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On the Necessity of Priority Monism

Stephen Harrop[1]

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Abstract
Priority monism is the doctrine that there is only one basic object. Priority monists often take this to be a metaphysically necessary thesis. I explore the consequences of modalizing the priority monist thesis. I argue that, modulo some assumptions, the modalized thesis entails the necessary existence of the actual cosmos. I further argue that, if the modalized thesis is true, and the actual cosmos necessarily exists, then the only possible concrete objects are the actually existing ones.

1 Introduction

In recent years there has been a resurgence of interest in monism. Probably the most prominent version of monism, championed by Jonathan Schaffer (in, for example, Schaffer 2009, 2010a, b), is *priority monism*, which is, roughly, "the conjunction of the numerical thesis that there is exactly one basic object with the holistic thesis that the cosmos is basic."[1] While this is taken by Schaffer to primarily be a thesis about the actual world (Schaffer 2010, p. 45), he also takes the monistic thesis to hold of metaphysical necessity (Schaffer 2010, §2.2). The literature is split on monism's modal status, with some (such as Schaffer and Calosi (2020)) taking it to be a necessary thesis, and others (such as Trogdon (2017) and Siegel (2016)) holding that it is contingent.

This paper explores the consequences of taking priority monism to be a doctrine that holds of metaphysical necessity. The thesis of this paper has two parts. First, if the modalized version of priority monism is true, then the actual cosmos necessarily exists. Second, if the modalized version of priority monism is true, and the actual cosmos necessarily exists, then the only possible concrete objects are the actually existing ones. Hence, then, if the modalized version of priority monism is true, then the only possible concrete objects are the actually existing ones.

1 (Schaffer 2010, p. 42).

Stephen Harrop
stephen.d.harrop@gmail.com

1 Department of Philosophy, Yale University, New Haven, USA

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Here is the plan of the paper. In §1 I explore formulations of priority monism. In §2 I explore one modalized version of priority monism, and argue that, on one standard conception of semantics for quantified modal logic, it leads to a surprising result: the necessary existence of the actual cosmos. In §3 I argue that the priority monist should reject the standard semantics for quantified modal logic, and instead adopt a variable-domain semantics. I then explore another modalized version of priority monism and argue that it leads, modulo some assumptions, to the same conclusion as in §2: the actual cosmos exists necessarily. In §4 I generalize the arguments given in §§2-3: I try to identify the core commitments that any formalized version of priority monism must carry, and argue that this core thesis entails the same conclusions reached in §§2-3, regardless of what semantics one adopts. In §5 I explore the question of the trans-world identity of this necessary concretum. I argue that the actual cosmos exists in every possible world, with all its actual parts. In other words, the "modal universe" can't shrink. Finally, in §6, building on the argument in §5, I argue that the modal universe can't grow either: The actually existing concrete objects can't be added to. Hence, putting §5 and §6 together, the modalized version of priority monism entails that the only possible concrete objects are the actually existing ones. This does not, I claim, constitute an argument *against* the truth of priority monism. Rather, it constitutes an argument that the position contains some heretofore unrecognized metaphysical import.

2 Preliminary Definitions

First, let's give a definition of

> *Priority monism* there is one and only one basic concrete object, and it is the whole world.[2]

Claudio Calosi (Calosi 2020, p. 2) formulates priority monism as the view that "the *universe*, or the *cosmos*, i.e., the mereologically maximal element, is the only *fundamental* concrete object."[3] Alex Steinberg (Steinberg 2015, p. 5) puts it as "the view that the cosmos, the whole all concrete things are parts of, is the one and only concrete object that depends on no concrete object." For the purposes of this paper, we will treat all these glosses as stating the same view. Following Jonathan Schaffer ((Schaffer 2010, p. 42), (Schaffer 2010b, p. 344), (Schaffer 2018, §3.1.1)), we might render this view, formally, as:

> *Priority monism, formal*: $\exists! x Bx \wedge Bu$

[2] See, e.g., (Schaffer 2010, p. 42), (Schaffer b, p. 344).

[3] Priority monists often assume that unrestricted mereological composition is necessary. Some disagree; see for instance Bohn (2009). I don't think that priority monists need to assume this. In this paper, I'll just assume that the maximal mereological sum of all actual concrete objects exists. This is really all they need.

where u is a dedicated constant denoting the whole cosmos. Again following Schaffer, we will analyze the predicate Bx as follows (Schaffer 2010b, p. 343)

> x is basic $=_{df}$ (i) x is a concrete object, and (ii) there is no y such that (a) y is a concrete object, and (b) x depends on y

Formally, we'll notate this as follows (with Cx and Dxy representing the predicate "x is a concrete object" and the relation "x depends on y" respectively; we assume dependence is metaphysical grounding, and hence is asymmetric and irreflexive):

$$Bx =_{df} Cx \wedge \neg\exists y[Cy \wedge Dxy]$$

Before continuing, let me address one possible misconception about my thesis. It might be thought that what I am arguing for is in some ways trivial. After all, if an existence thesis is necessarily true, then of course the entity in question exists necessarily. Why write a paper about this? I think this misses a crucial distinction. Suppose one holds the that, necessarily, Fido exists. This is compatible with thinking that there is some measure of flexibility as to what precisely exists in each world. In one world, Fido might have lost his tail; in another, he might be a giraffe; in another, he might have been born with five legs. There is, we might say, modal variation in such a scenario.

What I want to argue, however, is different. What I will argue is that the priority monist is committed to the position that the cosmos *as it actually is constituted* exists necessarily. There is no modal variation in this thesis. To return to our metaphor, it is like arguing that Fido *as he actually is constituted* exists necessarily. That is a far more interesting, and more binding, thesis than the one we initially considered. It is also one, I think, that the debate over priority monism has failed to appreciate. It also has a much stronger consequence, as I will argue in §§6-7 – namely, that all actual concrete objects exist necessarily, and no other concrete objects could have.

