1. Introduction

Suppose the clock in my office has proper spatial parts: a face, two hands, many sub-atomic particles, and so forth. Suppose it also has proper temporal parts: a ‘last week’ part, which is spatially similar to the whole clock, but which was present only during last week; a ‘2019’ part, present only during 2019; and so forth.1 Perdurantists hold that the clock’s existence at more than one time — its persistence — is metaphysically explained by the clock’s possession of such temporal parts, much as its presence at more than one spatial location is explained by its possession of proper spatial parts.2 I will argue that perdurantism is false. However, I wish neither to deny that my clock has proper temporal parts, nor to affirm that it persists by enduring, in the technical sense of being ‘wholly located’ at each moment of its career.3 Nor do I hold that the successive denoting utterances of ‘clock’ in this paragraph pick out distinct momentary stages.4 Rather, I will argue that the clock’s persistence is metaphysically explained by the distribution of certain pluralities of fundamental property instances across time. The clock was present last week because a certain sub-plurality of the clock-grounding plurality of fundamental property instances were present exactly last week. It is present this week and will be present next week for analogous reasons. Thus neither perdurance nor endurance explains the clock’s persistence, whether or
not it has proper temporal parts. Nor is the clock a momentary stage. Rather, it persists by — as I will put it — plurduring.5

The basic argument that plurdurantism is superior to perdurantism is that the former successfully accounts for the persistence of material continuants across a wider range of metaphysically possible worlds than the latter can manage.6 Specifically, plurdurantism can account for material continuants whose temporal mereological structure is junky in the sense that all temporal parts involved in the structure are proper temporal parts of some others.7 Perdurantism, by contrast, cannot account for temporal junk. Why not? Because junky continuants are pluralities that contain other entities’ proper temporal parts — they are not fusions that possess proper temporal parts. (To see this difference, consider a toy disagreement between a more and a less liberal mereologist. The former theorist holds that there is a mereological whole composed of exactly my nose and the trunk of an elephant. This whole possesses those two objects as mereological parts. The latter theorist might well deny that there is any such whole, even as she accepts that there is a plurality that contains as members exactly my nose and the elephant’s trunk.) Since the persistence debate concerns metaphysical necessity, and since junky persisters are metaphysically possible, perdurantism loses out.

As for endurantism, many of the perdurantist’s familiar arguments against it are available to the plurdurantist, such as arguments from analogy with space and from temporary intrinsics. That said, I will leave for another occasion the task of arguing that plurdurantism is superior to endurantism. As for stage theory, I will mention below a reason (independent of junk) to think that it too falls short of the modal scope afforded by plurdurantism: there are plausible metaphysical possibilities that plurdurantism accommodates successfully but stage theory does not, but not vice versa.

The upshot, then, is a novel unified theory of persistence that is uniquely positioned to be metaphysically necessary without requiring endurantist sympathies or reservations about plausibly possible mereological structures.

The remainder of this introduction clarifies the central idea of temporal junk and how it bears on the persistence debate. Consider an arbitrary possible cosmos C. Let T name the plurality of all the portions of time during which C exists: all the relevant seconds, minutes, hours, and so forth. If time is metaphysically junky at C then the members of T, rather than being parts of some maximal whole time, are such that each is a proper temporal part of some others. For example, a certain second at C is part of some minute, both of which are parts of some hour, all three of which are parts of some millennium, all four of which are parts of some galactic year, and so forth, without mereological end. Thus no fusion of seconds, minutes, or galactic years is numerically identical to time at C. Rather, time at C is an unfused plurality of intervals. Similarly, if C itself is materially temporally junky then it is a plurality of material temporal parts, each of which is a proper temporal part of some others. The spatially-cosmos-sized temporal part that exists exactly at a certain second is part of the spatially-cosmos-sized temporal part that exists exactly at some minute, and so on. Each of these material entities is a proper temporal

5. To invoke pluralities of fundamentalia to explain material persistence is not a new approach, the chief antecedent being E.J. Lowe’s ‘particle re-arrangement’ account presented in Lowe 1987, 1988 and Lowe and Noonan 1988. However, Lowe’s account and plurdurantism are importantly different. For example, the former, but not the latter, is endurantist, incompatible with proper temporal parts, hostage to assumptions about actual physics, and less than clear about the explanatory relationship between the relevant plurality and the relevant continuant.

6. Following Sider 2001, I use ‘continuant’ throughout with neutrality as to whether continuants possess proper temporal parts. I also wish to remain neutral as to whether continuants must have continuous careers, as opposed to having gaps during which they do not exist. For examples of contrasting usage, see Broad 1933, Simons 1987, and Steward 2015.

7. To my knowledge, the first occurrence of ‘junk’ in a mereological sense is due to James Van Cleve 2008. Van Cleve uses the term to describe structures in which every collection of objects composes some object. An earlier discussion of the notion of junk as understood here, but which uses the subsequently overlooked terminology of ‘k nug’ (the semordnilap of ‘gunk’), occurs in Parsons 2007. Usage of ‘junk’ in this sense is due largely to its deployment in Bohn 2009a, 2009b, and Schaffer 2010. None of these authors appears to be concerned specifically with temporal junk.
part of some others, but none is a proper temporal part of \( C \), for \( C \) is the unfused plurality of such entities.

