

## Theories as Recipes: Third-Order Virtue and Vice

Michaela M. McSweeney

**Abstract:** A basic way of evaluating metaphysical theories is to ask whether they give satisfying (not necessarily truthful!) answers to the questions they set out to resolve. I propose an account of “third-order” virtue that tells us what it takes for certain kinds of metaphysical theories to do so. We should think of these theories as *recipes*. I identify three good-making features of recipes and show that they translate to third-order theoretical virtues. I apply the view to two theories—mereological universalism and plenitudinous platonism—and draw out their third-order virtues and vices. One lesson is that there is an important difference between essentially and non-essentially third-order vicious theories. I also argue that if a theory is essentially third-order vicious, it cannot be assessed for more standard “second-order” theoretical virtues and vices, like parsimony. This motivates the idea that third-order virtues are distinct from second-order ones. Finally, I suggest that the relationship between truth, progress, and third-order virtue is more complex than it seems.

Metaphysicians often focus on what I’ll call first-order desiderata: that our theories accurately describe the data (if there is any data); that they don’t logically entail contradictions or wildly implausible consequences, etc. (and perhaps, that they ‘seem plausible’). We also often focus on the second-order desiderata: that our theories have certain virtues (e.g. explanatory power, unification, parsimony, etc.) and lack certain vices. When doing metametaphysics, we often focus on epistemic and methodological questions: whether our theories are on epistemically shaky ground; whether we could be justified in believing any of them; whether we can assimilate metaphysics to science; and so on.<sup>1</sup>

In this paper, I focus on a different metametaphysical question: what properties should a theory have in order for us to be able to assess it for these first and second order desiderata? I’ll call those properties *third-order desiderata*. One way of thinking about the “third order” is this: what properties do we want a set of claims to have in order for them to even count as a metaphysical theory? I dislike this way of framing the question, which I think is prone to leading to merely verbal disputes about what counts as a theory—and there is a substantive issue here.<sup>2</sup> Instead, I propose that we think of there being third-order *virtues* and *vices*, just like the second-order ones (the more standard theoretical virtues).

Our central third-order desideratum that we want metaphysical theories to fully answer the question(s) that they set out to answer. Indeed, the best way to understand what third-order virtues are is to focus on what makes a metaphysical theory a successful (not necessarily true!) answer to its corresponding question. Third-order virtues will vary with what kind of question this is. Some

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<sup>2</sup> I find it problematic to think about theories in an ‘all-or-nothing’ way—which is why I frame things here as about virtue and vice. Policing the boundaries of theoryhood so that certain theories get ruled out doesn’t help us make progress.

metaphysical theories aim to analyze a certain concept we already have (e.g. *free will*). Some metaphysical theories aim to give ameliorative accounts of (e.g.) social phenomena (e.g. *gender*). These two kinds of projects have different aims and correspondingly different third-order virtues and vices.

My interest is in what I'll call *ontological theories*, which answer questions like: 'which things are there (in a particular domain) and what are they like/how are they arranged/how do they interact?'. My goal is to spell out what it takes for an ontological theory to successfully answer its question(s).

I resist the idea that we should think about metaphysical theories in just the same way that we think about scientific theories, or that we should assimilate metaphysics to science. Contemporary metaphysicians and scientists often care about distinct questions; and ontological theories in particular seem to have a different kind of flavor, as well as a different form, than our current best (e.g.) physical theories. However, my approach is partly influenced by the philosophy of science, and I mention some connections later.

My central claim is that we should think of ontological theories as *recipes*, and third-order virtues as corresponding to three virtues of recipes: they specify their ingredients; they give us instructions about how to turn those ingredients into a final product; and they explain their ontology and terminology in terms of concepts that we understand.

I suspect that proponents of theories that aren't (by my lights) third-order virtuous will simply reject my claims about what it takes for a theory to be third-order virtuous. I'm unconcerned by this, since my goal is to lay out a framework for third-order virtue—not to convince anyone that their first-order views are false. However, I will also argue that one of the theories I examine, *plenitudinous platonism*, is essentially third-order vicious, and that it follows that it cannot be assessed for second-order virtue—so there is a bullet such philosophers must bite.

In §1, I introduce the central claim of the paper: we should think of ontological theories as recipes, and correspondingly should think of third-order virtuousness of ontological theories as akin to what makes a good recipe. In §2, I introduce the two metaphysical theories I will discuss, plenitudinous platonism and mereological universalism. In §3, I examine whether mereological universalism is third-order virtuous. In §4, I examine whether plenitudinous platonism is third-order virtuous. In §5, I use plenitudinous platonism to argue that if a theory is essentially third-order vicious, it is not apt for assessment for second-order virtue or vice. In §6, I conclude by briefly discussing Kant, Einstein, and whether third-order vicious theories are good for anything.

## 1. Ontological Theories as Recipes

I believe that we should think of ontological theories, at least roughly speaking, as recipes. Think about a recipe for bread. The recipe will tell you (a) what ingredients you need and exactly how much of them you need; (b) how to incorporate and cook them properly; and (c) how to understand its equipment and terminology (for example, at least in a recipe for beginner bread bakers, it might explain what it means to 'let the dough rise' or 'knead', or whether to use an electric mixer).

These translate into our three criteria as follows:

- (a) A theory should specify its base ingredients: e.g.: what it takes to be primitive; what it takes to be fundamental; what its ur-elements are; etc. Call a theory that does so *foundational*, and a theory that fails to do so *baseless*.
- (b) A theory should give guiding instructions: it should specify how those ingredients need to be incorporated together in order to generate the theory's full ontology and tell us what relations hold between the items in its ontology. Call a theory that does so *guiding*, and a theory that fails to do so *guideless*.
- (c) A theory should specify any scaffolding (outside machinery, e.g.: interpretation, bridge principles, mathematics, etc.) that needs to be wheeled in in order for the theory to answer its question(s). (One way to think of this: if it is maximally scaffolded, a theory will "explain itself" in terms that you can understand, just as a maximally scaffolded recipe will explain its steps, ingredients, etc. in terms that you can understand.) Call a theory that does so *scaffolded* and a theory that fails to do so *unscaffolded*.

The recipe analogy also makes sense of our initial desideratum (that a theory fully answers the question(s) it sets out to answer): a recipe for buttery lemon cake should produce that, rather than dry brownies.