3 Getting the Argument Started

Schaffer writes that, though priority monism and priority pluralism (the doctrine that there is more than one fundamental concrete object) are, as defined, doctrines about the actual world, "[they] are metaphysically general theses, in the sense that whichever doctrine is true, is true with metaphysical necessity."[4] He then goes on to argue that priority monism is true (and hence metaphysically necessary) and priority pluralism is false (and hence necessarily so). My concern here is not with any particular argument for this thesis. Instead, I want to ask what the priority monist commits to by committing to the modalized version of monism.

How should we formulate the claim that priority monism is metaphysically necessary? The natural way to do it seems as follows:

[4] Schaffer (2010, p. 56).

Necessary priority monism (henceforth NPM): necessarily, there is one and only one basic concrete object, and it is the whole world.

The formal analogue is quite straightforward:

NPM, formal: $\Box[\exists!xBx \wedge Bu]$

This claim has an interesting consequence. It is a theorem of the minimal modal logic **K** (proof omitted), and hence of quantified modal logic, that necessity distributes across conjunction. That is, the following is a theorem, where ϕ and ψ are wffs of the modal logic in question:

($\Box\wedge$) $\Box[\phi \wedge \psi] \supset [\Box\phi \wedge \Box\psi]$

So the following thesis follows fairly straightforwardly, from *Necessary priority monism, formalized* and ($\Box\wedge$) by modus ponens:

Necessary existence, formal: $\Box\exists!xBx \wedge \Box Bu$

Or, in words,

Necessary existence: necessarily, there is one and only one concrete object, and necessarily, it is the whole world

How are we to interpret this? The priority monist might want to give it the following gloss: at every world, the maximal concrete object *at that world* is the only basic object. But I do not think *Necessary existence, formal*, as stated, bears this interpretation. Let me explain why.

The semantics for SQML (simple quantified modal logic) make use of SQML-models, which are defined as follows:

An *SQML-model* $\mathfrak{M}$ is a 5-tuple $\langle W, R, \mathcal{D}, \mathcal{I}, V\rangle$, where

- W is a non-empty set of world,
- $R \subseteq W \times W$ is a binary accessibility relation,
- $\mathcal{D}$ is a non-empty domain of entities, and
- $\mathcal{I}$ is an interpretation function that maps terms of our language to entities in $\mathcal{D}$ and pairs of worlds and n-place predicates of our language to n-tuples of entities in $\mathcal{D}$.
- V is a valuation function that maps pairs of well-formed formulas and worlds to truth values.

Using these models, one can give full semantic clauses for $\neg$, $\wedge$, $\exists$, and $\Box$ (or whatever alternate set of primitives one wishes). The thing to notice here is that $\mathcal{I}$ will lift the constant term u (the dedicated constant for the cosmos) to one and only one element of $\mathcal{D}$ (otherwise the function would be badly defined). I take it that the following is an upshot: In this formulation of the modalized priority monist thesis, the priority monist is committed to the necessary existence of the actual cosmos.

Why? Let me give an informal argument. First, we can note that necessarily, the actual cosmos denoted by u is basic. Hence, at every world accessible from the actual world @, the object denoted by u is basic. But for this object to be basic at that world, it must exist at that world. Hence, at every world accessible from @, the object denoted by u exists. Further, given the definition of Bx, it must be concrete at that world. Hence, the priority monist is, on this reading, committed to the existence of at least one necessarily existent concrete object, the actual cosmos. It is important to note that this consequence is built into the semantics of SQML, and not just the formula $\Box Bu$. Since every world shares the same domain of quantification, u denotes the same object in every world.

The priority monist might respond by shifting away from the notion that u is a dedicated constant which rigidly designates the actual cosmos, and instead demanding that the object denoted by $\mathcal{I}(u, w)$ is simply the maximal concrete object at every $w \in W$, thus getting them out of *Necessary existence*. This approach seems promising, but it has the following complication. Since, in SQML, $\exists$ ranges over all of $\mathcal{D}$, what the first part of *NPM* commits the priority monist to is the existence of only a single basic object in $\mathcal{D}$. Hence, the maximal concrete object at w, where $w \neq @$, is not basic. For if it were, then there would be more than one basic object in $\mathcal{D}$, violating the first conjunct of *NPM*. In a sense, then, *NPM* would vindicated, but at the cost of holding that the only basic object is the *actual* cosmos.

Another option for the priority monist who wishes to avoid this conclusion would be to adopt a non-normal modal logic, such as the system **E**, which does not have $\Box[\phi \wedge \psi] \supset [\Box\phi \wedge \Box\psi]$ as a theorem. But as a fit for metaphysical modality, this seems off. For it certainly seems true that, if it is necessary that Socrates is both mortal and snub-nosed, then it is true that he does not fail to be both mortal and snub-nosed in some possible world. So while this is a possible line of defense for the priority monist, taking it will require some sacrifices which may be too heavy to bear easily. Indeed, the priority monist's position itself may bear this defense poorly. For, on the adoption of a non-normal modal logic which rids one of this turbulent theorem, the opponent of priority monism could hold that *Necessary priority monism* is true, but that there is some world in which either there is not exactly one basic object or else that the cosmos is not basic at that world. This seems problematic for the priority monist.

Before going on, I should discuss one other possible option. Mightn't we make do by (a) relativizing basicness to a possible world and (b) quantifying over possible worlds instead of using a necessity operator? In other words, why don't we use the following formula to stand in for the necessitated priority monist thesis (where $B(x, w)$) represents the predicate "x is basic at w" and u is a term whose denotation at w is just the maximal concrete object at w):

$$\forall w \exists ! x[B(x, w) \wedge B(u, w)]$$

As a technical matter, for this proposal to work one, would have to make several adjustments to both the model theory and the semantics presented earlier. First, one needs to be able to express "for all worlds" in the language of SQML and give semantic clauses for it in our model theory. One way to do this would be to have a dedicated quantifier Π to range over the set of worlds W. (We can't do this using $\forall$ because that ranges over $\mathcal{D}$, and $\mathcal{D}$ contains objects, not worlds.) One would then have to give a semantic clause for Π. Another way is to shift to a second-order modal logic where one allows quantifiers to range not only over $\mathcal{D}$ but over the powerset of $\mathcal{D}$, $2^{\mathcal{D}}$. One then might restrict the admissible subsets of 2^{D} to exactly those which constitute the objects which exist at the worlds in the relevant model.