The contemporary persistence debate concerns material continuants—persisting entities like clocks, cars, particles, and cosmoi—which can exemplify diverse intrinsic qualitative properties and play functional roles characteristic of material objects. Immanent universals, if there are any such entities, persist. Yet they fall outside the mainstream of the debate because they cannot exemplify diverse intrinsic qualitative properties or play material object roles. Some combination of these factors also excludes tropes, events, states of affairs, and (non-supersubstantival) spacetime regions from being the primary subjects of the debate. By contrast, the pluralities of the mereological nihilist can persist, bear diverse intrinsic qualitative properties, and (collectively) play material object roles. Some particles arranged table-wise may exist at many times, all while being (collectively) sturdy, wooden, and supportive of dinnerware. So nihilist pluralities have a place in the debate. However, they hardly constitute a newsworthy counterexample to mainstream views like perdurantism, for perdurantists must reject nihilism simply to state their view. Materially temporally junky pluralities like \( C \), by contrast, fall squarely within the debate without straightaway contradicting the mainstream ontologies of persistence.\(^8\) After all, junky \( C \) is (or perhaps are) just as much a cosmos as our own cosmos, albeit an unfused one.\(^9\)

For while \( C \) is a plurality of other entities’ proper temporal parts, it is not itself a temporal fusion. It thus contains many proper temporal parts (of other things) yet possesses none.

Proof that temporally junky \( C \) is not a fusion of temporal proper parts: Begin with the assumption that if an entity \( x \) persists over some interval \( i \) and has any proper temporal parts, then for each sub-interval \( i_n \) of \( i \), it has a temporal part that exactly corresponds to \( i_n \). Perhaps one could tenably reject this assumption by tinkering with the standard notion of a temporal part, but what matters for present purposes is that theorists with perdurantist sympathies cannot, since they accept for persistence across an arbitrary interval by invoking corresponding proper temporal parts. Now suppose for reductio that \( C \) is a materially temporally junky cosmos and yet possesses at least one spatially-cosmos-sized entity as a proper temporal part. Either \( C \) has all spatially-cosmos-sized entities at the relevant possible world as temporal parts, or it does not. Given the assumption, it does. Yet if it does, then \( C \) is not junky, for it would then be the fusion of all spatially-cosmos-sized proper temporal parts at \( C \), and thus itself a (maximal) spatially-cosmos-sized (improper) temporal part. This contradicts the claim that each spatially-cosmos-sized temporal part relevant to \( C \) is a proper temporal part of some others, which follows directly from the assumption that \( C \) is materially temporally junky.

There is nothing special about cosmoi in this regard. The proof can be generalized using variables for arbitrary continuant kinds and their instances. Suppose for reductio that \( x \) is a materially temporally junky \( K \) (for some continuant kind \( K \)) and yet \( x \) possesses some of its members as temporal parts. Either \( x \) has all its members as temporal parts or not. Given the above assumption, it does. If so, then \( x \) is not junky, for it is a fusion of all \( x \)-relevant proper temporal parts, and thus itself a (maximal) \( x \)-relevant temporal part. This contradicts the requirement from junk that each \( x \)-relevant temporal part is a proper temporal part of some others.

The remainder of the essay proceeds as follows. The next section explains some needed technical terminology and further situates the present project within the larger persistence debate. Section 3 then defends two claims. First, material temporal junk plausibly is metaphysically possible. Second, at least some possible materially temporally junky entities are continuants. Section 4 argues for two further claims: that the most competitive theories of persistence will

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8. See van Inwagen 1990.
9. Clearly temporal junk’s presupposition of proper temporal parts straightaway contradicts traditional endurantism. However, other competitive endurantisms accept proper temporal parts. See note 3.
10. See Schaffer 2010 for opposition to cosmoi that are pluralities. I return to the issue below.
account for materially temporally junky and non-junky continuants uniformly, and that perdurantism cannot account for materially temporally junky continuants. Sections 5 and 6, respectively, introduce plurdurantism and explain its treatment of material temporal junk, highlighting its uniformity with respect to non-junky continuants. Finally, section 7 considers and responds to two objections. According to the first, plurdurantism as developed here is ill-motivated. According to the second, temporal junk is too recherché to bear the advertised dialectical weight.

2. Terminology

For arbitrary material continuant $x$ and time $t$ at which $x$ exists, there are some properties that are exemplified by $x$ at $t$ at least partly in virtue of $x$’s relation to states of affairs extrinsic to $t$.\(^\text{11}\) For example, the property of *having been asleep* is exemplified by me now at least partly in virtue of my relation to an earlier state of affairs in which something (whether I or something closely related to me) was asleep. Let us call properties of this sort ‘persistence-sensitive’.\(^\text{12}\) Now let ‘four-dimensionalism’ name the thesis that spatiotemporally located entities exemplify persistence-sensitive properties at a time $t$ at least partly in virtue of numerically distinct spatiotemporally located objects not present at $t$, for example, temporal proper parts of the original entities or non-persisting stages of which the original entities are temporal counterparts.

