Philosophical Studies
https://doi.org/10.1007/s11098-023-01958-y

Branching actualism and cosmological arguments

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Accepted: 7 April 2023

Abstract
We draw out significant consequences of a relatively popular theory of metaphysical modality—branching actualism—for cosmological arguments for God's existence. According to branching actualism, every possible world shares an initial history with the actual world and diverges only because causal powers (or dispositions, or some such) are differentially exercised. We argue that branching actualism undergirds successful responses to two recent cosmological arguments: the Grim Reaper Kalam argument and a modal argument from contingency. We also argue that branching actualism affords a response to one popular defense of the classic contingency argument. What results are new difficulties for several cosmological arguments arising from the metaphysics of modality.

Keywords Branching actualism · Modality · Cosmological arguments · Kalam · Contingency arguments

1 Introduction

Cosmological arguments are all the rage in certain philosophical circles. These arguments take some broad feature of reality—contingency, change, the universe's beginning, or what have you—and conclude to some ultimate explanation or cause of said feature. Surprisingly, however, little work has been done exploring how theories of metaphysical modality bear on the plausibility and dialectical efficacy of such arguments. Our goal in this article is to redress this neglect.

More specifically, we'll explore how *branching actualism* bears on three such arguments: the Grim Reaper Kalam argument, the classic contingency argument, and a recent modal argument from beginnings. We'll argue that branching actualism

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Published online: 04 May 2023

affords new responses to these arguments. The broader significance of this result is that one's modal metaphysics influences the success of Kalam and contingency-style arguments.

We begin with some important background on metaphysical modality in Sect. 2. We then articulate branching actualism, together with some dialectical points, in Sect. 3. Then, in Sect. 4, we argue that branching actualism affords a response to a crucial premise in the Grim Reaper Kalam argument. In Sect. 5, we argue that branching actualism undermines a typical response to a popular Humean objection to the classic contingency argument. Finally, in Sect. 6, we develop a new, branching-actualism-based problem for a recent modal argument from beginnings for the existence of a necessary being. We conclude in Sect. 7.

2 Metaphysical modality

Metaphysical modality is tricky to pin down. In the opening line of *The Nature of Necessity*, Plantinga laments that the concept "is as easy to recognize as it is difficult to explain to the sceptic's satisfaction" (1974, p. 1). He says that while we can give pseudo-definitions, such as that a proposition is necessary if it is true in all possible worlds, or if its denial is impossible, etc., these are unenlightening as they already presuppose modal notions. Instead of providing any substantial definition of metaphysical modality, Plantinga says that "we must give examples and hope for the best" (ibid). And by way of examples, he provides the following:

> No one is taller than himself
> Red is a colour
> If a thing is red, then it is coloured
> No prime minister is a prime number.

Quinn suggests that these examples "serve both to circumscribe the realm of metaphysical necessity and to provide data which any correct metaphysical theory of necessity must at least be consistent with" (Quinn, 1982, p. 448). Nevertheless, the examples themselves have no obvious guiding thread to connect them together, nothing to enable us to say about a new case whether it counts as a metaphysical possibility or not. In short, there is no *theory* of metaphysical modality here as such.

And this is strange. Not all types of modality are like this. One does not need to merely 'give examples and hope for the best' when it comes to, for instance, logical possibility, epistemic possibility, or physical possibility. To make the point clear, consider (classical) logical modality. All that really matters here is self-consistency; any (maximal and) consistent set of propositions constitutes a 'possible world' (i.e., a logical possibility), on the standard Kripkean semantics. This means that we have a *characterising property* for logical modality; a set of propositions is logically possible iff it is self-consistent. And this means we do not need to start with examples and 'hope for the best'; we effectively have a *test* we can apply to see if a given set of propositions is logically possible or not.

Other varieties of modality also have relatively straightforward characterising properties. Epistemic possibility is just consistency with what I know; physical

possibility is consistency with the laws of physics; and so on. In each case we have a characterising property for being possible according to these varieties of modality. And according to Plantinga, there is no such characterising property when it comes to what is metaphysically possible.

Elusive though this notion of metaphysical modality is, it plays a prominent role in many central arguments for God typically discussed in philosophy of religion, such as the modal ontological argument (Plantinga, 1974, p. 214) and the Kalam cosmological argument (Craig & Sinclair, 2009, pp. 105–106).

However, there *are* theoretical approaches one can take to metaphysical modality, and doing so has consequences for these sorts of arguments. In particular, a relatively plausible realist view about metaphysical modality has many significant consequences for these arguments. This is what we shall explain in what follows.

We will present an account of metaphysical modality that is both relatively plausible and endorsed by a number of philosophers. However, we are not going to argue that it is correct; rather, we will draw out some significant (but hitherto neglected) consequences on the hypothetical assumption that it is true. Nor will we present the account in any real detail. It is really a *family* of views that we are interested in here, not one family member in particular.

3 Branching actualism and the dialectic

3.1 Branching actualism

The modal theory of interest here is *realist* about modal properties. Part of what this means is that at some level modal notions will not be entirely cashed out in non-modal terms. However, there is some reduction at play with most realist theories; normally, they pick one type of modal notion and reduce other modal notions thereto. Examples include understanding other modal notions in terms of subjunctive conditionals (Williamson, 2007), chances (Oppy, 2013), essences (Fine, 1994), etc. But all such realist views have *some* irreducible modal notions.

We think of these realist views as broadly *Aristotelian* accounts of metaphysical modality, given their resemblance to Aristotle's views (who talks of modal notions in terms of potentialities, or times). Such accounts, in one form or another, have garnered a significant amount of support among philosophers. Whether we think in terms of potentialities, counterfactuals, essences, powers, dispositions or capacities, the idea is that there is something about the world itself which is modal in character. The guiding idea, put most simply, is the following: *metaphysical modality is about what actually existing things have the potentiality* (*capacity, power, ability, disposition,* etc.) *to do.*

In a canonical expression of this broadly Aristotelian kind of view, Fine makes the following comments in *Essence and Modality:*

> [E]ach class of objects, be they concepts or individuals or entities of some other kind, will give rise to its own domain of necessary truths, the truths which flow from the nature of the objects in question. (Fine, 1994, p. 9)

Fine wants to ground claims about what is metaphysically possible in the natures of objects. If we think of modality in this way, where modality is tied to actually existing things and what they can do, then we can think of what is possible (i.e., the range of possibilities) as *possible continuations of how things actually are*. For example, if I have two dice in my hand, then there is a possibility of me rolling two sixes because this is a continuation of the actual state of the world. It doesn't require the dice doing anything that they lack the capacity to do. Rolling two sevens, or three sixes, is not metaphysically possible, because it would require the dice doing something they lack the capacity to do (show a seven, or show more than two numbers, etc.).