There are three important notes here. First, ontological theories don't always need to be a recipe for everything, and thus, needn't be complete—what is important is that they successfully answer the specific ontological question that they are invoked to answer. Sufficiently general questions ("what is there and what is it like?") do require complete theories. But most of our ontological questions aren't like that, and so the theories that answer them will be incomplete.

Second, there is one thing about the recipe analogy that may be misleading. Cooking is a process that unfolds over time, and one which (skepticism aside) produces a new thing from some initial things. This might suggest that ontological theories must involve processes, grounding, causation, building, production, etc.; which might in turn suggest that our ontology cannot be *flat*—that some things must be more fundamental than others, or cause others, or ground others.

To see this is not so, consider *flat universalism*, which says: (a) mereological universalism is true; (b) there are simples; (c) all of the axioms are as normally stated but (d) there is no sense of production or building in composition, and simples are not more fundamental than composites.

The recipe analogy can accommodate the flat universalist. Ontological theories are, in part, ways for us to understand reality. They deliver (candidate) objective facts, but they also deliver ways for us to understand and represent those facts. According to flat universalism, composite objects are not less fundamental than simples. The flat universalist should think of the "ingredients" of her theory as primitives, not fundamental entities. These are the simples. She should think of the "instructions" as instructions to us—the thinkers—about the circumstances in which the simples compose. The asymmetry of the ingredients (the simples) and the finished product (the composites) is not (necessarily) a worldly asymmetry, it's an epistemic or representational asymmetry. Our instructions can contain information about how the objects are related to each other, without entailing that those relations are layering relations (that relate more fundamental things to less fundamental things). For a theory to be guiding is not (necessarily) for the final product to be less fundamental than the ingredients. (a)-(c) are to be read as neutral with respect to whether there is worldly asymmetry.

Third, you might wonder why scaffolding should be a part of a metaphysical theory, rather than an external way to help us understand the theory. But what I'm interested in is metaphysical *views* about reality. And we need those to be intelligible in order to understand them. One way in which we want more out of metaphysical theories than we do out of scientific theories might be a matter of levels, or of how fine-grained the theory is; in some ways we can think of this as a question of how interpreted the theory is (the more interpreted, the more likely it is to successfully answer the kinds of ontological questions some metaphysicians are interested in). E.g.: we can't start doing the metaphysics of quantum mechanics until we distinguish between interpretations of quantum mechanics; and the interpretations themselves involve scaffolding. Perhaps more controversially, I believe that metaphysical theories are much better answers to ontological questions when we can understand them in some fairly deep sense—when they give us a way to conceptualize their content.

I'll examine two metaphysical theories that fail to deliver on some of (a)-(c): *mereological universalism* (roughly, the view that any two objects compose an additional object) and *plenitudinous platonism* (roughly, the view that any abstracta that could exist, do exist). I'll argue that (a) depending on what question(s) we are using it to answer, mereological universalism may or may not be third-order virtuous—it is neither essentially third-order virtuous nor vicious, and that (b) plenitudinous platonism is essentially third-order virtuous given its standard motivations and the question(s) we want it to answer. But the central point here is not to pick on either mereological universalism or plenitudinous platonism, but instead to examine them in order to motivate the claim that (a)-(c) are what we want out of ontological theories, as well as to show that these third-order desiderata affect assessments of second-order theoretical virtues and vices when it comes to metaphysical theories. My conclusions have implications for other theories, and not just in the abstract. For example, Lewis' (1986) modal realism is also a plenitudinous theory, and is motivated (but only in part!) by somewhat similar metaphysical and epistemic worries as those the plenitudinous platonist is responding to.<sup>3</sup>

## 2. Plenitudinous Platonism and Mereological Universalism as Answers to Questions

Focus on the natural numbers, and something we know about them, e.g. that  $2 + 7 = 9$ . How do we know this? How can we know things about abstracta, given that we are located in space-time, they are not, and we are causally disconnected from them? Plenitudinous Platonism (hereafter 'PLP') was proposed, and is attractive, in part because it seems to provide the platonist with an easy answer to these epistemic worries.<sup>4</sup> I focus in the remainder of the paper on Balaguer's (1995, 1998) version of PLP.<sup>5</sup> According to PLP, every mathematical structure that *could exist* (in the sense that it is internally consistent) does exist. So long as the natural number structure that contains 2, 7, and 9 is internally consistent, PLP guarantees that our belief that  $2 + 7 = 9$  is justified and true. We know that  $2 + 7 =$

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<sup>3</sup> There is a related literature about Lewis' views that, if I had more space, I would delve into: Divers and Melia (2002, 2003, 2006), Bremer (2003), Paseau (2006), Cameron (2012), Wilson (ms).

<sup>4</sup> For defenses of Plenitudinous Platonism, see eg. Balaguer (1995), (1998); Linsky and Zalta (1995), and possibly Hale (2013, ch. 9). Beall (1999) defends a view on which not just consistent, but also inconsistent mathematical objects exist. More recent applications and discussions of this kind of view or something in its ballpark can be seen in set theory (Hamkins 2011) and in responses to similar challenges in metaethics in Eklund (2017) Clarke-Doane (2017) and Balaguer (forthcoming), and the metaphysics of color (see Kalderon (2007) and Mizrahi (2006)). The epistemic "reliability" challenge is due to Benacerraf (1973) and Field (1989).

<sup>5</sup> My sense is that all versions will fail to be third-order virtuous, but the details make a difference. E.g.: Linsky and Zalta's (1995) view is arguably guiding in a way that Balaguer's is not, but still, I suspect, baseless and not sufficiently scaffolded. But that argument is for another day.

9 not by causal contact or magical powers of intuition, but because the abstract world contains everything that it possibly could: everything such that its existence doesn't entail a contradiction. For example, the proponent of PLP must believe in a structure that is *just like* the natural numbers ('NN'), but is missing the number 9. Call this structure NN\*. The 'numbers' in NN\* can't be identical to their counterparts in NN—so  $8^*$  is not 8—because if they were, we would have an immediate contradiction ( $8+1 = 9$  and  $8+1 = \text{undefined}$ ). But if 8 and  $8^*$  are distinct, then there is nothing internally contradictory about NN\*.