Expanding on the characterization offered in the introduction, let ‘endurantism’ name the view according to which a spatially and temporally located entity’s having some persistence-sensitive property is a matter of its being *wholly* temporally located at any time at which it exists, including some non-present time at which it is/was/will be the way required by the relevant persistence-sensitive property.\(^\text{13}\) For example, the endurantist holds that I now exemplify *having been asleep* because I am (or was) wholly located at some formerly present time at which I am (or was) asleep. Continuing from the same example without loss of generality, let ‘perdurantism’ name the view according to which my having been asleep is a matter of my having a proper temporal part at a past time who is asleep. Finally, let ‘stage theory’ name the view according to which my having been asleep is (roughly) a matter of my being counterpart-related to a non-persisting temporal stage at a past time who is asleep. So four-dimensionalism is disjunctively inclusive of both perdurantism and stage theory, but exclusive of endurantism.\(^\text{14}\)

I will proceed under the contention that the most competitive theories of persistence aim at metaphysically necessary truth. This is orthodox. Many philosophers hold that if perdurantism or endurantism is true then it is metaphysically necessary, or at least that if it is true with respect to material continuants of kind $K$ then it is metaphysically necessary with respect to $K$s. In any case, even if its intended modal scope were less ambitious than full metaphysical necessity, perdurantism would suffer a substantive blow if it were false at every possible world that contains material temporal junk, for there are many such worlds. Moreover, as we will see, many of these worlds are extremely similar to the actual world, similar enough for it to be a plausible epistemic possibility that the actual world contains material temporal junk.

\(^{13}\) There is ongoing intra-endurantist disagreement about how to explicate ‘wholly located.’ See Hawthorne 2008 and Hofweber and Velleman 2011.

\(^{14}\) ‘Four-dimensionalism’ is a potentially confusing technical term. Sometimes it names the thesis that material objects persist by having temporal parts (what I am calling ‘perdurantism’), a thesis consistent with there being only three dimensions of spacetime. Alternatively, sometimes it names the thesis that material objects occupy four-dimensional spacetime, which thesis is neutral on whether persisting material objects are wholly temporally located at more than one time. See Parsons 2000. My use (which follows Sider 2001) is not quite either of these since the former rules out stage theory and the latter rules in endurantism.
3. The Possibility of Materially Temporally Junky Continuants

The advertised problem for perdurantism from temporal junk only arises if both (i) material temporal junk plausibly is metaphysically possible and (ii) at least some materially temporally junky entities are continuants. The task of this section is to defend this required conjunction.

Four-dimensionalists commonly motivate their view by invoking a parallel between the respective mereological structures of space and time. Consequently, the perdurantist is likely to accept material temporal junk if she accepts material spatial junk, where a materially spatially junky structure is a plurality of material entities all of whose members are proper spatial parts of some others. Indeed, she is likely to focus on spatiotemporal junk. And while it is conceptually coherent to insist that junk obtains only in, say, one or two spatial dimensions but not in all three, it is implausible and ad hoc to hold this kind of restriction as necessary. For the four-dimensionalist, it is equally implausible and ad hoc to hold that junk only possibly obtains in the three spatial dimensions and not in the temporal one. For present purposes, then, considerations in favor of spatial junk support temporal junk as well.

Fortunately, proving that junk is possible is not the goal here. Good reason to take seriously the implications of a proposition $p$ does not require a proof that $p$; good reason to question not-$p$ suffices. I thus will proceed by showing that the two chief reasons to reject the possibility of junk that have been raised in the literature are less than compelling. According to the first, the obtaining of junk is dubious because it violates unrestricted composition, the thesis that the members of any collection of concrete entities jointly compose a concrete entity. If composition is unrestricted for material objects then no material structure can be junky, for unrestricted composition guarantees a maximal object whose parts are the elements of an arbitrary structure and which is not itself a proper part of any such element. For the purpose of establishing that the possibility of junk is a substantive threat to perdurantism, it suffices to observe that the junk versus unrestricted composition debate is live, and that those favoring unrestricted composition are not conclusively holding the better hand.$^{17,18}$

The second putative reason to reject junk is that it requires any world at which it obtains to be a plurality of objects rather than a whole object. Jonathan Schaffer (2010) goes so far as to contend that this makes junk ‘world-less’ and thus impossible. Pace Schaffer (and following Bohn (2009b)), I find this a hasty conclusion, for it is plausible that some worlds are pluralities of non-worlds. Some philosophers already take some worlds to be unfused pluralities (of simples, for example) for reasons not dependent on junk.$^{19}$ Moreover, if unrestricted composition is suspended then all that is needed in order to have a plausible example of temporal junk is a fundamental, eternal particle (or string or field) of the sort that the best present or future physics might well furnish. For the four-dimensionalist who is unmoved by unrestricted composition, such a particle could be construed tenably as a plurality of temporal parts, each element of which is a proper temporal part of some other. Given the preceding

$^{17}$ To this end, see Cotnoir 2014 and Giberman 2015b; but see also Smith 2019.
$^{18}$ In light of the Sider 2001/Lewis 1986 argument from vagueness for unrestricted composition in favor of four-dimensionalism, one might suggest that the question of the possibility of junk is being begged here. Specifically, if junk only causes a problem for perdurantism if unrestricted composition fails, then the argument from vagueness can come doubly to the rescue: it establishes four-dimensionalism as well as the impossibility of junk. But this suggestion is specious. First, if the Sider-style argument from vagueness goes through then it establishes four-dimensionalism, not perdurantism. Thus one could accept the conclusion of the argument even while objecting to perdurantism. Second — and more importantly — it is dubious that any criterion for restricting composition in the junky case is vague in the way the argument from vagueness requires (see Sider 2001: 122). One reason why is that the failure of a junky sequence to compose a whole is not due to the violation of any sort of proposed answer to the special composition question.

qualifications, this particle is an example of actual temporal junk. So, as mentioned in the prior section, the junk suggestion is not restricted to exotic metaphysical possibility. Of course, one of the relevant qualifications is resistance to unrestricted composition, but this just suggests that there is little force to the ‘junk is world-less’ objection without smuggling in unrestricted composition.