The second option is, effectively, to adopt variable-domain semantics for QML, which we'll deal with in a later section. As a result, I won't discuss it here. The first option would require substantial changes to the model theory and semantics, but not insurmountable ones. What happens when we take this option? Let's find out.[5]

First, note that the domain of objects $\mathcal{D}$ is fixed for all worlds. In other words, all the same things exist in every world. Thus, supposing that $u_{@}$ (the maximal concrete object in the actual world @) is in D, it exists at all worlds in our model. As a result, since $u_{@}$ is the mereological sum of all actual concrete objects, all concrete objects existing in @ must exist in every world. So there are no worlds in which there are *fewer* concrete objects than @, and no worlds in which there are *none* of the concrete objects existing at @. This rules out worlds wholly disjoint from @. In other words, there are no worlds where none of the actually existing objects exist.

Can there be worlds with *more* concrete objects than our own? No. For consider some such world w, with all the concrete objects in @ and then some, along with the maximal concrete object in w, u_w. Since u_w is in D (because it exists at w), it must also exist at @ (since, as we said before, the domain of quantification $\mathcal{D}$ is fixed). So then both $u_{@}$ and u_w exist at @. Recall that $u_{@}$ was supposed to be the maximal concrete object at @, so there can't be more concrete objects at @ than the ones which get summed to produce $u_{@}$. But if u_w exists at @ there *must* be more, since we assumed at the outset that w contained *more* concrete objects than @. Since we've reached a contradiction, there can't be any such world w.

These are both symptoms of an underlying problem. The issue here is that the objects which get summed into u_w for any w in W exist at all worlds. This means that their sum must exist at all worlds as well. Here I have assumed that a concrete object is essentially concrete, contra, say, Timothy Williamson's version of necessitism (c.f. Williamson (2013)). I am also assuming that u does not change its parts across worlds. This is a reasonable assumption, since the mereological summation is done using the objects in $\mathcal{D}$, and those do not change. But it has not gone unchallenged. Both of these assumptions may be questioned; I'll defend the latter assumption in a later section.

But the salient point here is that the argument, and the problem, does *not* depend on the precise formulation of the thesis so much as it depends on the semantics and model theory of SQML. The basic priority monist thesis is that there is one maximal concrete objects in the world, and this is true at every world. And – this is important – they might want to cash this out as there being many different possible such maximal concrete objects, perhaps even a different one per world. My argument here, and

[5] One could also do something similar using a "universal" modality U, with the following semantic clause: $\mathfrak{M}, w \vDash U\varphi$ iff $\mathfrak{M}, u \vDash \varphi$ for every $u \in W$. (See (van Benthem 2010, p. 79) for more details.) In words, $U\varphi$ is true if and only if φ is true at every world in the model, accessible from w or not. But this would eliminate the quantification entirely, as well as the dyadic basicality predicate, and the argument that we're about to give would still go through provided that every world can see every world in the model (as is required by S5, for example).

throughout this paper, is that given the details of the thesis which *any* formulation requires, this is disallowed. There is only one such object in any world – no *κόσμοι*, only *ὁ κόσμος*, *the* world.

4 Modifications

Perhaps the priority monist will find the options discussed in the last section palatable, but perhaps not. If the latter is the case, clearly some modification of *NPM* is needed to avoid the deleterious consequence. One possible way out would be to keep u as a dedicated constant for the actual cosmos, but to modify *NPM* to the following:

NPM 2.0, formal: $\Box\exists!xBx \wedge Bu$

This would seem to solve the immediate problem, since now the object denoted by u would no longer have to exist and be basic at every world accessible from @. But I think there are improvements in the offing.

Claudio Calosi (Calosi 2020, p. 2) formulates something similar to this claim: "if the universe is fundamental at the actual world @, then, every possible world w is such that, at w, the universe at w is the only fundamental concrete object at w." Alex Steinberg (Steinberg 2015, p. 2026) formulates it this way: "if the cosmos is the only concrete object that is basic at the actual world, then every possible world w is such that, at w, the cosmos is the only concrete object that is basic at w." Notice that the difference in both cases is that this is a conditional claim: if monism is true at @, it's true at every world.

It is tricky to give a formal rendering of this, but one way of doing it would be:

$$[\exists!xBx \wedge Bu] \supset [\Box\exists!xBx \wedge Bu_w]$$

where u is a dedicated constant for the maximal concrete object at @ and the denotation of u_w at world w is the maximal concrete object at w. Given the truth of monism at the actual world, we can reduce this to the following claim:

NPM 3.0, formal: $\Box\exists!xBx \wedge Bu_w$

Version 3.0 is an improvement over version 2.0, for the following reason. If we let u simpliciter be the dedicated constant for the actual cosmos, then version 2.0 will in fact be false at worlds where u does not exist (since one of the conjuncts is false). In shifting to version 3.0, we allow the denotation of u_w to vary so as to designate the maximal concrete object at the world w where we're evaluating the formula, avoiding the problem.

But the defender of priority monism is not out of the woods yet. For, notoriously, in SQML the formula $\Box\exists x[x = t]$ is a tautology for arbitrary term t, and hence $\Box\exists x[x = u]$ is a tautology as well. (To be clear, this is not only a problem for the priority monist, but for anyone who adopts SQML.) So the priority monist would seem to be stuck with *Necessary Existence* yet again.