PLP is intended to answer at least two distinct questions. In addition to answering the epistemic challenge, it answers the ontological question: what abstract objects are there?

I will argue that PLP fails to adequately answer both its questions, because it is baseless, guideless, and only partly scaffolded. First, I will compare it to another theory, *mereological universalism* (hereafter 'MU'), which says, very roughly, that any two objects compose a numerically distinct object.<sup>6</sup> (So: when does composition occur? Always.) PLP and MU look superficially similar: they both entail that there are a lot more things than we might have thought there were. Further, both PLP and MU are often motivated by epistemic problems. MU, or some variation of it, is sometimes invoked to answer the epistemic arbitrariness charges that come with attempting to justify our belief in ordinary composite objects like tables and trees.

However, there are two crucial differences. First, MU is sometimes invoked to answer a non-ontological question that has a different metaphysical flavor than that of the question PLP is responding to. Insofar as MU successfully answers this question, MU might be a perfectly good metaphysical theory without meeting conditions (a)-(c). Second, PLP is essentially third-order vicious, whereas MU can be adapted to be virtuous. I'll examine each in turn.

### 3. Is Mereological Universalism Third-Order Virtuous? It Depends.

There are (at least) two distinct metaphysical questions that MU is invoked to answer. The first is 'under what circumstances do objects compose other objects?'. This is a 'how does it work and what is it like?' question, not an ontological question. I'll call it the *mechanism* question, because it asks about the nature of a mechanism or relation. The second is the ontological question: 'what composite concrete objects are there?'

There are also multiple ways of understanding what MU says. At its most basic, it provides us with nothing but a set of formal axioms. These axioms already count as guiding, because they give us instructions for producing one collection of things from another. That is, we "feed in" some ur-elements, and then the axioms "produce" new elements. This set of uninterpreted axioms comes close to answering the mechanism question, but does not succeed because it is unscaffolded.

Scaffolding is what allows us to understand a theory as being about what we take it to be about—in some sense, it is what allows us to interpret the theory. One role that scaffolding plays is to help interpret formal axioms, if formal axioms are what make our theory guiding.<sup>7</sup> But to answer the mechanism question, our scaffolding needs to connect the axioms to the actual conceptual content we are talking about (in this case, composite physical objects). The axioms, supplemented with

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<sup>6</sup> I'm using the non-reflexive notion of parthood.

<sup>7</sup> I don't pretend that this isn't very messy; witness the ink that has been spilled about interpretation.

something as basic as a claim that these axioms are *about* composition, and their ur-elements are *whatever the (concrete) simple objects are (if there are any)*, are enough to answer the mechanism question.<sup>8</sup> Call the axioms plus this minimal scaffolding *barebones* MU.

Barebones MU is baseless—it doesn’t tell us anything about the simples. When barebones MU is invoked to answer the mechanism question, it doesn’t matter whether there are any objects, or whether there is only a single simple (and hence, no composite objects). It makes no difference how many different kinds of simples there are, or what they are like. The mechanism question is about the circumstances under which composition occurs and not about what objects there actually are. As a mechanistic theory, MU doesn’t need to tell us about its ingredients. It only needs to tell us about its instructions and its scaffolding. So, insofar as barebones MU is invoked to answer the mechanism question, its baselessness is not a third-order vice.

There is a lurking lesson here. Sometimes, when metaphysical theories are invoked to answer modally broad questions, it may often be that it is better for them to be baseless than foundational, so as to be modally flexible. The mechanism question is modally broad because it is not a question that is only about the actual world. (This is not to say that if barebones MU is true, it is necessarily true.) Barebones MU is not solely tied to actuality, because it allows for variability in what its base might be. This is what we want if it is to be a successful answer to the question ‘how does *this* composition relation work?, since the relation works in the same way in non-actual worlds. PLP doesn’t involve any particular relation or mechanism, and so it is hard to imagine what its mechanistic question could be. Further, PLP can’t have different primitives at different worlds, because anything that it posits in a different world, it must also posit in our world.

Barebones MU sufficiently answers the relevant mechanism question. And barebones MU is *baseless*, *guiding*, and minimally *scaffolded*. The upshot is that what it takes for a mechanistic theory to be third-order virtuous is quite different from what it takes for an ontological theory to be third-order virtuous.

However, MU is often invoked to answer ontological questions—e.g. ‘is there a table here?’, and more generally, to answer the question: “what composite objects are there?”. Barebones MU cannot successfully answer these questions. A good answer requires more scaffolding and a foundation.

Suppose that we want a metaphysical theory that accounts for the data that we have from ordinary perception; stipulate that we in fact perceive tables, mountains, and fingers, and we want our theory to account for their existence. Barebones MU cannot do so. MU would need to be foundational in order to explain what it was we were starting with that “built” the objects we were familiar with. And it would need more scaffolding to explain why applying the axioms to our simples would in fact generate tables, mountains, and fingers. (E.g., one thing we would need to explain is that tables are composite objects. Otherwise, we just have a theory about when simples compose composites, but no bridge principle or bit of theory that tells us why we should believe in tables.) So unless MU is supplemented with these things—(at least) an account of what the simples are, and also bridge principles such as the claim that tables just are the composite object made up of the simples in the

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<sup>8</sup> While barebones MU is guiding because of its formal axioms, we don’t need formalism to meet desiderata (b). Most metaphysical theories are written in (mostly) plain natural language. There is nothing superior about having a formal theory. Indeed, if a theory is guiding because of formal axioms, the theory will require more scaffolding (in explaining how to interpret the formalism).

spacetime region in which they seem to be located—MU is not successfully answering its ontological question. MU, in answer to the ontological question, must be foundational and (much more fully) scaffolded than barebones MU is.

A rough sketch of a common argument about composition looks like this:

- 1) It's objectionably arbitrary (either for epistemic reasons, or ontological for avoiding anthropocentricism reasons, etc.) to claim that there is a table here but no shmable here (where a shmable is composed of  $\frac{3}{4}$  of the parts of the table and my coffee cup).
- 2) So, we should avoid arbitrariness by either (i) rejecting that there are *any* composite objects or (ii) accepting that any two objects compose another one.  
-(ii) is just MU, and has advantages over (i). (We needn't get into the details about what those are.) So we should accept MU.<sup>9</sup>

If this kind of argument structure is supposed to give us a reason to believe MU, then MU better actually secure the result that the table in front of me exists. And if our question is: *given that we believe in tables, must we believe in shmables?*, then the metaphysical theory we appeal to in the course of answering this epistemic question (negatively) must tell us that tables exist. Barebones MU doesn't tell us anything about tables. We need a theory that tells us something about what our primitives are (is foundational), and that tells us that tables and shmables are among its composites (it needs more scaffolding—at the least, bridge principles that tell us that tables just are composite concrete objects).