An important point deserves emphasis here, namely that neither four-dimensionalism nor perdurantism requires unrestricted composition. One may find the traditional motivations for these views compelling and yet also, and without incoherence, find the possibility of temporal junk compelling. Indeed, something like this set of attitudes led me to write the present essay (though I do not intend to argue from autobiography). I also wish to emphasize that, while it would be helpful to have a clear and principled reason to accept arbitrary temporal parthood relations most of the time and yet reject them in the case of junk, no such reason need be given in order to appreciate the present dialectic. Even if the below arguments primarily show that perdurantists in fact are (or need to be) committed to unrestricted composition, that would be worthwhile news. Moreover, it may well comfort those bothered by such news — were it forthcoming — to learn of plurdurance as an alternative.

Before moving on from conjunct (i)—the claim that material temporal junk plausibly is metaphysically possible—it is worth mentioning that if one endorses an appropriate conceivability-possibility link then one can argue for the possibility of junk from its (apparent) conceivability. This strategy is notoriously controversial. Nonetheless, much important work in philosophy of mind and metaphysics turns on just this kind of argument, so its furnishing a case for the possibility of junk is dialectically significant, even as it goes undefended here. Specifically, it lends credence to conjunct (i), which requires only that the possibility of junk be established as plausible.

Let us now move to desired conjunct (ii), the claim that at least some materially temporally junky pluralities are continuants. Continuants exist at more than one time, are spatiotemporally located, are capable of exemplifying diverse intrinsic qualitative properties, and play functional roles characteristic of material objects. It is straightforward that materially temporally junky entities meet these criteria. By definition, they are spatiotemporally located and extant at more than one time. They are capable of as much qualitative variation as any material object. Moreover, unlike universals, tropes, events, or traditional spacetime regions, many junky entities satisfy ordinary object sortal concepts. For example, C above satisfies cosmos.

Let me forestall an immediate objection: To treat a plurality as an ‘entity’ in this way is to mistake the plurality for an individual, such as the mereological sum of its members. No plurality exists at more than one place or time; only its individual members or the fusion of its members can do that. This objection is based on a treatment of material pluralities that we should reject. Material pluralities, as understood here and throughout the relevant literature, are concrete (read: spatiotemporally located). They are not abstracta like sets. For example, consider van Inwagen’s simples arranged chair-wise or Bohn’s junky worlds. The former are defined as collectively filling a positive volume spatial region in a way sensitive to facts about chemical bonding and relative contiguity. They collectively spread through space to support those who sit on them. Abstracta like sets cannot do that, though the plurality of a set’s members can. And Bohn’s worlds, anticipated by Leibniz and Whitehead, just are concrete cosmoi. Yet no entity, whether a plurality or an individual, can fill a positive volume region or be numerically identical to a positive volume cosmos if it is not extant at more than one place. Pluralities typically are not exactly located at multiple places, of course, where to be exactly located at a region is to share that region’s

20. See Bohn 2009a, 2009b.
23. See Bohn 2009a and 2009b. Bohn does consider, in passing (2009a: 200), the suggestion that junky worlds are sets.
geometric and topological features, including its distance relations to other regions and objects. But ordinary objects are not exactly located at multiple places, either. It is commonplace that many entities exist at regions and times at which they are not exactly located.

Before leaving this objection behind, it is worth emphasizing that the attribution of temporal persistence and positive spatial volume to pluralities is not an esoteric quirk unique to junky or nihilistic structures. Consider, for example, the Rijksmuseum’s collection of Rembrandts. Art historians and collectors are highly interested in the persistence of that plurality of paintings. Indeed, the plurality has gained considerable value in the last century. Yet that could not be, were the plurality not to exist at more than one time. Likewise, suppose all the Rembrandts were gathered and placed upright on the floor of one of the museum’s galleries, leaning against a single wall. In that case, there is a single time at which the plurality collectively is in contact with both a wide expanse of the floor and a wide expanse of the wall (in the colloquial sense of ‘contact’). That could not be, however, were the collection not to exist at more than one place, for the floor is not co-located with the wall. Or, to take a more temporary plurality, suppose a performer sets up a soap bubble machine to spray bubbles for stage ambiance. In describing the show later, one might say, “the bubbles started around ten and lasted until ten-thirty.” In doing so, one is not attributing persistence to the fusion of the bubbles, nor is one speaking elliptically about the bubble machine’s workings qua event(s). Even if similar speakers might express these other contents in similar contexts, we may stipulate — in accord with ordinary speech — that our speaker does not. Rather, he is attributing persistence to the plurality of bubbles.