Fortunately, there is an old and reliable solution to this problem, and that is to adopt so-called variable-domain semantics. The basic idea is to modify the

SQML-models to allow the domain of quantification to vary from world to world; roughly, one lets the interpretation function $\mathcal{I}$ map terms into a domain of quantification that is indexed to a world w. This allows us to eject $\Box\exists x[x = t]$ from the exclusive club of tautologies. And, as a result, the priority monist might think to adopt a variable domain semantics as a way of evading *Necessary existence*, since this would allow the monist to escape the unwanted consequence that the actual cosmos exists in all metaphysically possible worlds. But this move might be too quick. Let's see why.

One of the other (supposed) problems with SQML is that the formula $\Box\exists x[x = x]$ is also a tautology. That is, in SQML it is necessary that something exists. In variable-domain semantics, this does not come out as a tautology, since one can, for instance, assign a world w the empty set as its domain of quantification. This means that at w there is no x such that $x = x$, which provides a countermodel to $\Box\exists x[x = x]$.

So far, so good. But once we unpack *NPM 3.0, formal*, problems start to emerge. Recalling the definition of Bx, we can substitute and get the following formula that is equivalent to *NPM 3.0, formal*:

$$\Box\exists!x[Cx \wedge \neg\exists y[Cy \wedge Dxy]] \wedge Bu_w$$

From this, it follows that there necessarily exists a concrete object (though not necessarily the same one). The reasoning goes as follows. By conjunction elimination, one can obtain that, necessarily, there exists exactly one x such that x is concrete and x depends on no other concrete object y. And from this, the following seems to follow:

Necessary concretum: $\Box\exists xCx$[6]

Hence, the priority monist is committed to the thesis that there necessarily exists at least one concrete object (though not necessarily the same one across worlds). Using this assumption, we can show that $\Box\exists x[x = x]$ is a tautology.[7] So the priority monist is committed to a position which cuts off the line of retreat to variable-domain semantics.

Here is what I am *not* saying. I am not saying that, because $\Box\exists x[x = x]$ is not a theorem in the context of variable-domain semantics, one cannot rationally adopt it. That would be a non-sequitur. Rather, I am saying this. In variable-domain

[6] Here is an argument for this conclusion. Suppose $\Box\exists!x[Cx \wedge \neg\exists y[Cy \wedge Dxy]] \wedge Bu_w$ is true at w. Then at w, $\Box\exists!x[Cx \wedge \neg\exists y[Cy \wedge Dxy]]$ is true (by conjunction elimination). Consequently, at all worlds accessible from w, $\exists!x[Cx \wedge \neg\exists y[Cy \wedge Dxy]]$ is true (by the definition of $\Box$). If $\exists!x[Cx \wedge \neg\exists y[Cy \wedge Dxy]]$ is true at all worlds accessible from w, then so is $\exists x[Cx \wedge \neg\exists y[Cy \wedge Dxy]]$. And if $\exists x[Cx \wedge \neg\exists y[Cy \wedge Dxy]]$ is true at every world v accessible from w, then $Cu \wedge \neg\exists y[Cy \wedge Duy]$ is true as well, for some $u \in \mathcal{Q}(v)$ (the domain of quantification for v). Consequently, Cu is true at every world v accessible from w. Since Cu is true at every v accessible from w, so is $\exists xCx$. And since $\exists xCx$ is true at every v accessible from w, $\Box\exists xCx$ is true at w.

[7] For suppose to the contrary. Then there is some model $\mathfrak{M}$ with some world $w \in W$ such that $R@w$ and $\mathfrak{M}, w \nvDash \Box\exists x[x = x]$. So there is some world accessible from w, call it w', such that $\mathfrak{M}, w' \nvDash \exists x[x = x]$. But by assumption, $\Box\exists xCx$ is true, so there is some $c \in \mathcal{Q}(w')$ (the domain of quantification indexed to w') such that $c = c$. Hence $\mathfrak{M}, w' \vDash \exists x[x = x]$. Contradiction.

semantics, the formula $\Box\exists x[x = x]$ is not a tautology. It is therefore not true in all worlds and all variable domain models. But what *Necessary concretum* does is commit the priority monist to that formula being true across all variable-domain models, as we have just shown. As a result $\Box\exists x[x = x]$ turns out to be a tautology. Hence, there is a tension between *Priority monism 3.0* and the use of variable-domain semantics.

It seems what the priority monist 3.0 should want to say is that, while monism is true at all worlds, it is a contingent matter whether the *actual* cosmos is the unique basic object. The way that one would like to do this is to adopt a variable-domain semantics, as was discussed above. But we have shown that this is problematic, since *NPM 3.0* commits one to the position that necessarily there is at least one concrete object, which vindicates as a tautology a formula which is *not* a tautology in variable-domain QML. Here, the priority monist's metaphysical commitments seem to dictate that they should not adopt variable-domain QML.

Perhaps the priority monist can accept this, but still claim to adopt a version of variable-domain QML: one which allows the domain to vary from world to world, but which does not allow for there to be world with an empty domain. Here it seems there is a trade-off of intuitions. If one is of the persuasion that there might have existed nothing at all, one will not find this plausible, and hence not find *NPM 3.0* plausible. If, however, one is strongly committed to the necessity of priority monism, one then has a reason to reject the strong intuition that there might have been nothing at all, and hence any logic which supports such a claim. There is perhaps one last line of defense. In order to adopt a non-jerry-rigged version of variable-domain semantics, the priority monist might endorse a further refinement of the thesis:

NPM 4.0 formal: $\exists x[x = x] \supset [\Box\exists!xBx \wedge Bu_w]$

This might avoid the problem with empty worlds, since the antecedent will be false at such worlds, and hence the conditional will be true. (By "empty world" I mean, roughly, "world with no concrete objects".) But there is a problem with this. Suppose we are at an empty world, w. Then the antecedent of *NPM 4.0 formal* is falsified, so at w it follows that *NPM 4.0 formal* is true.