Barebones MU is only a good answer to the mechanism question. But there is nothing about barebones MU that precludes us from adding to it: specifying primitives and scaffolding those primitives; adding more scaffolding in the form of “bridge principles” that tell us that, e.g., tables just are composite material objects made up of mutrons, and so on. Whether the resulting theory is plausible, true, or worth taking seriously is one question, but it is not the question at stake here—our question is whether such a theory would count as third-order virtuous.

MU is consistent with many different views about (e.g.) what the simples are, what they are like, how homogenous they are, and so on; and nothing about the motivation for MU requires us to posit many different kinds of simples. E.g. here is a third-order virtuous “fleshed out” version of MU, call it *MUtron*: Everything is made out of simple particles that are all the same type, the *mutron*. Mutrons all have the same set of essential properties specified by the theory (e.g.: size, shape, charge, color, etc.). Everything concrete is composed out of mutrons. Any two objects compose a numerically distinct object. We should believe in Tillie the table because Tillie's smallest parts are mutrons; the axioms of MU are true; tables are nothing more than composite concrete objects; so Tillie must exist. And so on. Whether you think that MUtron is plausible is not relevant here. The important point is that it is (a) third-order virtuous and (b) consistent with the way MU answers its metaphysical and epistemic questions, and consistent with the core commitments of MU.

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<sup>9</sup> E.g. (though not all of these are endorsements!), Beebe (2015), Hawthorne (2006, introduction), Korman (2010, 2015), Noonan (2014), Quine (1981: 13), Sidelle (2002), Sider (2001), Van Cleve (1986, 2008). Also see Fairchild (ms) for worries about (a) clarifying arbitrariness arguments and (b) whether arbitrariness arguments can actually motivate views like MU.

So we can adapt barebones MU to be a third-order virtuous ontological theory. In contrast, some theories, like PLP, are essentially baseless, guideless, or unscaffolded: we cannot add a foundation, or a set of instructions, or more scaffolding, without making the theory fail in some other way.

#### 4. Is Plenitudinous Platonism Third-Order Virtuous? No, and Essentially Not!

PLP's ontological question is this: *what abstract objects are there?* PLP fails to answer this question, and so is third-order vicious. It is baseless and guideless, but perhaps partly scaffolded. Further, it is essential to PLP that it fails to answer its ontological question—which distinguishes it from barebones MU, which can be supplemented to fully answer MU's ontological question.<sup>10</sup>

PLP gives us instructions, but they are not instructions that give us a way to determine an ontology. Instead, they—at best—allow us to determine what is not in our ontology. Instead of telling us what is in the domain of abstracta, PLP's instructions tell us how to determine what is not in the domain of abstracta: if a potential structure or object is internally inconsistent, then it is not an abstract object; everything else (non-concrete) is. We can make some progress: for example, there is an abstract object for every concept we have, so we can consult our concepts and try to come up with new ones. But we are still missing out on huge swaths of abstracta. We might also point out that there is an abstract object for every concept we could possibly have, and fish around for new concepts. But even this is not enough: PLP is committed to alien objects (objects that we lack concepts corresponding to, or even ways to construct such concepts).<sup>11</sup>

If PLP is committed to alien objects (in the specific sense in which we have *neither* concepts that correspond to these objects *nor* procedures for arriving at those concepts), then it is analytically guideless. When a theory is committed to alien objects, then it simply follows that the theory cannot provide us with a set of instructions for arriving at our ontology, since an alien object (in the narrow sense I laid out above) is one which no procedure could allow us to arrive at a concept of. And PLP must be committed to alien objects if it is going to sufficiently answer its epistemic question. Lurking in the background of PLP's epistemic question is this: why would it be that our beliefs (or discoveries) about mathematics map onto the actual mathematical facts about the actual mathematical structures? This seems like a magical coincidence given that we don't seem connected to those facts in the right sorts of ways. PLP answers: it is not magical if *any consistent arbitrary belief*, maps onto actual mathematical facts about actual mathematical structures. This includes beliefs which humans could not possibly have (but which, e.g., either omniscient creatures like gods could have, or creatures who were sufficiently differently cognitively and mentally constituted than humans could have). If so, then by definition, PLP cannot provide us with a set of instructions for determining its ontology. So if PLP successfully answers its epistemic question, it will turn out to be analytic of, and hence essential to, PLP that it is guideless.

It is instructive to examine a tamer version of PLP, which restricts itself to positing an object for each of our possible concepts, rather than also positing objects we could not possibly dream of. This version of PLP, call it PLP-, must still posit  $\mathbb{N}\mathbb{N}^*$  (the structure that is a qualitative duplicate of the natural number structure, except that it is missing a number\*, 9\*).

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<sup>10</sup> Some of the argument in this and §5 is somewhat similar to Restall's (2003) argument that PLP is ill-formed, and, if sharpened, is either too strong or too weak. However, I am concerned about a much more general issue than Restall is.

<sup>11</sup> Not all versions of PLP are committed to this; e.g., if Hale (2013) counts as a proponent, he seems to be defending a tamer version.



Let us first restrict our attention to these NN-like structures: structures that are something like qualitative duplicates of NN, but with some numbers added or removed. We might be able to construct a set of instructions that would deliver all of the NN-like structures.

However, once we contemplate what PLP- has to say about the rest of mathematical space, it seems impossible that there could be any such instructions except for the one-liner “any internally consistent mathematical structure actually exists”. If I had to catalogue what there was in the abstract world, I couldn’t just say “mathematical objects work this way:” and then list a set of instructions for “constructing” mathematical objects. Instead, each mathematical structure is constructed in a different way. So, it looks like the proponent of PLP- would have to give a distinct principle for each type of mathematical structure. Given that there are infinite variations on NN that she must accept, and this is just scratching the surface of the entities she must accept, it follows that there is no finite way to state a set of instructions for constructing the ontology of even the limited PLP-. (And note that, given the seeming open-endedness to human creativity, it is unlikely that there is a countably infinite way to do it.)