With this initial objection addressed, the problem from junk for perdurantism may now be clarified. Let ‘ordinary functional object’ sortal concepts be those whose satisfaction requires the fulfillment of the functions typically served by ordinary objects. For example, satisfiers of ‘car’ typically are mechanical, pilotable, and capable of ground transport. If some entity — whether an individual or a plurality — satisfies a certain critical mass of these and like conditions then it is a car, in the ordinary functional sense. Though van Inwagen’s plurality is not (according to most) itself an individual chair and the collection of Rembrandts not itself a painting, it is plausible that many pluralities do satisfy ordinary functional object sortals. For example, materially temporally junky clocks, cars, pencils, particles, and cosmoi are pluralities of temporal parts that, relative to each respective example, collectively track time, drive, write, spin, and embody the world.

Of course, one could be squeamish about applying ‘car’ and the like to junky entities qua unfused pluralities, insisting that no car is more than one object, even if the plurality in question concerns only temporal parts. But this would be to ignore the ordinary functional sense of sortal application at work here, for the junky entities in question look and function just like ordinary cars. Junk is no more car-less than it is world-less. Moreover, it is easy to generate a wider notion of ordinary functional ‘quasi-sortals’ that apply to both single objects and pluralities. This wider concept leaves intact the crucial connection between playing the functional role of an ordinary persisting object and calling out for a metaphysical explanation of persistence, at least for those theorists who accept that ordinary persisting objects exist.

Thus the challenge from temporal junk for perdurantism — spelled out further in section 4 below — may be seen as the demand for an explanation of the parity between the diachronic behavior of entities that possess temporal parts and the diachronic behavior of their extremely similar junky counterparts. For even if we accept that a great many diachronic cars are fusions of temporal parts, still there are some unfused pluralities of temporal parts, namely, certain junky ones, which equally satisfy ‘car’ diachronically. Therefore, given that junk is possible, one cannot give a satisfying unified account of persistence for cars without allowing some cars to lack temporal parts. Notice, in contrast, that the mereological nihilist cannot confront the perdurantist

with this parity problem. He cannot point to some unfused pluralities of simples that are diachronically extremely similar to some fusions of temporal parts of cars and then demand an explanation for why the unfused plurality should persist in some fundamentally different way from the individual car. For the nihilist must reject individual cars and temporal parts.

4. The Problem for Perdurantism from Temporal Junk

As the preceding section makes clear, there are pairs of materially temporally junky and non-junky continuants whose members are sufficiently similar for one to expect uniform treatment of how they persist. At minimum, the similarity demands independent justification of non-uniform treatment. One way to appreciate this point is to recognize plausible actual candidates for material temporal junk, such as the eternal particle described above. Consider two possible worlds $w_a$ and $w_b$, each a near duplicate of the other and each as close to the actual world as is consistent with the following descriptions. $w_a$ contains a certain materially temporally junky fundamental eternal particle, $a$. That is, $a$ is an infinite plurality of particle-like temporal parts, each of which is a proper temporal part of some others. $w_b$ is exactly like $w_a$ except that instead of containing $a$, the former contains a whole individual eternal particle, $b$. Aside from being non-junky, $b$ is intrinsically and extrinsically just like $a$. Suppose that at $w_a$, $a$ travels from Alaska in 1980 to Hawaii in 1990 and that $b$ makes a qualitatively identical trip during that decade at $w_b$. It is difficult to see why $a$’s persistence as it travels from Alaska to Hawaii at $w_a$ should be fundamentally different from $b$’s persistence as it travels from Alaska to Hawaii at $w_b$. Both particles have the same intrinsic non-mereological features and interact in like ways over time with like physical objects in qualitatively identical spacetimes; and both fall under the same determinate particle kind. Their only distinguishing features are extrinsic ones like being in $w_b$, mereological ones like being

25. Caveat: perhaps spacetime at $w$, must be junky (in addition to infinite) since $a$ is junky — but perhaps not. I do not wish to close the question here.

26. Notice that the plurality of the fused particle’s temporal parts also shares almost all the particle-like characteristics of the particle. Yet it cannot persist by perduring, for it lacks proper temporal parts. One might then wonder whether a problem for perdurantism arises from such pluralities, quite independently of junk. Two considerations indicate not. First, the perdurantist may accept composition as identity. Yet that move is off the table in the junk case, for no junky entity is composite. Second, even if the perdurantist dismisses composition as identity, it hardly seems damning for her to accept that certain pluralities persist not by their possession of temporal parts but rather by some closely related individual’s possession of temporal parts (e.g. the individual that has exactly the members of the plurality in question as proper parts). That is, the perdurantist can say plausibly that the plurality’s persistence is grounded in the relevant object’s having temporal parts at distinct times, even while endorsing numerical distinctness of plurality and object. This deviates from the letter of perdurantism, but not prohibitively. Again, the move will not help in the junk case, however, for there is no object whose status as a mereological whole may be invoked to ground the persistence of the junky plurality.
differences between individual Ks and pluralities of Ks. For example, a dozen cookies, understood as a plurality, are collectively qualitatively discernible from each individual cookie, the former (collectively) having approximately twelve times the size, mass, and caloric value. Moreover, each individual cookie is the uniquely appropriate kind of thing to satisfy the ordinary sortal ‘cookie’; yet there is no ordinary sortal for whose satisfaction cookie pluralities are uniquely appropriate. (‘Batch’, for example, applies also to pluralities of non-cookies.) Perhaps some theorists would see these qualitative and conceptual differences as defeasible reasons not to treat ordinary, non-junky pluralities and their individual members uniformly with respect to persistence. However, the issue is irrelevant for present purposes, for there simply are no such differences between a and b.