Then it follows that w – indeed, every empty world – is not possible relative to any non-empty world. To see this, consider some non-empty world v, and suppose that w were possible relative to v. Then it would be the case that $\Diamond\neg\exists x[x = x]$ is true at v (since w is possible relative to v). And then it cannot be true at v that $\Box\exists!x[Bx]$. So it must be the case, at all filled worlds (and hence, the actual world) that empty worlds are not possible.

It follows from these two facts that the resulting system of modal logic cannot be S5, the modal logic most typically associated with metaphysical modality. In S5, it is required that the accessibility relation R be reflexive, symmetric, and transitive. But because filled worlds may be possible relative to empty worlds, but not vice versa, the relation cannot be symmetric. This puts the thesis in tension with strong intuitions about metaphysical modality. Plausibly, a world possible relative to a second world counts the second world as positive relative to it. But this intuition is violated if *NPM 4.0* is true. This gives one a strong prima facie reason to reject *NPM 4.0*.

Let me put the point another way. Suppose you think there could've (metaphysically) been nothing at all. Then some empty world w is possible relative to @. But, if the right modal logic is S5, then @ should also be possible relative to w. But *NPM 4.0 formal* disallows this, as we've seen. So there is a tension between these three premises. If you think there could've been nothing at all (which variable-domain QML allows), and that the right modal logic is S5, then you've got a problem with *NPM 4.0 formal*.

As a matter of the logic *alone*, you could, of course, require that your model's accessibility relation be such that, though every empty world is possible relative to itself, it is not possible relative to any other world, and no other world is possible relative to it. But there's a problem here. This means that, supposing yours is a pointed model (that is, roughly speaking, one with a world designated as actual), there couldn't have been nothing at all relative to the actual world. This follows straightforwardly: if we think that empty worlds are not possible relative to filled ones, then they can't be possible relative to @ presuming @ is filled. So once one thinks that S5 is the correct logic to model metaphysical modality *in the actual world*, then one can either think there could've been nothing at all, or that *NPM 4.0 formal* is true, but not both.

5 The Core Monist Thesis

So far, I've looked at two possible patches that the priority monist may make to *NPM, formal*, as well as combinations of the two. First, they can modify the actual formulation of the thesis from the original, to avoid the problems I've raised. Second, they can jettison SQML in favor of variable-domain QML. And, of course, they can take some combination of these two. This is necessary, as dealing with extant versions of a view is, at least, a proof of concept. It shows that the criticisms one makes have some actual, concrete bite.

But everything done in this paper up to now has essentially been a piecemeal action. I've only been addressing *particular* formulations of priority monism, and their *particular* details and problems. But there are a host of such formulations, more than are dreamt of in *my* philosophy anyway. Dealing with all of them individually seems like an intractable task. What we should be after, then, is some *general* way to treat these formulations. In other words, what we want is to discover what features any priority monist thesis needs to have in order to be a version of priority monism, and then necessitate it.

But that doesn't mean the reasoning in §§3-4 was useless. Quite the contrary. It helped us on our way towards diagnosing what the problems might be for any priority monist thesis – namely, the interaction between the precise formalizations and the domain requirements of the semantics. It also allowed us to diagnose shortcomings in the extant formalizations, so that we may construct the most general and – hopefully – the most unassailable version of the monist thesis. Unfortunately, as we'll discover, even that will not be enough.

First, what does it take for the priority monist's position to be necessary? So far, we have (more or less) been taking a version of priority monism and throwing $\Box$ in front of it. This reflects the usage of its proponents. Vide, for instance, (Schaffer 2010, p. 56):

> *Monism* and *Pluralism* are rival doctrines about the laws of metaphysics, with respect to the grounding of mereological structure. Thus:
> [10.] Either it is metaphysically necessary for the cosmos to be a fundamental whole, or it is metaphysically necessary for the cosmos (if it has proper parts) to be derivative.

I take it that the following is a plausible heuristic: To find a modalized version of a thesis, take the thesis and stick a modal operator in front of it. So, for instance, if we want to say that monism is metaphysically necessary, we take the monistic thesis, however it may be formulated, and put $\Box$ in front of it (where $\Box$ is understood as metaphysical necessity).

So to find out what the modalized monistic thesis is, first we need to know what monistic thesis we are talking about. To consider all possible such theses is not a task achievable in a single paper. Instead, I want to claim that, irrespective of the precise formulation, the core monistic thesis must have features which make it vulnerable to the arguments I have given above.

What is the core monist claim? Earlier, we defined the priority monist thesis as follows: there is one and only one basic concrete object, and it is the whole world. In previous sections, we defined this using a dedicated constant that denotes the maximal mereological object at the actual (and later at any) world. But – the thought goes – perhaps using such a dedicated constant in the formulation of the monistic thesis is what got us into trouble in the first place. One might then want to do away with any dedicated constant, and instead introduce a formula that will designate the single basic object.

What characteristics must this formula have? It should be fulfilled by

(1) A basic object
(2) An object on which all other concrete objects depend
(3) Exactly one object

These are our monistic desiderata. We require that the object picked out by the formula be basic, since it is supposed to not be grounded in any other objects. That it be concrete is assumed by the proponents of monism. We require that all other objects depend on it, since it is supposed to be fundamental. And we require that it pick out exactly one object because, well, it's monism. The clue's in the name.

Suppose that it fails one of these desiderata. If it fails to be basic, then there will be some other concrete object on which the object picked out by our formula depends. (I assume that we concede it must be concrete.) If there is some object which doesn't depend on it, then it doesn't ground all other things (and hence loses any right to be called *priority* monism).[8] This is a problem because And if the formula is satisfied by more than one object, then this is a pluralist thesis and not a monist one. In any of these cases, I submit that our formula will fail to capture what the monist is after. Hence, each of them is an essential part of the core claim.