Further, insofar as PLP is supposed to be a response to the epistemic question, there is no principled way to separate mathematical from non-mathematical abstract objects; every possible abstract object could be, for all we know, an alien mathematical object. So there may be some mathematical structure which has as components various musical works. (Note: the proponent of PLP must be committed to this for the same *epistemic* reasons that motivate her view as a response to the reliability challenge, not in the same way that (e.g.) certain kinds of mathematical structuralists must be committed to the idea that anything could serve as a node in a mathematical structure.) And it is easy to see that we could not possibly come up with a guiding version of even PLP-.

It looks very difficult to see how PLP- could possibly have instructions (at least, instructions that themselves were finitely long). And it is analytically impossible to produce instructions for PLP. I conclude that PLP is guideless, and moreover that it is *essentially* guideless, insofar as it can answer its epistemic question in the way it is intended to.

By similar (but simpler) reasoning we should conclude that PLP requires infinitely many primitive terms, and that it hence is *baseless*. We would need infinitely many 0, 0\*, 0\*\*...s and infinitely many successor functions just to generate the relevant NN, NN\*, NN\*\*, etc., and again, that these are an extremely small part of just mathematical abstract space for the proponent of PLP (not to mention non-mathematical abstract space!). PLP would also require alien primitives. And even PLP-’s primitives seem unlikely to be countably infinite. So it seems that PLP—even in its restricted form—is likely essentially baseless.<sup>12</sup>

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<sup>12</sup> Readers may start wondering about the relationship between primitive terms and fundamental entities: maybe there is some theory of mathematics that can ground or secure all of the non-fundamental facts/entities that the proponent of PLP believes in (though I’m pessimistic). If so, perhaps the only primitives we need are those in the fundamental theory. But first, given the epistemic challenge that PLP is supposed to be answering, I don’t see how any proponent of PLP could possibly endorse this kind of claim, given the epistemic leaps that are required to commit to it. Second, if a theory only provides us with fundamental terms, and then instructions, then in order to be third-order virtuous, it is going to have to end up with a lot of scaffolding. Given my framework, the grounding theorist must accept that claims about “what grounds what” just *are* scaffolding, and hence that they show up in the theory; but much more needs to be said about what this means for evaluating theories for second-order virtue, as well as for the question of whether grounding

Why require finite, or countably infinite, bases or guides? If ontological theories are like recipes, we need to be able to follow them: they need to do epistemic work for us. And we can't follow them if they have uncountably many ingredients or steps.

Let me briefly say something more direct about why we need foundational, guiding ontological theories. Stepping away from PLP for a moment, suppose we are focused on the question: “what abstract objects are there?” (and perhaps: “what are they like?”). And now consider some standard ways of trying to characterize abstracta. It is often claimed that abstracta either (i) lack location in spacetime or (ii) are causally inert.<sup>13</sup> Either claim tells us something about what differentiates abstracta from concreta. But no one would treat either (i), (ii), or their conjunction as an informative *theory* of abstracta, one which, for example, we can start assessing for second-order virtues like explanatory power or parsimony. ((i) and (ii) might be informative theories that are responses to the question “what differentiates abstracta and concreta?”, but that isn't an ontological question in the sense under discussion here. Neither (i) nor (ii) tells us anything about the natures of abstracta or about any properties they have (besides the negative, non-intrinsic, properties of lacking location and lacking causal powers). Nor do they tell us what abstract objects there are. (Note: both (i) and (ii) are also, I think, bad answers to the question “what is an abstract object?”, which might be closer to what they are actually intended to answer; this is because neither tells us anything at all about what abstract objects are like; they just tell us about what they aren't like. They don't tell us anything about properties that give us a sense of the *character* of abstracta. See my (ms) for discussion.)

Consider a physical theory that says “there are some new fundamental particles; they aren't like anything that you're familiar with; and moreover, I can't tell you anything about what they are like or how they give rise to the manifest image; but I'm positing them because they can do such-and-such work for me, and make it more likely that my theory is true”. Such a description of fundamental reality would not pass muster as a fully fleshed-out scientific theory that was apt for being assessed for theoretical virtuousness. Nor should (i) or (ii) pass muster as a fully fleshed-out metaphysical theory of abstracta, apt for assessment for (e.g.) parsimoniousness. What PLP shares with (i) and (ii) is that both can be thought of as *constraining* theories: they tell us only about the constraints on what can be let in to the ontology; they don't give us a recipe for constructing a positive ontology. I'll say more about this in §6.

Is PLP scaffolded? This is a much trickier question to answer. But it will help us get clear on different ways in which theories can be scaffolded. PLP is clearly at least partly scaffolded. This is because it (at least partly) answers the question of (e.g.) which of the things in platonic heaven we are referring to when we talk about whether  $2+7 = 9$ . I won't get into the details here, but if securing reference is a part of scaffolding, PLP is (perhaps unsatisfyingly!) scaffolded.

There is also an important sense in which PLP is not scaffolded, which is instructive to examine. All theories, it seems, must involve some *undefined* primitives. And sometimes, those undefined primitives just are the theory's “base ingredients”. But sometimes, undefined primitives can still be scaffolded (and sometimes, even informally defined). Consider MU: if MU is going to answer its

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claims are themselves grounded in the fundamental. A proponent of my framework and grounding might use Dasgupta's (2014) strategy (note, though, his use of ‘scaffolding’ is distinct from mine—though related).

<sup>13</sup> See, e.g., Lewis (1986).

mechanistic question, we need to know that its primitives pick out *whatever the compositionally simple concrete entities are*.

When taken as an answer to the mechanism question, all we need to know that is that the primitives of MU are whatever ends up filling the theoretical role of the “simples”. For MU to be an ontological theory, we must know something more about these primitives. For MU to license belief in tables, it must entail that this table right here has parts that are, in fact, simples. This suggests that for theories to answer ontological questions, we need scaffolding for our primitives, not just (e.g.) bridge principles about tables or stipulations about the subject matter of our theories. This primitive scaffolding serves to connect the primitives in our theories to something we better understand (e.g. that the smallest parts of this table are simples connects the simples to something we already conceptually grasp).