Here is how Alexander Pruss puts the Aristotelian-style view:

> Even if I never grow a beard, it is true to say it is possible for me to grow a beard because there is in me and in the environment around me something in virtue of which the growing of a beard is possible, say, a power (of course further scientifically analyzable) in the hair-follicles on my chin to produce hairs together with the capability for refraining from shaving. The ground, on an Aristotelian account, of the proposition that it is possible for me to have a beard is to be found in such powers or capabilities. (Pruss, 2011, p. 30)

If something like this is right, then we have a very interesting consequence that will hereafter take centre stage in our paper. The consequence is that all metaphysically possible worlds branch away from the actual world at some point in time.

Finally, here's how Graham Oppy spells out this sort of view:

> Possible worlds are alternative ways that the actual world could have gone, or could go, or could one day go; possible worlds all 'share' an initial history with the actual world and 'branch' from the actual world only as a result of the outworkings of objective chance. … If there was an initial state of the actual world, then all possible worlds 'share' that initial state; if there was no initial state of the actual world, then all possible worlds 'share' some 'infinite' initial segment with the actual world, and hence any two possible worlds 'share' some 'infinite' initial segment with one another. (Oppy, 2013, p. 47)

Let's call this the 'branching actualist' theory of metaphysical modality. According to branching actualism, every metaphysically possible world shares some initial segment with the actual world and diverges only because of differential exercises of indeterministic causal powers, propensities, dispositions, or the like. Equivalently, a world that shares no initial segment with the actual world—a world that fails to 'branch away' from the actual world at some point in time—is not metaphysically possible. For our purposes, this is the key feature of branching actualism.[1]

[1] Several distinctions could be made within branching actualism. For instance, is there is dynamic 'pruning' of branches (cf. McCall, 1996) or not (cf. Belnap et al., 2001)? Do worlds *literally* share transworld-identical initial segments, or are their 'shared' initial segments merely exact duplicates (cf. Lewis, 1986,

Two final terminological notes. First, an 'initial segment' of a world is the world's global history up until a given time. (For non-actual worlds, this time will typically (though not always) be the time at which the world branches away from the actual world.) We'll also treat 'an initial segment' and 'a history' interchangeably. So 'a history' is always a world's global history *up until a given time*. Second, our use of 'shares' is stipulated to be *neutral* between literal sharing of transworld-identical segments and mere exact duplication of segments.

Having covered branching actualism, some important dialectical points need covering.

3.2 Dialectical points

Our main purpose in this article is to bring out a significant, heretofore unnoticed assumption of popular cosmological arguments for God's existence—namely, the falsity of branching actualism. Bringing this assumption to light is significant for at least three reasons. First, highlighting an unnoticed, implicit assumption of arguments is philosophically significant in its own right, especially if that assumption is controversial while its denial is philosophically defensible. Second, doing so can provide a new *undercutting defeater* for the arguments in question. Whereas a *rebutting defeater* (as we use it) shows that a premise or assumption in an argument is *false*, an *undercutting defeater* (as we use it) shows that a premise or assumption in an argument is *unjustified*.[2] As we will argue, several cosmological arguments *assume* without justification the falsity of branching actualism, and hence they succumb to an undercutting defeater—they fail to adequately support their conclusions. Third, establishing reliance on said assumption shows that the arguments are dialectically toothless against opponents who accept branching actualism.

In light of the preceding, note that we are not *arguing for* branching actualism in this article. Nor, further, are we arguing that the cosmological arguments in question rely on a *false* assumption. Nor do we claim that branching actualism is true, or without its own problems, or what have you. Our aim is simply to explore how one's metaphysics of modality affects the success of cosmological arguments and to underscore that such arguments rest on an unjustified assumption that can reasonably be rejected.

With both branching actualism and the above dialectical points covered, let's turn to the Grim Reaper Kalam argument.

Footnote 1 (continued)

Section 4.2)? Interesting though these are for how branching actualism is cashed out, we take no stance on them here, as they are not directly relevant to our project. All that matters for our project is that, under branching actualism, every possible world shares a (perhaps infinitely long) initial segment with the actual world and diverges only because of differential exercises of indeterministic powers, dispositions, or the like.

[2] Or, at the very least, an undercutting defeater (as we use it) shows that *relative to what the proponent of the argument has said on its behalf*, the premise or assumption is unjustified.

4 The Grim Reaper Kalam

Several authors have recently employed the Grim Reaper paradox to argue for the finitude of the past. The paradox dates back at least to Benardete (1964), although he did not draw the same conclusions as the contemporary authors. Among such authors are Koons (2014, 2020), Pruss (2018), and Luna and Erasmus (2020), *inter alia*. The finitude of the past, in turn, is taken to support the second premise in the Kalam cosmological argument (Craig & Sinclair, 2009), which runs:

1. Whatever begins to exist has a cause.
2. The universe began to exist.
3. So, the universe has a cause.

Here's one way to set up this sort of Grim Reaper paradox. Suppose that the past is infinite, and that at regular intervals (one per year, say) there is a Reaper, each of which is assigned a unique natural number. Each Reaper receives a note in their allotted year from their immediate predecessor. If there is something written on the note, they simply pass it along to their immediate successor at the end of their year; if the note is blank, then they write their number on it, and pass it along instead.

Such a set-up is paradoxical for the following reason. Suppose Reaper n receives a blank note. This means no previous Reaper wrote their number on it. But Reaper $n-1$ (our original Reaper's immediate predecessor) must have also received a blank note, in which case they would have written their number on it. Thus, the note cannot be blank. Yet, the note cannot have $n-1$'s number on it, as that would require $n-2$ to have received a blank note and not written on it. And this reasoning goes for any number. Thus, the note cannot be blank, but it also cannot have any number on it. The set-up is inconsistent.

Koons writes:

> When a story like this yields a contradiction, we can use this contradiction as a way to falsify at least one of the presuppositions that led us initially to the necessarily false conclusion that the story was possible. I will argue that the presupposition of the story that we should reject is the assumption that it is possible for an event to have an infinite causal history. (Koons, 2020, p. 5)

Thus, according to Koons, the problem originates with the assumption that an infinite causal history is possible. Likewise—and more directly relevant to the second premise of the Kalam—Koons (2014) argues that the possibility of an infinite past (with infinitely many parts) similarly engenders a Grim Reaper paradox. Koons' case for these claims employs a version of the 'patchwork principle' (sometimes called the 'recombination' or 'rearrangement' principle), and this is what we'll call into question from a branching actualist point of view. Here's the most rigorous and precisely stated version of the patchwork principle at play in Koons' case:

> **Infinitary Patchwork (PInf)**. If S is a countable series of possible worlds, and T a countable series of regions within those worlds such that T_i is part of W_i (for each i), and f is a metric and topology structure-preserving function from

> T into the set of spatiotemporal regions of world W such that no two values of f overlap, then there is a possible world W' and an isomorphism f' from the spatiotemporal regions of W to the spatiotemporal regions of W' such that the part of each world W_i within the region R_i exactly resembles the part of W' within region f'(f(R_i)). (Koons, 2014, p. 258)[3]

According to PInf, if we have any finite or denumerably infinite number of individually possible spacetime regions (our 'sample patches'), and if there's an isomorphism between an arrangement of those regions (without overlap) and the spacetime regions of some possible world (our 'framework world') that preserves metrical and topological features, then there's a possible world (our 'quilted world') whose spacetime regions exactly resemble that arrangement of sample patches. More simply, so long as there's a possible world with enough spatiotemporal 'room' to accommodate (without overlap) an arbitrary arrangement of individually possible spacetime regions (including their contents), then there's a possible world containing exact intrinsic duplicates of those regions in precisely that arrangement.