Note that on the definition of basicness given in §2, a basic object is already a concrete object. So the core monist thesis reduces to:

> *Core thesis*: there is exactly one x such that (i) x is basic and (ii) for every concrete y distinct from x, y is a part of x and depends on x

Formally, where $x < y$ stands for "x is a proper part of y" and all other predicates are as before:

> *Core thesis, formal*: $\exists! x[Bx \wedge \forall y[[Cy \wedge x \neq y] \supset [y < x \wedge Dyx]]]$

So far so good. How do we modalize this? An obvious way is to put $\Box$ right in front of *Core thesis, formal*. This would dictate the use of SQML, since the first conjunct of our formula rules out the possibility of an empty world, and hence of using variable-domain semantics. And since it uses SQML, we run into the same problem as before. Suppose that *Core thesis, formal* is true at @. Then there is exactly one concrete object o that satisfies the formula given above. But it is a theorem of SQML that $\Box\exists x[x = o]$, as we saw before. Hence, o exists necessarily. Note that we have reached this conclusion without having to have a dedicated constant u, as before. We can reach the same conclusion using a formula that picks out the object fulfilling our desiderata.

On the other hand, perhaps the adopter of *Core thesis, formal* wishes to adopt variable-domain semantics, so as to avoid the problem above. If that's the case, then while *Core thesis, formal* will have to be retained somehow, it can't be adopted as is. One way out is to adopt a conditional thesis, much as was done with *NPM 4.0*. For example, one could adopt:

> *NPM 5.0 formal*: $\Box[\exists x Cx \supset \exists! x[Bx \wedge \forall y[[Cy \wedge x \neq y] \supset [y < x \wedge Dyx]]]]$

In words: necessarily, if there is at least one concrete object, then *Core thesis* is true. This allows one to preserve the modalized priority monist thesis along with variable-domain semantics, since *Priority monism 5.0, formal* allows for empty worlds. At such worlds, the antecedent would be false, and the conditional would therefore be true.

But there is something strange about *NPM 5.0 formal*: It would be true *even if all possible worlds were empty ones*. In other words, it would be true at an empty world w such that all worlds accessible from w are themselves empty. That is, monism could be necessarily true even if, necessarily, there are no concrete objects, basic objects, or concrete basic objects. *NPM 5.0 formal* can be true if it is metaphysically impossible for there to be dependence relations or concrete objects.

[8] This may not be a problem for every sort of monist, but it is for Schafferian monists, and it is to them that this paper is addressed.

Here is another way to put the point. Jonathan Schaffer writes that monism is "relative to a target and unit, where monism for target *t* counted by unit *u* is the view that *t* counted by *u* is one."[9] Nihilism with respect to a target domain, on the other hand, holds that "*t* counted by *u* is none."[10] If this is the case, then *NPM 5.0 formal*—or indeed any similar conditional monist thesis—fails, I claim, to capture the spirit of Schaffer's monism. We can put the problem as a simple modus tollens. If *NPM 5.0 formal* adequately captures Schafferian monism, then it can't be true where Schafferian nihilism is also true. But it can be true there, so it doesn't adequately capture Schafferian monism. The second premise I have just argued for, and I take it that the first is an upshot of the characterizations of monism and nihilism just quoted. So the conclusion follows.

A general point should be made here. If the priority monist wishes to adopt variable-domain semantics, then they must adopt a conditional analysis of their thesis. For, as we have seen, modalizing *Core thesis* by itself produces the unwanted consequence of necessary existence. The point of making it a conditional thesis is to allow for empty worlds. At such a world, the antecedent would simply be false, making the thesis as a whole true. But then, since the point is to make the thesis true when the antecedent is false, *any such conditional thesis* – and this is important – will be vulnerable to the criticisms I have just made. Any such modalized thesis will fail to capture what I take to be the important part of Schafferian monism.

6 The Modal Universe Can't Shrink

If the arguments I have given in §§3-5 succeed, then the priority monist is stuck with a necessarily existing concrete object, the actual cosmos. In this section and the next, I'll expand on the argument I gave in §3 which concluded that a formulation of priority monism in terms of quantification over worlds doesn't let the priority monist avoid a necessarily existing actual cosmos. I'll argue, first, that the modal universe can't *shrink*: The concrete objects which actually exist, and their sum, exist in all possible worlds. In the next section, I'll argue that the modal universe can't *expand*: No *other* concrete objects exist in any other possible world. Putting these two together yields the conclusion that, if priority monism is a necessary thesis, the actual concrete objects are all and only the ones which exist in every possible world.

So far, we've argued that the actual cosmos exists necessarily. This may be unpacked in one of two ways. Either the actual cosmos exists as itself in all metaphysically possible worlds, or else some counterpart of the actual cosmos exists in all metaphysically possible worlds.

It may not be advisable for the priority monist to adopt counterpart theory. As we have seen, the adoption of variable-domain QML presents challenges for the priority monist, since the position commits one to the existence of at least one concrete object per world. Hence, the advisable semantics are those of SQML. But, as is easy to see, SQML allows an individual to exist in more than one world. This

[9] (Schaffer 2018, §1.1)
[10] (Schaffer 2018, §1.1)

violates one of the postulates of counterpart theory (P3 in (Lewis 1968, p. 114), for instance), that nothing is in two worlds. Alternately, the priority monist may adopt the jerry-rigged version of variable-domain QML mentioned in the previous section. On this semantics, the priority monist can claim that, while *Necessary concretum* is true, nonetheless what exists in the other nearby worlds are counterparts (or perhaps only some of them are counterparts) of the actual cosmos.