But PLP’s primitives cannot be scaffolded, because PLP is baseless. It doesn’t have as many primitives as it would need for to generate its entire ontology. We can in fact list some of the primitives of PLP, e.g., 0, the successor function,  $0^*$ , the successor function\*, etc.. And some of these primitives will be at least partly scaffolded. But even supposing list all of the primitives in PLP, most of them would be unscaffolded—they would be entirely disconnected to anything that we already had a grip on, and so we could get no understanding of them at all, except via examining the structures that their respective instructions would “create”—but those are also unscaffolded! And so, just as PLP seems to be essentially baseless and guideless, it seems to be essentially unscaffolded: even if we could specify all of its primitives, we wouldn’t be able to sufficiently scaffold them.

PLP is essentially baseless, guideless, and at least partly unscaffolded. So there is no way to turn PLP into a theory that is foundational, guiding, and sufficiently scaffolded to be third-order virtuous.

### 5. Third-Order Vice Leads to Second-Order Unassessability

I now want to argue that PLP’s third-order vices make it inapt for assessment for second-order virtues (e.g. explanatory value, unification, parsimony, etc.). This should concern those who might respond to what’s been said so far by rejecting my third-order criteria. While we might disagree about exactly how to cash out second-order virtue and vice, assessing theories for second-order virtue is one of our main methods for theory choice in metaphysics. If theories that are third-order vicious can’t be assessed for second-order virtue, then we cannot compare them, at the second-order level, to third-order virtuous theories.

I will solely focus on parsimony, and will show that PLP cannot be properly assessed for either ontological or ideological parsimony. I think similar arguments can be made for other second-order virtues, but more needs to be done to extend what I say here to other potential second-order virtues.

It is somewhat standard to think that it is *qualitative* and not *quantitative* ontological parsimony that is virtuous: that is, a theory is less parsimonious insofar as it posits more kinds of entities, not insofar as it posits more entities.<sup>14</sup> But I will briefly say something about why PLP can’t be assessed for quantitative parsimony. We cannot meaningfully compare PLP to *any* other platonic mathematical

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<sup>14</sup> The claim that it is generally accepted that it is qualitative parsimony that matters often appears in general discussions of parsimony, e.g. Baker (2016, §2). Lewis (1986) appeals to it to defend against the charge of a bloated ontology. However, there are dissenters, e.g. Nolan (1997), Baker (2003), Jansson and Tallant (2016).

theories that posit uncountably many mathematical objects, because we cannot assess the number of entities that PLP posits.

Given that it contains all of the mathematical objects there are, and all of the abstracta there are, we seem to be able to know, for example, that mathematical space contains ZF set theory (since it contains every possible mathematical structure), and hence that it contains very large cardinals like Berkeley cardinals. It is a quick road from here to paradox if we attempt to determine how many things there are in mathematical space “altogether”.

What matters for the proponent of PLP is that each structure posited is internally consistent. However, there cannot be a mathematical function that allows us to *add* all of the elements of each of those structures together and determine how many things there are in mathematical space. There cannot be an external-to-all-mathematical-structures “addition” function. There may be no fact of the matter about how many things there are in mathematical space. At the least, there is no accessible-to-and-statable-by-us fact, so we cannot assess PLP for quantitative parsimony.

Part of this problem is one shared by all mathematical theories that posit uncountably many things, and so it may be unfair to claim that it is because of PLP’s third-order viciousness that we cannot assess it for quantitative parsimony. I think that PLP has additional problems here, though, because it must insist on quantifying over certain objects that other theories need not. But I don’t have the space to argue for this, and I suspect that quantitative parsimony is not the right kind of parsimony to focus on in the first place. So let’s consider qualitative parsimony.

Sometimes qualitative parsimony is taken to be about distinguishing types from tokens; sometimes it is taken to be about distinguishing ontological categories from entities (e.g. a theory that posits both properties and individuals is less parsimonious than a theory that posits only properties). For PLP, where we draw the parsimony line does not matter (unless it is drawn only between abstract and concrete objects). While other mathematical theories that posit uncountably many objects can maintain that there is only one kind of mathematical object (or, at least, finitely many kinds), PLP must posit uncountably many kinds of mathematical entities.

Let *pointillism* be the view that abstract objects are dimensionless, property-less points in abstract space, and that none is any different from any other (except in the relations they bear to one another). Let *qualitativism* be the view that abstracta have qualitative properties just like concreta do: *the equilateral triangle* is, itself, triangular, and hence distinct from *the square*, which is square. Let *structuralism* be the view that abstract objects are structures of relational properties. Focus for a moment on pointillism. A view that says that abstract objects are all dimensionless, property-less points in abstract space is as (qualitatively) parsimonious as possible while still positing the existence of *something*. It only posits objects of one kind.

If PLP could be adapted to only (e.g.) include pointillist objects, then it would be parsimonious on both the type understanding and the ontological category understanding of parsimony. But it cannot be adapted this way, which contrasts with both (i) other platonist views that posit uncountable infinities and (ii) MU. PLP must be committed not just to every internally consistent mathematical structure but also to every internally consistent nature that each of those structures might have. So PLP is committed not to NN and NN\*, but instead to NN(P), NN(P)\*, NN(Q), NN(Q)\*, and so on, where (P) and (Q) are labels for ‘pointillist’ and ‘qualitativist’. PLP cannot decide between

various metaphysical ways that abstracta might be; instead, the proponent of PLP must accept every possible metaphysical account of the natures of abstracta.

It is easy to imagine views which don't even treat abstracta as, fundamentally speaking, objects—e.g. “bundle theory” in the abstract realm, which gives a reductive story about the nature of abstract objects as being bundles of properties (which themselves are not reducible to abstract objects). PLP must accept those as well.

The central point is that PLP is committed to all the entities that the pointillist, the qualitativist, and the structuralist posits, and all the entities that any consistent theory of abstracta posits. Unlike MU, and unlike other platonist theories, a central motivation for PLP is that it is supposed to resolve the epistemic challenge for platonism. And it is supposed to do this by guaranteeing that, for any abstract object we could possibly consistently conceive of (and more!), that abstract object exists. Without this aspect of PLP, it can no longer earn its keep, since we will be again be faced with (a the epistemic challenge (how do we avoid the magical coincidence problem if we believe in NN(S) and it turns out that is the only NN-like structure that exists?). The possible natures of abstracta seem endless, and not just endless, but uncountable. And regardless of whether we draw the line at types or ontological kinds, it is precisely metaphysical natures of entities that we appeal to in qualitative parsimony judgments.