Here, then, is how Koons' argument for temporal finitism works. Assume that an infinite past is possible. Then, there's a possible world (our framework world) containing an infinite number of disjoint regions stretching infinitely far into the past, with each region large enough to contain a single Reaper enjoying the intrinsic power and disposition to receive a note, write its number on the note iff the note is blank, and pass the note to another Reaper. Since *individual* spacetime regions containing Reapers of this sort are possible, we can use PInf to cut and paste infinitely many intrinsic duplicates of these regions into the possible framework of an infinite past. Per PInf, the world that *results* from this recombination is possible. But since the resultant world is inconsistent—it instantiates the Grim Reaper paradox, after all—it follows that the resultant world is *not* possible.[4] Hence, our original assumption is false. An infinite past is *not* possible after all.

The trouble, though, is that PInf is false on branching actualism. Under branching actualism, every possible world shares an initial history with the actual world (whether that history is finite or infinite). The temporal-modal structure that characterises metaphysical modality is thus a *branching tree* of possibilities, with bifurcation in the later-than direction. Consequently, for each possible world *w*, some initial segment of *w* is also an initial segment of the actual world. But if PInf is true, *not* every possible world shares an initial history with the actual world. So, if branching actualism is true, PInf is false. Here's the argument:

1. If branching actualism is true, then every possible world shares a history with the actual world.

[3] The principle in Koons (2020) expresses the same basic idea: so long as there's a possible framework world with enough spatiotemporal 'room' to fit infinitely many intrinsically-described situations in a certain (non-overlapping) arrangement, then there's a possible world which contains precisely that arrangement of situations.

[4] We set aside the problem that the paradox also requires *interaction* among the disjoint regions and Reapers, the possibility of which is *not* secured by PInf. One of us is developing this problem (and others) for Koons' argument in other work.

2. If PInf is true, then *not* every possible world shares a history with the actual world.
3. So, if branching actualism is true, then PInf is false.

Premise (1) follows from our characterisation of branching actualism in Sect. 3. Premise (2) is true because PInf allows us to recombine individually possible spacetime regions (and their contents) in whichever way we please, provided that the regions don't overlap and provided that there's a possible spatiotemporal framework with enough 'room' to accommodate that arrangement of regions. Let's then take the *actual world* as our possible framework world (i.e., the world into whose spatiotemporal structure we'll be patching an arrangement of individually possible regions). Let's next fully populate some initial segment of the spatiotemporal framework with individually possible regions whose contents do *not* duplicate the contents of the regions contained in the corresponding initial segment of the *actual world*.[5] Given PInf, the resulting, patched-together world *w* is a *possible world*. And yet *w* does *not* share a history with the actual world—there's no initial segment of *w* which is also an initial segment of the actual world, since we were careful to patch into *w* initial regions whose contents *do not duplicate* the contents of the actual world's initial regions. Thus, if PInf is true, then *not* every possible world shares a history with the actual world, and premise (2) is secured.[6]

The upshot is that if branching actualism is true, then PInf is false—in which case, the branching actualist has a principled response to the Grim Reaper Kalam. Note, too, that the branching actualist's denial of PInf is not at all ad hoc. It is simply a consequence of their favoured theory of modality, which (to the branching actualist, at least) is an otherwise plausible theory of metaphysical modality. If that metaphysical modality is understood in branching actualist terms, then the argument is unsound, as one of its premises (the patchwork principle) comes out false.[7]

One might try avoiding our branching-actualism-based criticism by positing a *non-spatial* initial segment of the actual world's history. If such a segment exists, then every possible world may share a (non-spatial) history with the actual world *even though*—per PInf—*not* every possible world shares a *spatiotemporal* history

[5] Note that we can do this whether the actual world's history is finite *or* infinite. If it's infinite, the 'initial segment' will simply be an infinitely long segment of the world such that no region is earlier than that segment. Note also that we speak here in terms of a region's contents *duplicating* another region's contents (rather than literally sharing transworld-identical contents), but this is inessential; we're simply following Koons' lead. Also, recall that our use of 'shared' is neutral between transworld identity and mere exact duplication.

[6] Oppy (2020) makes a similar point about the patchwork principle in Koons (2020), though our discussion extends beyond Oppy's. Notice, also, that the tension with branching actualism is not specific to Koons' articulation of the patchwork principle. Lewis, for instance, says that anything can co-exist with anything else, space and time permitting. This, too, allows us to recombine individually possible regions in such a way that the history of the resulting patched-together world does not overlap the actual world's history. If Lewis' patchwork principle is true, then that resulting world is possible; but that resulting world is *not* possible under branching actualism, since its history does not overlap the actual world's history.

[7] There are, of course, *supertask* versions of Grim Reaper paradoxes. But our goal in this article is to assess how branching actualism bears on cosmological arguments, and the paradoxical variants most relevant to cosmological arguments—and, in particular, the *Kalam* argument—are ones involving an infinite past.

with the actual world.[8] As a result, one can maintain *both* branching actualism *and* PInf, *pace* our criticism. And this posit needn't be an unjustified or ad hoc dialectical maneuver; one can even argue *from* branching actualism and PInf *to* the existence of such a non-spatial initial segment.

We grant that one could argue from branching actualism and PInf to the existence of such a non-spatial initial segment. This alone is dialectical progress: we've here uncovered a fascinating new connection between modal metaphysics, patchwork principles, and the temporal structure of reality. In addition to uncovering this connection, though, we have two rejoinders to the objection.

First, one could *equally* argue from branching actualism and the *non-existence* of such a non-spatial initial segment to the *falsity* of PInf. In fact, one need only argue from branching actualism and the *possible* non-existence of such a non-spatial initial segment, for its possible non-existence *entails* its actual non-existence under branching actualism.[9] Thus, without some reason to privilege PInf over the possible non-existence of such a non-spatial initial segment, the branching actualist has no reason to accept the Grim Reaper Kalam. And as far as we're aware, proponents of the Grim Reaper Kalam have provided no such reason. Thus, by the branching actualist's lights, the Grim Reaper Kalam relies on an as-yet-unjustified assumption.[10]

Second, let a *merely temporal* region be a temporal *but non-spatial* region of a world. It seems to us that if one accepts PInf (which permits the free recombination of *spatiotemporal* regions within any possible framework world containing enough *spatiotemporal* 'room' to fit the relevant regions), one should *also* accept a relevantly similar patchwork principle—call it *PInf**—that permits the free recombination of spatiotemporal *and merely temporal* regions within any possible framework world containing enough spatiotemporal *and merely temporal* 'room' to fit the relevant regions. After all, any reason favouring PInf seems equally to favour PInf* (*mutatis mutandis*).[11] If all the foregoing is right, then branching actualism *does*,

[8] By contrast, if there is *no* such non-spatial initial segment, every possible world (under branching actualism) must share a *spatiotemporal* initial segment with the actual world, and consequently PInf is false.