Nor is it open to the perdurantist to deny altogether that a persists through the 1980s, for a is an eternal continuant, the plurality of particle-like temporal parts collectively responsible for the relevant particle-like goings-on throughout the full history of $w_a$. Crucially, this responsibility is unique: no particle-like entity other than a is available to explain the existence of the relevant eternal particle goings-on at $w_a$. In light of the foregoing considerations, it is a prohibitive strike against perdurantism if it must treat a’s persistence during the 1980s as fundamentally different from b’s. The very possibility of a shows that not all possible particles persist by having temporal parts.

There is nothing special here about particles, the 1980s, or the way from Alaska to Hawaii. So, generalizing from the example, the persistence of materially temporally junky continuants is not metaphysically explained by perdurantism. Recall that the perdurantist’s account of persistence treats parthood as the basis for its fundamental explanantia. Thus Quine maintains that bathing in two temporal parts of a river “constitutes bathing in the same river twice;”27 Lewis characterizes perdurantism as the view that persisting entities do so “by having temporal parts;”28 Heller says of Whitey, the piece of paper serving as an example of a material continuant: ‘Whitey’s parts exist at different times … and in virtue of this fact, we say that Whitey exists at those times;”29 and Fine, discussing the general importance of ground for metaphysical explanation, claims that the perdurantist “will take the existence of the persisting object at the time to be grounded in the existence of the temporal part.”30 Since a junky continuant has no proper temporal parts (rather it has members which themselves have and/or are proper temporal parts), the perdurantist cannot account for the persistence of material temporal junk.

One might object at this point that accounts of the fundamental metaphysics of persistence are concerned exclusively with survival over finite intervals, making junky continuants irrelevant. The most sophisticated version of this objection will attempt to explain away any putative relevance of junky continuants via their members, the idea being that what really accounts for the putative persistence of, say, a junky pencil are the various finite temporal parts had by each of its members. Anything properly pencil-like persists because of finite temporal parthood possession, even if there is a junky structure in the vicinity. So, the objection concludes, persistence and junk are irrelevant to one another. But this objection, if I may help myself to a trite phrase, misses the forest for the trees. As we have seen, the junky structure in the vicinity of the entities the objector favors is itself a persisting entity and highly plausibly a pencil. The correct account of persistence ought to apply to all such entities. Moreover, the objection at issue rests on a misconception of what theories of persistence seek to explain. When the metaphysician asks how this pencil persists, she is not asking about some particular sub-interval of its career. She is asking about any and all of the (perhaps infinite) intervals at which it exists.

27. Quine 1950: 621, my italics.
A second anticipated objection contends that the junk problem is superficial: junk simply requires the perdurantist to say of certain pluralities that they persist by having members that persist by having parts. Notice that this is not just a restatement of the previous objection. This second objector attempts to account for junky continuants by appeal to their members, not to dispense with junky continuants as irrelevant. However, the committed perdurantist cannot endorse this second objection since he takes parthood facts rather than membership facts to be the basic metaphysical explanantia of persistence for material continuants.

One might respond that the perdurantist treats parthood facts as fundamentally explanatory of the persistence of individuals only, not the persistence of pluralities. In the case of pluralities, the response continues, the perdurantist is happy to augment parthood facts with membership facts.

This response fails to take into account the importance of junky continuants qua continuants. It flouts the dialectical expectation that possible continuants that behave just like actual cars persist the way actual cars do. As we have seen, even if there were qualitative differences sufficient to justify the perdurantist in treating the persistence of non-junky pluralities differently from the persistence of individual continuants — perhaps by promoting membership facts ahead of parthood facts — those differences do not apply to temporally junky continuants. Moreover, even in non-junky cases, it is plausible that the perdurantist does well to treat plural continuants as persisting by having temporal parts. For example, it is plausible that he does better to treat the performer’s ambient bubbles as persisting by having pluralities-of-simultaneous-temporal-parts-of-bubbles as temporal parts than he would do to treat them merely as having bubbles-that-have-temporal-parts as members. For only the former treatment makes the temporal parts of the relevant persisting entity — namely, the plurality of bubbles — sufficiently explanatory.

One further objection that I anticipate is that the sense in which pluralities persist is not the sense of persistence that perdurantists seek to explain. But this objection is predicated on a confusion. There are not multiple senses of persistence. Persistence is just existence at more than one time. Perhaps the real thought behind this way of objecting, then, is that pluralities are insufficiently object-like to count as continuants. But that objection already has been addressed. What the possibility of material temporal junk establishes is that some possible diachronic cars, pencils, particles, and cosmos are pluralities.