On the other hand, the priority monist might wish to adopt the position that the actual cosmos exists in all metaphysically possible worlds. The actual cosmos is the mereologically maximal concrete object in the actual world, which is to say, it is "the fusion of all actual concrete objects."[11]

Now, consider the following argument:

(1) If, necessarily, the fusion of all actual concrete objects $o_1, o_2, \ldots$ exists, then necessarily $o_1, o_2, \ldots$ exist
(2) Necessarily, the fusion of all actual concrete objects $o_1, o_2, \ldots$ exists
(3) [**So:** (3)] Necessarily, $o_1, o_2, \ldots$ exist. (from (1), (2), by MP)

This argument is valid. Is it sound? At this stage in the argument, we are assuming that we have established the truth of (2). So it remains to be seen whether (1) is true.

Here is an argument for its truth. Suppose that, necessarily, the fusion of all actual concrete objects exists, and consider some arbitrary world w. Since it is necessary that the fusion of all actual concrete objects exists, it exists in w. The existence of the fusion or sum of all concrete objects implies the existence of the least upper bound (henceforth lub) of all concrete objects (see Simons 2000, p. 32), the "smallest" individual which contains all the o's. (We will offer technical definition shortly.) So this lub exists in w. Since the lub of the o's contains all the o's, all the o's exist in that world. Hence, necessarily, all the o's exist, which is what we wanted to show.

This argument does not rely on mereological essentialism, the doctrine that any mereological sum can change its parts (perhaps entirely) while remaining the same sum. That doctrine, or rather its status as a conceptual truth, has been challenged by some philosophers – for example, by Van Inwagen (2006).[12] Rather, it relies on the suppressed premise that all lubs of some collection of all actual concrete objects have their parts necessarily.

This suppressed premise has considerable intuitive support. Consider the smallest individual that contains both my left hand and the Eiffel Tower, and call it ε. It seems true to say that at any world where ε exists, my left hand and the Eiffel tower do not fail to exist.

We may also offer a direct argument for it, from the definition of $lub(x, y)$. For suppose that $lub(x, y)$ at time t_0 has x and y as its parts, and at time $t_1 > t_0$ does not have x as one of its parts, but instead has some other object z as its other part in addition to y.[13] Then, by the definition of $lub(x, y)$, it is the unique individual

[11] (Schaffer 2010, p. 34)

[12] Arguably by Thomson (1998) as well.

[13] The argument works equally well if we suppose $lub\ (x, y)$ changes its parts across worlds and not across times.

such that everything that x and y are a part of, it is a part of as well. But now consider the mereological sum of x and y, sum(s, y). Clearly this has x and y as its parts. But it doesn't have *lub*(x, y) as one of its parts. This is because, first, sum(x , y) does not have z as a part; second, *lub*(x, y) does; and third, parthood is transitive. From these one can clearly see that if *lub*(x, y) with z instead of x were a part of sum(x, y), z would both be and not be a part of sum(x, y). We have reached a contradiction for this condition. On the other hand, suppose that lub(x, y) loses x and gains no other parts. So its only part is x. But then, since everything is an (improper) part of itself, lub(x, y) is a part of lub(x, y). So it follows that x and y must be a part of lub(x, y). We have reached a contradiction yet again, and since those are the only two options (either lub(x, y) loses a part and gains another or loses a part and gains no other) and the argument is fully general (it applies to x as well as to y, severally or jointly), we conclude that lub(x, y) can't change its parts.

This is still not mereological essentialism, to be clear, nor does the argument given above presuppose it. At no point in the argument did I assume that it was impossible for sum(x, y) to change its parts while remaining the same sum. Nor do I deny that some sums may at one time be composed of parts x and y, and out of two qualitative duplicates of x and y, x' and y', at some later time (or that the same may happen when varying worlds instead of times). The difference between sums and lubs, on this view, is in the relations each uses. For sums, the relevant concept in the definiens is *overlap*, or part-sharing: the mereological sum of x and y is the unique object sum(x, y) such that for every w, if w overlaps sum(x, y) then w overlaps either x or y, and vice versa. For lubs, on the other hand, the relevant concept is *parthood* simpliciter. This generates different diachronic, synchronic, and trans-world identity conditions, such that while sums may change their parts, lubs may not.

Lest the reader misunderstand, note that our suppressed premise about lubs is not a thesis about individuals being able or unable to change *properties* across worlds. A concrete object may indeed have different properties across worlds, for all the argument we have given above says. For instance, there may be a world in which the relevant object has properties which are not necessitated by its concrete parts. Consider, for example, a view on which numbers are a certain kind of property (as presented in Yi (1999), for instance), and consider two worlds accessible from @, w and w'. In both w and w' some concrete object which exists at @ exists (we suppose), but in w the relevant sort of number properties are instantiated, and in w' they are not (assuming that number properties of this sort are not necessitated by there being certain concrete objects; if you think they are, think of some other properties that are not – examples abound). So even if the suppressed premise is true, the concrete object in question may change properties across worlds – it just can't change its *concrete parts*. All the argument given above relies on is truths about the concrete parts the object in question has.

Let us return to the original point. If (1) is true (as I have argued), then the argument is sound. In that case, the priority monist is not just committed to the necessary existence of the actual cosmos. Instead, the priority monist is *also* committed to the necessary existence of each of its actual parts. This may be a palatable consequence or it may not. But it seems to be one that the priority monist might have trouble getting out of.

7 The Modal Universe Can't Expand

There is still one more surprising upshot of this argument. It is that the only concrete objects that exist in the whole modal universe are the ones that *actually* exist. If something doesn't actually exist, then it necessarily doesn't. This is, of course, a surprising and counterintuitive conclusion, so the claim that it is entailed by the arguments we've given requires an argument all its own. It is to this task that I now turn.

Let's orient ourselves. What we have shown, so far, is that the modal universe can't shrink. None of the actually existing concrete objects can fail to exist in any possible world. But nothing we've said so far rules out the possibility that the modal universe may *expand*. That there might be a possible world where *more* concrete things exist than actually do exist. But, as I will now argue, this is ruled out by the modalized thesis.