[9] If such an initial segment were possible but non-actual, then there would be a possible world whose history is not shared with the actual world—namely, the world that contains the non-spatial initial segment! And *that*, of course, violates branching actualism.

[10] Note that there are two ways for there to be no non-spatial initial segment of the actual world: (a) the spatiotemporal history of the world is infinite (and so presumably not preceded by some further period of non-spatial time), and (b) the spatiotemporal history of the world is finite and not preceded by non-spatial time. Thus, to justify PInf over <possibly, there is no non-spatial initial segment>, one must justify PInf over *each* of ◇(a) and ◇(b). (It's not enough, then, to offer support for PInf. One must show, firstly, that this support doesn't *equally* support ◇(a) or ◇(b) (or both); and secondly, one must address whatever uniquely supports ◇(a) or ◇(b) (or both).).

[11] A central motivation behind patchwork principles (like PInf) is *Hume's Dictum*, according to which there are no necessary connections among wholly distinct, intrinsically typed entities (Wilson, 2010). If Hume's Dictum is true, then any entity can co-exist or fail to co-exist with any other entity, provided that the entities are wholly distinct and intrinsically typed. This motivation, however, applies to both spatiotemporal *and* merely temporal entities and hence would equally support PInf*. Koons' (2014, p. 257) cited motivation for PInf is that it's needed for much of our modal knowledge. The idea is that—since we have little direct access to alternative possibilities—much of our modal knowledge relies on knowledge of the actual world together with the license to recombine regions thereof. But both PInf and PInf*

indeed, conflict with PInf. For if one accepts PInf, one should also accept PInf*. But PInf* allows one to recombine the contents of *any* initial segment of the actual world, whether spatiotemporal *or* merely temporal. And *that*, of course, conflicts with branching actualism.

Before moving on to the classic contingency argument, some final notes are in order. First, one might object that our response to Koons overlooks other, simpler responses to Koons' argument. For example, one might argue that there are solutions to the Grim Reaper paradox (e.g., the unsatisfiable pair diagnosis of Shackel (2005) or the convergence approach of Laraudogoitia (2023)) that are superior to temporal finitism. In reply, notice that the existence of *other* responses to Koons' argument is entirely compatible with our claim that Koons' argument suffers *elsewhere*—namely, in its assumption that branching actualism is false. Our point isn't that this is the *only* place where the argument suffers; instead, our point is simply that it is *one* place where the argument suffers. More precisely, our point is threefold. First, Koons does not justify the argument's assumption that branching actualism is false, and yet such justification is *needed* for the argument to succeed. Second, Koons' argument fails for those sympathetic to branching actualism. And third, it's significant in its own right that we've uncovered a controversial assumption of Koons' argument.

Second, note that we aren't claiming Koons' argument fails because it rests on a *false* assumption. That would require establishing branching actualism's truth. Instead, we simply claim that Koons' argument fails because a crucial step therein is *unjustified.* As defined in Sect. 3.2, we're offering an *undercutting* defeater.

Having covered branching actualism's resources for resisting the Grim Reaper Kalam argument, let's turn next to the classic argument from contingency.

5 The classic contingency argument

Instead of offering branching actualism as a response to the classic contingency argument *as such*, we'll trace out a popular dialectic ensuing from the argument and show how branching actualism offers a new move in said dialectic. This dialectic involves a popular Humean response to the argument, a popular Clarkian rejoinder on the argument's behalf, and our new branching actualist criticism of this Clarkian rejoinder. Our task, then, is to show how branching actualism undermines a typical *defense* of the argument from a popular Humean objection.

The classic argument from contingency, such as we see in Leibniz, runs something like this (Pruss, 2009, p. 26):

1. Every contingent fact has an explanation.
2. There is a contingent fact that includes all other contingent facts.

Footnote 11 (continued)
license the relevant recombinations, and each appears to explain our modal knowledge just as well as the other.

3. Therefore, there is an explanation of this fact.
4. This explanation must involve a necessary being.
5. This necessary being is God.

One line of support for (4) is that an entirely contingent chain of explanations either terminates with a contingently existing thing, or involves a circle, or goes on forever. The first is a blatant violation of the principle of sufficient reason, and the second seems clearly problematic. But with infinite chains of explanation, the problem is a little harder to state. And that's because, on the face of it, the principle of sufficient reason (PSR) isn't violated here. After all, each contingently existing thing does have an explanation (in terms of other contingently existing things). And because the chain of explanations never terminates, there are always enough explanations for each contingently existing thing. No contingent thing goes unexplained.

The usual reply is that while each *individual* contingent thing has an explanation, it is the *totality* that stands unexplained. Here's how Leibniz puts the point in *On the Ultimate Origination of the Universe:*

> Let us suppose a book . . . to have existed eternally, one edition having always been copied from the preceding: it is evident then that, although you can account for the present copy by reference to a past copy which it reproduces, yet, however far back you go . . . you can never arrive at a complete [explanation], since you always will have to ask why at all time these books have existed, that is, why there have been any books at all and why this book in particular. (Leibniz, 1965, p. 84)

Leibniz's point is that explaining each book is not enough, for we still need to explain "why there have been any books at all". But this thought has not gone unchallenged. In Hume's *Dialogues*, Cleanthes pushes back against this as follows:

> Did I show you the particular causes of each individual in a collection of twenty particles of matter, I should think it very unreasonable should you afterwards ask me what was the cause of the whole twenty. This is sufficiently explained in explaining the cause of the parts. (Hume, 1991, Part IX, p. 150)

Cleanthes' point is that not every totality of contingent things needs to have an explanation distinct from the individual explanations of each contingent thing; often, explaining each individual contingent thing will suffice. However, the defender of the contingency argument has a typical reply here. One expression of this reply comes from Samuel Clarke:

> According to [the supposition that there has been an infinite succession of changeable and dependent beings, produced one from another in an endless progression, without any original cause at all], there is nothing, in the universe, self-existent or necessarily-existing. And if so; then it was originally *equally possible*, that from eternity there should never have existed any thing at all; as that there should from eternity have existed a succession of changeable and dependent beings. Which being supposed; then What is it that has from eternity

> determined such a succession of beings to exist, rather than that from eternity there should never have existed any thing at all? (Clarke, *A Discourse Concerning the Being and Attributes of God*, quoted in Sobel, 2004, p. 206)

We can put the Clarkian thought like this. Perhaps each individual contingently existing thing has an explanation, but there is no explanation for why this entire beginningless sequence exists at all, rather than some other sequence instead (or no sequence at all). And thus the PSR is still violated on this view, just as much as for a finite sequence that terminates with a contingent thing. But now the reliance on the possibility of the entire temporal sequence being different is stark, and it is precisely this that one cannot appeal to on a branching actualist view. The PSR-based demand for an explanation only applies where some alternative possibility exists—at least if we're focusing on a PSR quantifying over *contingent* facts. (And this is, indeed, what we're focusing on here—cf. premise (1).) But if every possible world overlaps with the actual world at some point in time, there is no globally different alternative scenario; at least, none that are metaphysically possible. And hence Clarke is violating branching actualism to formulate his reply here.