Suppose, by analogy, that there were good reason to take seriously the suggestion that some possible material cars are not particulars but rather are heterodox, qualitatively diverse immanent universals that lack spatial or temporal parts but otherwise function just like ordinary cars — perhaps via some claim about how best to draw the universal/particular distinction that leaves this possibility open. In such a case, it does the friend of the necessity of perdurantism no good to insist that these universal cars are not the kind of thing for which perdurantism — a theory about particulars — is intended to account. Rather, to insist as much would threaten the necessity of perdurantism, for perdurantism is accountable for all entities that function over time just like ordinary cars. A theory that furnished a unified explanation of the persistence of universal and particular cars would thereby enjoy a robust advantage over perdurantism.

5. Plurdurantism

5.1 The View Stated

Though perdurantism fails to account for material temporal junk, there is an alternative theory available that maintains much of the motivational infrastructure of perdurantism but replaces parthood facts with plurality membership facts in its central explanatory scheme. According to plurdurantism, pluralities of fundamental property instances ground material continuants in a way explanatory of material persistence. To state the theory more precisely, let ‘≺’ express the grounding relation and ‘∈’ the sub-plurality relation.
Plurdurantism: For any material continuant \( x \) at arbitrary possible world \( w \), there is some plurality \( P \) of fundamental property instances such that \( P < x \) at \( w \); for any time \( t \) at which \( x \) exists at \( w \) there is some \( n \) such that \( n \in P \), \( n \) is exactly located at \( t \), and \( n < x \) the existence and full intrinsic qualitative nature of \( x \) at \( t \) at \( w \); and for \( x \) to persist across interval \( I: \{ t_0, ..., t_n \} \) at \( w \) is for there to be, for every sub-interval \( m \) in \( I \), some \( n \) such that \( n \in P \), \( n \) is exactly located at \( m \), and \( n < x \) the existence and full intrinsic qualitative nature of \( x \) at \( m \) at \( w \).

Much as the notion of a proper temporal part of some continuant \( x \) may usefully be thought of as the spatially maximal part of \( x \) exactly located at some temporally minimal region, so the sub-pluralities of \( P \) at work here (the \( n s \)) may usefully be thought of as the spatially maximal sub-pluralities of \( P \) exactly located at the relevant temporally minimal regions. What Plurdurantism says, in short, is that pluralities of fundamental property instances ground material persistence facts. Its truth is independent of and consistent with the claim that continuants have proper temporal parts. Indeed, with respect to an arbitrary material continuant \( x \), the plurdurantist generally agrees with the four-dimensionalist as against the endurantist that \( x \) considered only as it is at some time \( t \) is numerically distinct from \( x \) considered only as it is at distinct time \( t' \). But what metaphysically explains \( x \)'s persistence is not that these distinct ‘slices’ are parts of \( x \), even if that mereological state of affairs is sufficient for \( x \)'s persistence. Rather, what genuinely explains the persistence are the spatially maximal and temporally minimal sub-pluralities of the plurality of property instances that ground \( x \). Plurdurantism thus tolerates the ontology of perdurance without requiring it. Most importantly, plurdurantism does not accept the explanatory claims of perdurantism. Thus the two views are strictly inconsistent. Consequently, nothing that plurdures perdures, strictly speaking, since in order for something to perdure, its temporal parts must explain its persistence, which plurduring prohibits. This is so even though many plurdures objects, for example a non-junky car, have exactly the temporal mereological structure to which the perdurantist appeals.

The mereological nihilist could incorporate a version of plururance, so long as he interprets “… material continuant \( x \)…” in Plurdurantism as simples arranged \( x \)-wise over time or some such. For the basic insight of employing membership and ground is as much at the nihilist’s disposal as it is at the traditional four-dimensionalist’s disposal. Having noted this, I will not develop a nihilist variant of plururance here, as I am more interested in a version that can preserve the traditional motivation for perdurance and that can accommodate plausibly possible mereological structures like junk.\(^{31}\)

Notice that the explanation for \( P \)'s grounding something of \( x \)'s sortal kind(s) (rather than something of another kind) is not furnished by plururance, just as the explanation for why a given continuant satisfies a certain sortal is not furnished by perdurance. Rather, the explanation requires a supplemental account of the diachronic identity conditions for instances of sortal concepts that \( x \) satisfies. Similarly, plururance, like perdurance, is not in the business of explaining identity per se: the issue of why this instance of the relevant kind is \( x \) in particular, as opposed to some distinct instance \( y \) of that kind. One is free to supplement plururance with one’s favored mechanism for explaining identity attributions, perhaps origin essentialism or haecceities or counterpart-relevant resemblance facts.

5.2 Some Clarifications

‘Ground’, ‘fundamental’, and ‘property instance’ require careful explication. There has been a rapid expansion in the literature on ground and like notions following work by Kim, Fine, Schaffer, Rosen, and others.\(^{32}\) The basic idea of ground is that the obtaining of certain

31. Thank you to an anonymous referee for encouraging me to emphasize the potential application of plururance to nihilism. Perhaps future work will explore this route.

facts or the existence of certain objects is — to use a relatively neutral term — metaphysically responsible (in a non-causal, non-agental sense) for the obtaining, existing, or nature of others. For example, it is plausible that my having a certain total physical microstructure grounds my being in excess of five feet in height and that the existence of certain molecules appropriately arranged grounds the existence of cola in my soda can. My usage of the notion of ground will usually reflect what has been dubbed ‘full’ or ‘complete’ ground as opposed to ‘partial’ ground.33 Something is a full ground for something else if the former alone is sufficient to ground the latter.