This does not entail that PLP is wildly qualitatively (ontologically) unparsimonious. Some candidate metaphysical natures of abstracta will be alien to us, and so we can't possibly access the facts (if there are facts) about how many kinds of things PLP posits. We cannot enumerate what is alien to us. So we cannot assess PLP for qualitative parsimony. This problem—perhaps unlike the quantitative parsimony problem—is unique (among mathematical theories) to PLP, and is a product of PLP's third-order vices: it is because PLP (i) cannot specify its primitives and (ii) cannot be fully scaffolded that it is not assessable for qualitative ontological parsimony.

### **5.1 So much for ontological parsimony. What about ideological parsimony?**

A theory's ideological parsimony is a measure of how theoretically rather than ontologically parsimonious it is: how simple the theory itself is (perhaps to be cashed out in terms of number of primitive expressions required in the vocabulary, length, etc.).<sup>15</sup> At first glance, PLP is very ideologically parsimonious: it can be summed up in a sentence or two (e.g. something like “anything goes, so long as its existence does not lead to a contradiction”). But this is wrong. PLP cannot be assessed for so-called ‘ideological parsimony’, at least, it cannot be assessed in comparison to its rivals (which is what matters for us in making second-order virtue and vice judgments).

PLP's appears to be ideologically parsimonious because it is baseless, guideless, and not sufficiently scaffolded: it doesn't have the features that it should given the question it is trying to answer, and it is because it lacks these features that it can be stated so simply. So we cannot compare it to theories that are foundational, guiding, and sufficiently scaffolded. In order to compare two theories for ideological parsimony, we have to normalize something about their form. That is, we have to require that they provide us with at least somewhat similar levels of information about various things. Roughly, we might think, they have to be equally informative recipes. Just as we shouldn't compare

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<sup>15</sup> For discussions of ideological parsimony, see Cowling (2013), Dasgupta and Turner (2015), Finocchiaro (2019, forthcoming), McSweeney (2019), Sider (2011).

(e.g.) the number of primitive terms in a recipe for brownies that says “intuitively toss some ingredients together and throw it in the oven” and one with a list of every ingredient and detailed instructions, we shouldn’t compare two theories that differ in this way. And because PLP is essentially third-order vicious, we can’t flesh it out in order to compare it to third-order virtuous ontological theories. So it looks like we can’t compare PLP to other theories that are more third-order virtuous.

We might instead try to normalize things down to the level of information and detail that PLP provides us: perhaps, in order to make comparative ideological parsimony judgments, we simply need to take stripped-down versions of competitor theories. This won’t work, because most metaphysical theories that are third-order virtuous will cease to say anything at all if we attempt to strip them of their third-order virtues. Consider a toy version of (fleshed-out) MU which says that the simples are all homogenous (tokens of a single type); that the axioms of MU are true; and that every ordinary object (tables, trees, bicycles, etc.) is nothing over and above a composite of those simples. And now consider what would happen if we were to strip this toy theory of its third-order virtues and try to make it more like PLP. At best, we might end up with the statement ‘composition always occurs’, and nothing else.

I conclude that we cannot assess PLP for ontological or ideological parsimony; and that this is because PLP is (essentially) third-order vicious. There is no epistemically accessible fact of the matter about either how many things, or how many kinds of things, PLP posits. Moreover, theoretical virtues seem to be comparative: we make judgments about which theory to accept, not about how second-order virtuous a theory is, full stop. PLP is not apt for comparison with respect to ontological theories that more thoroughly answer their questions..

## 6. Some Methodological Notes

I have laid out three claims about what it takes for an ontological theory to be third-order virtuous. I have examined two theories, mereological universalism (MU) and plenitudinous platonism (PLP). I have argued that the answer to whether MU is third-order virtuous is “it depends”—because MU is flexible in a way that allows us to make it third-order virtuous. In contrast, PLP is essentially third-order vicious. I have also tried to begin to show that PLP’s third-order vices lead directly to difficulties with assessing it for second-order virtue. (Though I should note that more work would need to be done here to fully establish this claim.) I want to conclude by saying a bit more about the relationship between third-order virtue and vice and progress.

There is an important relationship between an ontological theory being third-order vicious and it involving some kind of incurable ignorance. PLP is committed to incurable ignorance about what there is (alien abstracta) and what it is like (e.g. natures that abstracta might have that we can’t think of). And this is closely tied to its baselessness, guidelessness, and insufficient scaffolding. Being third-order vicious doesn’t *lead* to incurable ignorance. Instead, involving some incurable ignorance is just part of what it is for a theory to be essentially baseless, guideless, or not sufficiently scaffolded. So it looks like incurable ignorance might be a third-order vice itself.

I think this is right. But I also want to be clear that I am not trying to claim that we should never favor theories that are third-order vicious. Just as we must sometimes settle for second-order vicious theories (when, for example, there simply isn’t an alternative that accounts for the data we have and

answers the question we are posing), we must sometimes settle for third-order vicious theories. When we do so, we are answering ontological questions by saying that they are not fully answerable by creatures like us.<sup>16</sup> Similarly, that a theory is third-order vicious does not entail that it is false. It might be that we just can't get a successful recipe for our ontology.

I think that, insofar as metaphysical progress is possible, when ontological theories (like PLP) are *essentially* third-order vicious, we must remember that they may be true, but also should not work to develop them further. This has much broader implications. To give one example, I have long been attracted to neo-Kantian metaphysics, or at least, to readings of Kant on which he is committed to there being things-in-themselves, but that we can know very little about them. (We can know that they are not mind-dependent, and hence not spatiotemporal—note the similarity to the kinds of things that platonists say about abstract objects.)

If Kant is putting forward an ontological theory, then the theory is clearly—perhaps paradigmatically—essentially third-order vicious. (This also makes clear that while plenitudinous theories are often third-order vicious, so are theories that have almost nothing in common with PLP—so if you were worried about whether my view is designed to cause problems for plenitudinous views, it isn't! We also cannot assess the Kantian view of things-in-themselves for second-order virtues...)