To put it simply, a popular response to the possibility that there is an infinite sequence of contingent explanations is that the entire sequence itself doesn't have an explanation. But on branching actualism, it's false that the entire sequence could have been different. That would be a world that doesn't overlap with the actual world at any point at all. Thus, it is not a contingent fact that the entire sequence exists. Its existence is therefore not within the PSR's quantificational scope. Thus, solely by means of the PSR, we cannot infer that its existence has an explanation. By assuming that the entire sequence of contingent explanations *does* contingently exist, the Clarkian reply effectively begs the question against branching actualism.

6 The modal argument from beginnings

We've argued that the branching actualist need not fear the Grim Reaper Kalam, and we've also argued that branching actualism supplies a new response to a popular way of defending the classic contingency argument. But the significance of branching actualism extends further still. In particular, branching actualism *also* affords a new response to a recent but almost entirely undiscussed argument from contingency for a necessary being.[12] This argument is Pruss and Rasmussen's (2018, ch. 4) *Modal Argument from Beginnings (MAB)*.

The MAB is a *modal* cosmological argument from contingency. Such arguments require only the *possibility* of a cause (or explanation) of contingent things. They are thus taken to be more *modest* than generic, non-modal contingency arguments. Their purported modesty, however, is no threat to the branching actualist. For—as

[12] We know of no critical appraisals of the argument we'll consider in this section. Our article thus fills an important gap in contemporary literature on arguments from contingency for a necessary being.

we will argue—branching actualism undergirds a new symmetry problem for the MAB.

As Pruss and Rasmussen (2018, pp. 69–70) articulate it, the MAB runs:

1. For any positive state of affairs *s* that can *begin to obtain*, it is possible for there to be something external to *s* that causes *s* to obtain.[13]
2. It is possible for there to be a beginning of the positive state of affairs of its being the case that there exist contingent concrete things.[14]
3. If (1) and (2) are true, then it is possible that there is a necessary concrete thing.
4. Therefore, it is possible that there is a necessary concrete thing.
5. It is possible that there is a necessary concrete thing, then there is a necessary concrete thing.
6. Therefore, there is a necessary concrete thing.

Pruss and Rasmussen motivate each premise in turn. Since our sole concern in what follows is premise (2), we focus exclusively on their motivations thereof. For reasons that will become apparent, we will tackle such motivations only after sketching our symmetry problem.

Let's call the positive state of affairs of its being the case that there exist contingent concrete things '*Contingent*', and let's say that a state of affairs *s* obtains *past-infinitely* iff (i) there is a time at which *s* obtains, and (ii) there is no time or finite interval of time *U*, such that there is no time prior to *U* at which *s* obtains.[15] Premise (2) then says that possibly, *Contingent* begins to obtain. But a state of affairs beginning to obtain is incompatible with that state of affairs obtaining past-infinitely, since (ii) in the definition of 'obtains past-infinitely' is the negation of (ii) in the

[13] A *positive* state of affairs is one that "specifies how things *are*, not how things *aren't*" (Pruss and Rasmussen, 2018, p. 70). A state of affairs *s begins to obtain* just in case "(i) there is a time at which *s* obtains, (ii) there is a time or finite interval of time *U*, such that there is no time prior to *U* at which *s* obtains, and (iii) *s* would not obtain without time" (*ibid*, p. 71). A *cause* is "anything that acts as an antecedent condition (or entity) responsible for some event", and an *external* cause is one "that isn't *included* in its effect" (*ibid*). Finally, the modal notions at play are *metaphysical* in nature.

[14] Something is concrete just in case "possibly, it causes something" (*ibid*, p. 70).

[15] Equivalent to (ii): for any time or finite interval of time *U*, there is a time prior to *U* at which *s* obtains. We use the double negative in the main text because it highlights the symmetry between the second conditions in the definitions of 'begins to obtain' and 'obtains past-infinitely'. We also use 'past-infinitely' instead of (e.g.) 'eternally' because 'eternal' suggests never having gone out of existence and then coming back into existence, whereas *s* obtaining past-infinitely (as we define 'obtains past-infinitely') allows *s* to undergo bouts of 'gappy existence' throughout the infinite past. Finally, in case the entailment from <*s* obtains past-infinitely> to <the past is infinite> isn't immediately evident, here's a quick derivation: if *s* obtains past-infinitely in world *w*, then (given (ii) in the definition of 'obtains past-infinitely') for any time or finite interval of time *U* in *w*, there is an earlier time in *w* at which *s* obtains. But if the duration of *w*'s past is only finite, then there is some *U* in *w* such that there is *no* time prior to *U* in *w* at which *s* obtains. (Consider, e.g., some finite interval of time in *w* whose earlier-than boundary is *time*'s earlier-than boundary in *w*.) Hence, if *s* obtains past-infinitely in *w* (for any arbitrary *w*), then the duration of *w*'s past is infinite. (A terminological note: going forward, '*U*' will stand for a time or finite interval of time.)

definition of 'begins to obtain'. Hence, premise (2) entails that possibly, *Contingent* does not obtain past-infinitely.

But given branching actualism, <possibly, *Contingent* does not obtain past-infinitely> is *incompatible* with.

(2*) Possibly, *Contingent* obtains past-infinitely.

Suppose (2*) is true. That is, suppose there's some possible world in which *Contingent* obtains past-infinitely. Then there's some possible world *w* such that for each *U* in *w*, there is an earlier time (i.e., a time prior to *U*) at which *Contingent* obtains. But under branching actualism, every possible world shares a history with the actual world. Since every history of *w*—i.e., every initial segment of *w*—is such that for each *U* within that history, there's an earlier time at which *Contingent* obtains, it follows (given branching actualism) that the *actual* world likewise contains some history H such that for each *U* within H, there's an earlier time at which *Contingent* obtains. But if for each *U* within H, there's an earlier time at which *Contingent* obtains, then *a fortiori*, for each *U* in the *actual world as such*, there's an earlier time at which *Contingent* obtains.[16] But again, under branching actualism, every possible world shares a history with the actual world. Since every history of the actual world—i.e., every initial segment of the actual world—is such that for each *U* within that history, there's an earlier time at which *Contingent* obtains, it follows (given branching actualism) that *every possible world* likewise contains a history H* such that for each *U* within H*, there's an earlier time at which *Contingent* obtains. By the same reasoning used in the case of H and footnote 16, it swiftly follows that *every possible world w* is such that, for each *U* within *w*, there's an earlier time at which *Contingent* obtains. And *that* implies that, for every possible world, *Contingent* satisfies (ii) in the definition of 'obtains past-infinitely'.

It's *also* true in every possible world that *Contingent* satisfies (i) in the definition of 'obtains past-infinitely'. Since every world overlaps the actual world at some point in time (under branching actualism), every possible world has some *U* (i.e., some time or finite interval of time). Because every possible world has some *U*, and because every possible world *w* is such that, for each U within *w*, there's an earlier time at which *Contingent* obtains, it follows that every possible world *w* is such that there is some time in *w* at which *Contingent* obtains. And *that* implies that, for every possible world, *Contingent* satisfies (i).