Here is how we see this. Suppose there is some possible world w, $w \neq @$, such that the actual cosmos u exists at w and some concrete object c exists at w that does not exist at @. Then it follows, as we showed in §3, that u is the only basic object in our domain. Hence c depends on u. Call this new cosmos in which c exists and depends on u v instead. Now, since priority monism is necessarily true, it follows that all the arguments we've given throughout this paper apply at w as well as at @. It follows, then, that v exists in all possible worlds.

It also follows, as we've argued in this section, that all v's parts exist in all possible worlds. Recall the argument we gave above concerning the fusion of all actual objects, and suppose that, instead of running the argument using all actual concrete objects, we instead ran it using all concrete objects at w. Since v exists in all possible worlds, (2), suitably modified, is true. As a consequence of this, (3) is true as well, suitably modified. So all the parts of v exist necessarily. In particular, c exists in @. But this contradicts our assumption that c did not exist in @. So we conclude, by reductio, that there is no such possible world w where there exists a concrete object c that does not exist in @.

This is, one might think, a truly alarming upshot. At the very least, it is a sort of necessitarianism: It entails that there couldn't have been any other concrete objects than there actually are. This is a far cry from where we started. Initially, it seemed as though one could get away with saying both that priority monism is necessarily true and that there could have been other cosmoi. But, as we have shown, if the first statement is true, the second is not. Still worse, the modal universe can neither expand nor shrink. We are stuck with exactly what exists – no more, no less.[14]

[14] This, in a surprising twist, bears some interesting resemblance to a recent analysis of modality given by Wilson (2020). There, Wilson analyzes possible worlds in terms of Everett worlds, which are (briefly and somewhat oversimplifying) ways the world could be that are consistent with the laws of quantum mechanics given an Everettian interpretation. The Everettian multiverse is, then, the collection of all such worlds, each with their own spacetime. ((Wilson 2020, pp. 96–97)) But this multiverse is, as far as I can make it out, *not* the multiverse of Star Trek or Lewisian modal realism. The laws of nature as they currently are do not vary ((Wilson 2020, p. 145)), and neither does the initial state of the multiverse. ((Wilson 2020, p. 28)) Some actual things which we currently regard as contingent (whether the world is classical or quantum, whether the initial universal quantum state could've been different, etc) turn out to be necessary.

This might still leave some room for variation, but not much. It might allow, say, for permutations of the actually existing concrete objects such that they stand in different relations. Consider, as a toy model, a cosmos consisting of two concrete objects, *a* and *b*, where *a* stands in relation *R* to *b*. Then the necessitarianism for which we've argued might seem to allow for possible worlds where *b* bears *R* to *a*, or where *a* bears R' to $R'b$, and so forth.

But this may not be as permissive as it seems. Suppose, for instance, that grounds necessitate their groundeds, and suppose that in the actual world, concrete object *a* grounds concrete object *b*. Then, one might think, even under this account of necessitarianism one might be able to permute *a* and *b* such that *b* grounds *a*. But this will not do. For if *a* grounds *b*, and grounds necessitates their groundeds, then if *a* exists then so does *b*, and *a* grounds *b*. But, if grounding is transitive, then in our permuted world it would be the case that *b* grounds *a* and *a* grounds *b*, and hence that *b* grounds *b*, violating the irreflexivity of grounding.

How about another relation, that of causation? If one adopts the Humean constraint of no necessary connections between distinct existences, then perhaps one can so permute the actual concrete objects such that the causal facts about the world differ. However, priority monists are often *not* Humeans in that sense; Schaffer (2010b), for instance, explicitly disavows the stricture against necessary connections. And so, if causes necessitate their effects, we have a problem that is very similar to the one we saw about grounding. Suppose that in the actual world, event *a* causes event *b* (assuming that events are concrete objects). Then, if causes necessitate their effects, in a world where *b* caused *a* instead, *a* would nonetheless still cause *b*. This generates a causal circle, and even if one does not think that causation is transitive (as with, for instance, Hall (2000) or Hitchcock (2001)), this still seems problematic.

These two cases leave me with a decidedly sour taste in my mouth. We have seen that, in at least two cases, it seems that even recombination of the actually existing concrete objects may fail to generate interestingly new worlds. It cannot, or at least plausibly cannot, do so by means of permuting objects which stand in relations of grounding or causation to each other, at least. This is an admittedly weak inductive case that there are *no* interesting relations whose relata we could so permute. But whatever the case may be, the priority monist is left with a very constrained collection of ingredients with which to work.

8 Concluding Remarks

What moral should we draw from the foregoing? As I see it, there are two options. First, the priority monist may deny *NPM* and *NPM 3.0*, and insist that priority monism is in fact contingent. Some philosophers discuss doing this on other grounds (see for instance Miller 2009; Baron and Tallant 2016; Siegel 2016; Benocci 2017; Trogdon 2017), and the arguments I have given may provide another reason to do so.

Second, the priority monist might simply bite the bullet and accept *Necessary Existence*. This would involve either a commitment to a necessarily existent actually existing concretum, along with the necessary existence of all its actual parts– no more and no fewer, as we showed in §6 – or the adoption of a jerry-rigged logic to accommodate other metaphysical scruples. The first is a much heavier metaphysical cost than the priority monist might have expected. It is one thing to insist that every world contains a maximal concretum that is fundamental at that world. It is quite another to accept the necessary existence of one and the same necessary concretum, and that the only possible concrete objects are the actual ones. And the second runs the risk of ad-hoc-ness, merely inserting a patch to a preferred logic in order to preserve a preferred metaphysic. But this, I have argued, is what the position leads to.

I do not take either of these positions to militate against or in favor of monism itself. Arguments in its favor must be assessed on their own grounds.[15] But I hope to have established that, if one wishes to take monism as a thesis about what is metaphysically necessary, one is saddled with other, unexpected, substantial metaphysical views.

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[15] As does, for instance, Bohn (2012)

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