If they want to accept my account, here are two ways for (neo)Kantians to go here: either deny that the theory being put forward is an answer to an ontological question (and hence claim that it is not an ontological theory), or accept that it is but claim that (e.g) we can't do better, and should stop looking for a third-order virtuous ontological theory.

I'll quickly say something about these two options, while staying neutral with respect to Kant interpretation. I suspect that many contemporary metaphysicians take the Kantian view to be answering an ontological question, and thus find the limitations of the view frustrating. If the view is an ontological theory, then it is an essentially third-order vicious one, and what I have said here suggests that this frustration is justified; we shouldn't—qua metaphysicians—be either endorsing it or attempting to flesh it out. Instead, we should be looking for alternative ontological theories, developing those that are not essentially third-order vicious, and often reflecting on whether they do better than (e.g.) the Kantian metaphysical view. Kantian humility about things-in-themselves must be held as a background possibility about what is true, but our focus, as metaphysicians, ought to be elsewhere. I think this is an interesting result, one that may lend support to the combination of metametaphysical angst and engagement with first-order metaphysics that seems common amongst contemporary metaphysicians.

If, on the other hand, Kant's claims about things-in-themselves are not meant to constitute an ontological theory, then what are they meant to do? A plausible answer is that his views here can't be disentangled from his answers to epistemic and moral questions.<sup>17</sup> Contemporary metaphysicians (including me, here!) often try to separate out epistemic, moral, and metaphysical questions, and we

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<sup>16</sup> For recent discussion of this sort of epistemic indeterminacy see Bennett (2009) and Willard (2013).

<sup>17</sup> E.g. see Kant (1781/1787, B xxx). There is lots of contemporary analytic movement back to the inseparability claim (which non-analytic philosophers perhaps never lost sight of!). Among metaphysicians this is perhaps most prominent in ameliorist philosophers like Haslanger (e.g. 2012); in social and feminist metaphysics more generally; and in Chan's account of "ethics first" metaphysics (ms).

might resist this by claiming that there is no way to ask ontological questions separately from the epistemic and moral questions they are tangled up with. If this is right, it is the project of trying to isolate ontological theories—as answers to ontological questions—that is problematic, and not third-order vicious ontological theories themselves. So we might worry that the project I've undertaken in this paper—attempting to elaborate what it is for an ontological theory to be third-order virtuous—is misguided.

I hope not, since my interest in theories like PLP lies precisely in their systematicity: they attempt to simultaneously answer ontological and epistemic (and sometimes metaethical!) questions—a feature that they share with much of historical metaphysics. I don't think that we can separate metaphysics from epistemology, or from morality. Perhaps, though, once we elaborate and develop our theories, we might be able to separate metaphysical *questions* from epistemic and moral ones, and assess our theories as answers to each. This paper does a small piece of that work, by setting up a framework for assessing theories as answers to ontological questions. But it deserves a cautionary note, which is that we risk losing sight of virtues of theories as answers to epistemic, moral, and metaethical questions when we assess them as answers to ontological questions.

I want to end by considering Einstein's distinction between constructive and principle theories, and his philosophical stance towards them.

Most (physical theories) are constructive. They attempt to build up a picture of the more complex phenomena out of the materials of a relatively simple formal scheme from which they start out. Thus the kinetic theory of gases seeks to reduce mechanical, thermal, and diffusional processes to movements of molecules -- i.e., to build them up out of the hypothesis of molecular motion. When we say that we have succeeded in understanding a group of natural processes, we invariably mean that a constructive theory has been found which covers the processes in question.

Along with this most important class of theories there exists... "principle-theories." These employ the analytic, not the synthetic, method. The elements which form their basis and starting-point are not hypothetically constructed but empirically discovered ones, general characteristics of natural processes, principles that give rise to mathematically formulated criteria which the separate processes or the theoretical representations of them have to satisfy. Thus the science of thermodynamics seeks by analytical means to deduce necessary conditions, which separate events have to satisfy, from the universally experienced fact that perpetual motion is impossible.

The advantages of the constructive theory are completeness, adaptability, and clearness, those of the principle theory are logical perfection and security of the foundations. The theory of relativity belongs to the latter class. (1919, 101.)

Einstein thought that our goals should be to get constructive theories, and that only they give us real understanding. Constructive theories give us models of reality, and then "build up" the higher-level phenomena out of that foundation. Being constructive is quite close to being foundational and



guiding! Constructive theories tell us something foundational about reality, and then show us how to recover the phenomena.<sup>18</sup>

But Einstein also thought that principle theories were undervalued; and principle theories are somewhat close to certain kinds of third-order vicious ontological theories, like PLP and Lewis' modal realism: both involve general principles that serve as constraints, and that we can draw out the logical consequences of. (These theories don't involve empirical generalizations, though!) One reason he thought principle theories were undervalued is that they lead to important results—like special relativity, which in its initial form was a principle theory that reconciled two seemingly logically inconsistent empirical generalizations. This is less relevant here. But his second reason was that they provide important constraints on allowable constructive theories.

I don't endorse Einstein's philosophical views more generally, and I flag that analogizing my views to his is messy. But all of the upshots of translating his views back into my framework are worth taking seriously. First, third-order vicious theories can be informative. Second, third-order vicious theories don't successfully answer their ontological questions, but they might guide us (if we assume they are true) by narrowing the possible third-order virtuous theories. This is particularly so if third-order vicious theories are constraining, as PLP is. Notice, though, that the constraints that PLP places on abstract reality are so minimal that they cannot give us much information; and that essentially third-order vicious theories can't narrow the possibility space of third-order virtuous theories. So some third-order vicious theories neither give us much information themselves nor constrain the possibilities for third-order virtuous theories.

Third, insofar as genuine understanding is an aim of metaphysical inquiry, we ultimately want our theories to be third-order virtuous. Theories that essentially rule out understanding parts of reality (like abstract space or modal space) are inconsistent with understanding reality more generally, which is an important aim of metaphysical inquiry. Perhaps it will turn out that we can't jointly satisfy this aim of metaphysical inquiry and another important aim: truth. But we should try.

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<sup>18</sup> See Balashov & Janssen (2003, §4).

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