So, in every possible world, *Contingent* satisfies both (i) and (ii) in the definition of 'obtains past-infinitely'. Hence, in every possible world, *Contingent* obtains

[16] This is because any *U* in the actual world is either within H or later than H. If some arbitrary *U* is within H, then clearly—given the antecedent of the conditional sentence in the main text—there's an earlier time (prior to *U*) at which *Contingent* obtains. If some arbitrary *U* is later than H, then there's still an earlier time (prior to *U*) at which *Contingent* obtains, since H is then earlier than *U*, and every *U** in H is such that there's an earlier time (prior to *U**) at which *Contingent* obtains. Either way—whether some arbitrary *U* in the actual world is within H or later than H—there's an earlier time (prior to *U*) at which *Contingent* obtains. (*U* cannot, of course, be *earlier* than H, since H is a *history* of the actual world and so contains *everything* up until a given point in the actual world).

past-infinitely—i.e., necessarily, *Contingent* obtains past-infinitely. Thus, it is *false* that <possibly, *Contingent* does not obtain past-infinitely>. So, assuming branching actualism, (2*) entails the falsity of <possibly, *Contingent* does not obtain past-infinitely>. Since (as we've seen) (2) entails <possibly, *Contingent* does not obtain past-infinitely>, (2*) is incompatible with (2) under branching actualism.

But why does it matter if (2*) is incompatible with (2) under branching actualism? The problem is that there seems to be an *epistemic symmetry* or *parity* between (2) and (2*). According to (2), it's possible that *Contingent* obtains *with* a beginning; according to (2*), it's possible that *Contingent* obtains *without* a beginning. More precisely, according to (2), it's possible that (i) there is a time at which *Contingent* obtains, (ii) there is a *U* such that there is no time prior to *U* at which *Contingent* obtains, and (iii) *Contingent* would not obtain without time. According to (2*), it's possible that (i) there is a time at which *Contingent* obtains, and (ii) there is *no U* such that there is no time prior to *U* at which *Contingent* obtains. The epistemic symmetry between these two possibility premises is apparent; they seem approximately equally modest and intrinsically probable. And yet—under branching actualism—the two are incompatible. In light of this symmetry and incompatibility, it appears intolerably arbitrary to assert (2) over (2*) in the absence of some principled reason that differentially favours the former over the latter. What's needed is some *symmetry breaker* between (2) and (2*)—or, at least, that's needed *by the branching actualist's lights*. Without a symmetry breaker, there seems to be no reason to privilege (2) over (2*). And yet such privileged treatment is required for the MAB's success.

We argue, however, that none of the considerations Pruss and Rasmussen adduce in favour of premise (2) break symmetry between (2) and (2*).[17] This, in turn, means that the branching actualist has been given no reason to adopt (2) over (2*); and, consequently, the branching actualist has been given no reason to accept the MAB. Under branching actualism, the MAB therefore faces an undercutting defeater.

Let's proceed, then, through Pruss and Rasmussen's motivations for (2) and examine whether they support (2) over (2*). They offer "four candidate reasons in support of (2)" (*ibid*, p. 75). The first reason is that "[t]here are theoretical models that are internally consistent, explain a wide range of relevant data, and imply that the universe has a beginning" (*ibid*). While such models might not be true, "they may at least seem possible" (*ibid*).

By our lights, this doesn't support (2) over (2*) for three reasons. First, we're not convinced that the mere fact that <a model or hypothesis is internally consistent and explains a wide range of relevant data> provides strong evidence for the model's metaphysical possibility. The history of science is rife with now-dead theories about the essential character of things like heat, combustion, disease, the elements, and so on that were internally consistent and explained much of the relevant data. But since they mistakenly characterise the *essential nature* of their phenomena, they aren't even

[17] *This* is why we've waited to consider motivations for premise (2). For given the incompatibility of (2) and (2*) under branching actualism, such motivations succeed by the branching actualist's lights only if they *differentially* support (2) *over* (2*). We will argue that they don't break symmetry in this fashion.

metaphysically possible.[18] Similarly, metaphysics is rife with hypotheses in domains wherein each incompatible hypothesis would be *necessarily* true if true at all.[19] And many such hypotheses are internally consistent and explain lots of relevant data.

Second, *even if* the aforementioned fact provides evidence for metaphysical possibility, it doesn't *differentially* support (2) over (2*). This is because there are *also* internally consistent models that explain a wide range of the relevant data on which the universe is past-infinite.[20]

Third, the possibility that the *universe* has a beginning doesn't entail the possibility that *contingent concrete things* have a beginning. In other words, the *universe* can have a beginning even though *contingent concrete things* don't. For starters, there may be a *metaphysical* time (distinct from *physical time*) that stretches infinitely far into the past and throughout which *Contingent* obtains. Or there may be some universe *isolated* from ours whose past is infinite and throughout which *Contingent* obtains. Or consider what Schmid and Linford (2023, ch. 8) call *atemporal wavefunction monism*. According to this view, there exists one fundamental, physical, non-spatiotemporal concrete thing: the *universal wavefunction*. This is a perfectly respectable view that has seen a blossoming of interest in philosophy of physics.[21] Suppose we take this universal wavefunction to be contingent. If this universal wavefunction exists, then *even if* the universe has a beginning, contingent concrete objects *as such* have no beginning—the contingent universal wavefunction is *timeless* and so has no beginning. Or perhaps there is a contingent concrete thing that behaves in precisely the way specified in Pruss and Rasmussen's reason for adding clause (iii) in their definition of *beginning to obtain*: "Clause (iii) is added in case there could be things, such as abstract objects, that exist during the earliest moments of time and that would exist whether or not time exists" (*ibid*, p. 71). A contingent concrete object of this sort might exist *timelessly* in the absence of a temporal order but *temporally* in its presence.[22]

[18] Even if some such theories weren't taken by past scientists to capture the *essential* character of the phenomenon in question, we can easily modify their theories to state that they *are* aiming to capture the nature of such phenomena. (What theories are we talking about? Most dead theories in philosophy of science's pessimistic meta-induction will do—e.g., heat essentially involves caloric; combustion essentially involves phlogiston; disease essentially involves miasma; water is a basic element; etc.)

[19] Consider, e.g., the panoply of defensible positions in philosophy of mathematics concerning the ontological status of mathematical objects, or the panoply of defensible positions about the nature and existence of moral truths and properties, or the panoply of defensible models of God, or the panoply of views on the nature of grounding, etc.

[20] Cf. Linford (2022) and the references therein.

[21] See (*inter alia*) Albert (2013, 2015, 2019), Ney (2013, 2020, 2021), North (2013), and Barbour (1999). Note that wavefunction monists differ in how they understand the universal wavefunction and the relationship between the universal wavefunction and all other physical objects. David Albert, Alyssa Ney, and Jill North, for instance, view the universal wavefunction as a field either defined on configuration space or on some more exotic state space. We need not get into the details here, however. What we say in the main text suffices for present purposes.

