that would be required for a full defence of the claim that it is a *benefit* of HA if it implies that necessarily there is something, though I hope the above does something to point the way in which one might go about constructing such a case. My primary aim, however, was to make the NEC-story seem plausible so that beyond merely being able to claim a theoretical *ability* to validate S5, the validity of S5 is something that the hardcore actualist can actually believe in. I hope to have achieved this by demonstrating the independent plausibility of the assumptions constitutive of the NEC-story as well as the general coherence of the NEC-story with HA.

7 | CONCLUSION

Different considerations pull in different directions on the question of HA’s ability to validate S5. I have argued that by properly appreciating of the nature of possibility, according to HA, we can resolve this tension in favour of HA’s ability to validate S5. But while it is theoretically possible for HA to validate S5, one may be concerned that the metaphysical assumptions required to do so are not believable. In response to this, I have argued that these assumptions are no mere ad hoc appendages, rather they enjoy a fair amount of independent plausibility and coherence with the hardcore actualist modal metaphysics.

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