[22] Unlike the first two proposals in this paragraph, these last two proposals are compatible with the past being finite (though they're also compatible with it being infinite). If we combine these proposals with a finite past, (2*) will come out as false. But note that the falsity of (2*) doesn't imply the truth of (2); while both cannot be true, both could be false. (Also, one complication we note (but haven't the space to explore in requisite depth) is that our point about clause (iii) may conflict with branching actualism. Whether it does may depend on tricky issues pertaining to counterpossible conditionals.)

So much, then, for their first reason. Their second reason is that "[t]here are (controversial) philosophical arguments against the possibility of an actual infinity of past events" (*ibid*, pp. 75–76). Again, we have three responses. First, we don't think such arguments succeed.[23] Second, this doesn't *differentially* support (2) over (2*), since there are also (controversial) philosophical arguments *for* the possibility of an infinite past.[24] Third, *even if* an infinite past is impossible—i.e., even if time is necessarily past-finite—it doesn't follow that contingent concrete things *as such* possibly have a beginning. (See our third reply to Pruss and Rasmussen's first reason.)

Their third reason is that "[i]t may seem *conceivable* that contingent things have not existed forever; and conceivability is plausibly taken as evidence of metaphysical possibility" (*ibid*, p. 76). Once again, we have three replies. First, we're not convinced that conceivability—at least in contexts far removed from ordinary experience, like the present context—is a good guide to metaphysical possibility.[25] Second, even if conceivability is a good guide to metaphysical possibility, this doesn't *differentially* support (2) over (2*). For it seems equally conceivable—to us, at least—that contingent things *have* existed forever. Third, the possibility that contingent things have not existed forever is *not sufficient* for establishing (2). For it could be the case (in principle) that the past is finite while contingent concrete things *as such* have no beginning—see our third reply to Pruss and Rasmussen's first reason.

Their fourth reason is that "[i]t may seem *unlikely* that a state of contingent things would (and *must*) last for an infinite amount of time" (*ibid*). The first thing to note here is that—once more—the fact that the past is (likely) finite does *not* entail that contingent concrete things *as such* (likely, or even possibly) have a beginning. (See, again, our third reply to their first reason.) Hence, even if Pruss and Rasmussen establish the former, they will not have established (2)—in which case, they will not have broken symmetry between (2) and (2*). And, importantly, everything Pruss

[23] For some representative criticisms, see Leon (2019) and the references therein. For recent criticisms of the argument from successive addition against a beginningless past, see Morriston (2022), Malpass (2022), and Leon (2011). For recent criticisms of the argument from the impossibility of actual infinites, see Malpass and Morriston (2020), Hedrick (2014), and Rasmussen and Leon (2019, ch. 5).

[24] Consider this argument: first, an infinite past is conceivable (else: imaginable); second, conceivability (else: imaginability) provides defeasible evidence for possibility. Or consider another argument: first, if x is possible and y differs from x merely in quantity or degree, then y is possible, *ceteris paribus* (for a defense of a relevantly similar principle, see Rasmussen (2014) and even Pruss and Rasmussen (2018, ch. 6)); second, some finite past is possible and some infinite past differs from some possible finite past merely in quantity or degree. (To be sure, these arguments are controversial. But so are the arguments Pruss and Rasmussen reference. Note also that we are not here *endorsing* these arguments.) And there are many more (controversial) arguments besides, such as taking inclusion in physically live, explanatorily powerful cosmological models to be a defeasible guide to metaphysical possibility (à la Pruss and Rasmussen's first reason in support of (2)).

[25] We sympathise with Felipe Leon when he notes that "many (if not most) [conceived] scenarios that are at least modestly remote from human experience are such that, when we try to flesh out the details about what they would involve, we quickly find that it is no longer clear that the envisioned scenario is metaphysically possible" (Rasmussen and Leon 2019, p. 24). There are boatloads of examples where this is borne out, many of which are discussed in van Inwagen (1977, 1998, 2008) and Fisher and Leon (2016). For a survey of some of the central arguments for a 'mitigated' or 'moderate' modal skepticism about the evidential salience of conceivability and other such appeals in domains far removed from our ordinary experience, see Rasmussen and Leon (2019, pp. 24–29).

and Rasmussen say in fleshing out their fourth reason only supports the (likely) finitude of the past. Nevertheless, we'll critically examine their fleshed-out case.

They begin by letting *c* be the class of all (and only) contingent concrete things. They then focus on one member of *c*, Tibbles the cat, and wonder "what maintains Tibbles' existence from moment to moment" (*ibid*). By their lights, there are only four candidate answers:

> Option 1: Tibbles' existence is maintained by one or more other contingent concrete things, each of which is also maintained by other contingent concrete things, *ad infinitum*.
> Option 2: Tibbles' existence is maintained by one or more contingent concrete things that somehow maintain their own existence (by existential inertia perhaps).
> Option 3: Tibbles' existence is ultimately maintained by foundational members of *c* that aren't maintained by anything.
> Option 4: Tibbles' existence is maintained by one or more necessary concrete things. (*ibid*)

Setting option 4 aside (as it delivers their desired conclusion), they proceed to each other option, arguing that each is either (i) implausible, (ii) entails that an infinite past is highly improbable, or (ii) leaves explanatory questions unanswered that—if answered—would lead to a necessary concrete thing. We will only consider what they say against option 2.[26]

Against option 2, Pruss and Rasmussen raise a dilemma: either the self-maintaining thing(s) (which they call 'Jack') necessarily maintains its own existence (i.e., maintains its existence by nature) or contingently maintains its own existence. We'll focus here on what Pruss and Rasmussen say against the first horn on which something about Jack's nature accounts for or explains Jack's persistence:

> Let us consider, then, the alternative that Jack maintains its own existence *of necessity*. How does Jack do that? Presumably, Jack doesn't *produce* its own existence: for it seems that nothing can produce existence without already having existence. It seems to us that by far the most plausible account of how a thing can maintain its own existence of necessity is by having a nature that cannot fail to be exemplified. In other words, a thing maintains its existence by having a necessarily exemplified nature. If that is so, then a self-maintaining concrete thing is a necessarily *existing* concrete thing. And we have arrived at the conclusion of MAB. (*ibid*, p. 77)

We do not find this plausible. First, it's not clear to us that Jack couldn't produce its own existence *in the sense* that the succeeding stages or phases in Jack's life couldn't

[26] Pruss and Rasmussen don't define what 'maintain' means, but it's safe to assume that they mean *explain the continued existence of*. Consider that, in examining option 3 (according to which the foundational members of *c* are not maintained by anything), Pruss and Rasmussen claim that "According to this option, the foundational elements have no explanation for their continued existence" (*ibid*, p. 78). This is only plausible if by 'maintain' they mean *explain the continued existence of*.

be connected by relations of causal production.[27] This doesn't require Jack to causally produce *Jack's existence (simpliciter)*; instead, it simply requires that (say) *Jack at time t* causally produces *Jack at time t+1*. This is similar to an account of persistence developed in (e.g.) Schmid (2021):

> For concrete object O and times t_{-1} and t (where t_{-1} is immediately temporally prior to t), the existence of O-at-t is explained by the conjunction of (i) the state and existence of O-at-t_{-1} and (ii) the absence of any sufficiently causally destructive factors acting on O-at-t_{-1} and through t. (p. 205)

Schmid's account is written in endurantist terms, but it can easily be made consistent with relativistic and perdurantist accounts of persistence. For example, for globally hyperbolic relativistic spacetimes, times t_{-1} and t can be replaced by appropriately related Cauchy surfaces, and instead of considering O at distinct times, we can consider proper parts of O located on distinct Cauchy surfaces.

Here's how Schmid's explanation goes, with the simplifying assumptions that (i) the relevant transtemporal explanatory relation is *causation*, (ii) time is discrete, and (iii) endurantism is true.[28] The explanandum is O's existence at *t*. Schmid's explanans, under the aforementioned assumptions, is: (a) There is an absence of sufficiently causally destructive factors operative on O from t_{-1} to *t* (where t_{-1} is the time immediately prior to *t*), and (b) the state and/or existence of a temporal concrete object at a given time at which it exists causally produces its existence at the next moment provided that no sufficiently causally destructive factors are operative at either time. O's persistence is then explained by repeated applications of this explanatory schema to each successive (non-first) time of O's life.

To be sure, there might be the further question of why some of those explanatory facts *themselves* obtain. For instance, there's the question of why reality is so constituted that the successive stages in an object's life are related by causal relations. But this is a *separate question* from why O exists at t. And, plausibly, it won't be all that difficult to provide plausible stories for the former question. (Here's a candidate explanation: (b) obtains in virtue of O's nature or the nature of temporal concreta more generally.) Similarly, there's the question of why no such (sufficiently) destructive factors have been operative. But, again, this is a *separate question* from explaining O's persistence. And, again, it won't be all that difficult to provide plausible stories concerning the absence of such (sufficiently) destructive factors. Moreover, "it is not a condition on legitimate explanation that a deeper explanation for every statement in the explanans always be ready to hand, or even that it exist at all" (Beaudoin, 2007, p. 89).

Our second reason for finding Pruss and Rasmussen's quoted reasoning implausible is that there seem to be defensible explanations of Jack's persistence, citing facts about Jack's nature, that are at least as good as Pruss and Rasmussen's proffered explanation that Jack is a necessary being.

[27] We use 'successive stages or phases of an object's life' as neutral between endurantism and perdurantism.

[28] As Schmid and Linford (2023, ch. 6) explain, these assumptions can be discharged.

One family of such explanations is, of course, one we already canvassed—there are transtemporal causal relations among the successive stages of objects' lives. Another family cites the essential tendencies of objects. According to Beaudoin (2007, pp. 88–89), for instance, Jack persists because (i) the only power capable of annihilating Jack has thus far been unexercised, and (ii) Jack lacks a tendency to spontaneously disappear. (We can suppose that Jack essentially lacks such a tendency.) For if Jack lacks such a tendency, then Jack will not spontaneously disappear unless Jack is subject to some sufficiently destructive or annihilating factor. This is part and parcel of what tendencies involve: *x* has a tendency to manifest some outcome or undergo some process in conditions C if and only if *x*, when placed in C, manifests said outcome or undergoes said process.[29] Thus, if Jack *lacks* a tendency to spontaneously annihilate (i.e., cease to exist) in conditions C—say, when not subjected to sufficiently destructive or annihilating factors—then Jack, when placed in C, will not annihilate. And provided that Jack is in C—provided that there is an absence of sufficiently destructive or annihilating factors, as specified by condition (i) of the abovementioned conjunction—it follows that Jack will not annihilate but will instead persist.

In a similar vein, Oderberg (2014) cites a *positive* tendency to persist. On our favoured way of developing Oderberg's account, O's existence at some non-first time *t* at which O exists is explained by the following: (i) O existed at some time *t* earlier* than *t*; (ii) O possessed, at *t**, the tendency to persist in existence unless subjected to sufficiently destructive factors; (iii) O has this tendency in virtue of the *kind* of thing O is (i.e., in virtue of O's nature); and (iv) O was not subjected to sufficiently destructive factors between *t** and *t*. Oderberg, moreover, offers several reasons for thinking there is such a tendency—for instance, we tend to witness things cease to exist when and only when subject to sufficiently destructive factors. This calls out for an explanation, just as "if it were the case that all objects ceased to exist when and only when in the vicinity of objects twice their size" (*ibid*, p. 351). This is best explained, according to Oderberg, by a tendency to *cease* when and only when subject to such factors. And given plausible complementarity principles, this entails that there is a tendency to *persist* when and only when *not* subject to such factors.[30]

Once again, we have the further questions of why no such (sufficiently) destructive factors have been operative and why objects have (or lack) the relevant tendencies. But again, these are *separate* explanatory demands (separate, that is, from merely explaining Jack's persistence), and it's not clear why explaining such facts would be any more difficult than explaining why objects have or lack *other* tendencies. Moreover, *Pruss and Rasmussen's* account of persistence in terms of some necessarily existing foundational temporal concrete thing likewise invites further

[29] We can set aside the literature on masks and finks (cf. Martin 1994), since we're not concerned here with an *analysis* of tendencies/dispositions. As Schmid and Linford (2023, p. 133) point out, we can either (i) simply build into the account that for normal cases, persistence and destruction don't succumb to the presence of finks, masks, and the like (which is a plausible assumption, since the examples of finks and masks are often outlandish); or (ii) simply include within C the specification that no masks/finks/etc. are operative; or etc.

[30] For more on complementarity principles in this context, see Benocci (2018, pp. 59–63).

questions—for instance, *why* is there such a necessarily existing thing? How does it relate to and explain the persistence of non-foundational, contingently existing temporal concreta? Is it causation, grounding, constitution, functional realization, or something else entirely? And so on.

All of this, we think, suffices to justify our modest claim that Pruss and Rasmussen have not ruled out the first horn of their dilemma for option 2 and hence have not succeeded in showing that the past is likely finite. This, in turn, means that they have not succeeded in breaking symmetry between (2) and (2*), and so our symmetry problem for the MAB stands.

7 Conclusion

We've argued that branching actualism has three significant consequences. First, branching actualism offers a way to block the inference from the impossibility of Grim Reaper-style scenarios to the finitude of the past. For branching actualism delivers a principled reason to deny the patchwork principle that facilitates said inference. Second, branching actualism undermines a typical response to a Humean challenge to the classic contingency argument. Third, branching actualism undergirds a new symmetry problem for the MAB. The payoff is that one's modal metaphysics significantly affects the success of various cosmological arguments. In other words, the payoff is dialectical progress.

Acknowledgements Many thanks to three anonymous reviewers for helpful feedback.

Funding There is no funding

Declarations

Conflict of interest In addition, EB members need to follow our in-house editorial policy under Submission Guidelines that says: "Where an Editor or Editorial Board Member is on the author list, they must declare this in the competing interests section on the submitted manuscript."

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