In general, the formal properties of ground will not be at issue here, nor will its relation to explanation, dependence, necessity, essence, or supervenience. When I say that material entities are ‘grounded’ by or exist ‘in virtue of’ certain fundamental property instances, I intend to say something sufficiently weak and neutral that virtually all theorists in the literature on ground can agree with it — including those who doubt that ground is irreducible or eliminable.34 The working claim is simply that the relationship between those entities and those instances is relevantly like the relationship between the cola and some molecules appropriately arranged. It may be that, in order to explicate the relationship, we must appeal to more specific relationships than bare ground, for example, determinate/determinable hierarchies, functional realizations, proper subset relations, or parthood relations.35 Of course, for present purposes, any such parthood relations must not be of the stripe perdurantism invokes.

Indeed, any readers who are staunch anti-grounders are free to understand perdurantism as requiring only asymmetric supervenience of persistence facts on facts about pluralities of fundamental property instances, with no official appeal to ‘ground’ made at all.36 Nothing required by the dialectical and explanatory goals of plurdurantism entails otherwise. ‘Ground’ talk is but a useful and presently fashionable way of packaging the core idea.

As for fundamentality, I will say that something is ‘fundamental’ with respect to some domain just in case it is grounded by no other entity in that domain. I here leave open whether an entity might ground itself. Thus a property instance is fundamental just in case it is grounded by no distinct property instance. I will remain neutral about the ontology of property instances. The neutral menu includes, inter alia, universal/bare particular pairs formed by exemplification; universal/region pairs formed by exemplification; bundled tropes; the particulars of the Quinean nominalist; and particulars-standing-in-certain-resemblance-relations.

Notice, then, that property instances are not to be understood as the substantial particulars that exemplify first order properties, setting aside an exception to be mentioned shortly. For example, an apple’s being red is a property instance and its being crisp is a distinct property instance, but the apple itself is not a property instance. Similarly, a quark’s having a certain charge is (let us suppose) a fundamental property instance and its having a certain spin is a distinct fundamental property instance, but the quark itself is not a property instance. I leave open whether properties may be complex or structural such that the redness, charge, and shape of an apple may combine into some one complex property that has an instance where the apple is located. The exception mentioned several lines up concerns the Quinean, who holds that there is no ontological distinction between the apple and its being crisp, though she can still make fine-grained qualitative distinctions in her ideology and formulate grounding claims accordingly.

Having explained the working notion of fundamentality, I wish to address a corresponding dialectical worry.37 Given the present project of arguing for plurdurantism over perdurantism by appeal to modal scope, one would expect plurdurantism not to be vulnerable

34. See Wilson 2014 and Hofweber 2009.
35. See Wilson 2014.
36. Thank you to an anonymous referee for encouraging me to make this point.
37. Thank you to an anonymous referee for drawing my attention to this kind of worry.
to metaphysically possible counterexamples. Yet plausibly it is metaphysically possible that material continuants exist at worlds that contain no fundamental property instances. Rather, at these worlds, every property instance is grounded by some others. Indeed, this seems just the kind of possibility that those tolerant of ‘infinite complexity’ scenarios like junk ought to accept. Yet such worlds would show that plurdurantism fails to be metaphysically necessary, for it appeals directly to fundamental property instances.

I have two responses to this worry. First, even if we grant that worlds without fundamental properties are metaphysically possible, it is questionable whether they are relevant to the persistence debate. The identity of a property is determined in part by its relationships to other properties, particularly if the original property is non-fundamental. For example, the property of being water must relate in a certain way to the property of being oxygen. And even the property of being oxygen must relate to certain more basic physical properties, lest we have mere ‘fool’s oxygen’. The problem, then, is that when we follow the objector in trying to imagine a world with property instances whose grounds never bottom out, we cannot help but leave open that the properties we are imagining are not the properties relevant to ordinary object sortal concepts. For there is always the potential that some new property in the infinite descent of grounds will reveal that what we thought was property F is really a form of “fool’s F”. To invoke the famous example, if there is a possible world in which watery stuff is not grounded in certain actual physical properties, that would not be a world that contained water. Thus it would not be a counterexample to a candidate explanation of how water persists. Granted, the persistence of watery stuff remains relevant to the general persistence debate (water aside), so the world in question might still be dialectically relevant. But water is just an illustrative example. The more important cases are worlds in which properties relevant to the general status of being a material continuant at all – properties like spatiotemporal status or the basic quantities of final physics – are grounded in infinitely many other properties (whatever they may be), rather than being fundamental.

For such worlds would not contain the sort of material entities with which contemporary theories of persistence are concerned, but rather some sort of quasi-abstract, metaphysically alien entities (“fool’s material continuants”). Consequently, they would not be compelling counterexamples to extant theories of persistence. Crucially, this concern about the relevance of fundamental-property-less worlds to the persistence debate does not apply to the metaphysical possibility of infinite qualitative complexity per se. For infinite qualitative and/or mereological complexities need not entail a lack of fundamentality. 38

The second response to the worry is that even if – contra the first response – there were persistence-relevant worlds that contained no fundamental property instances, Plurdurantism could easily be modified to accommodate them. The explanatory work done by the plurdurantist’s appeal to fundamentality could also be done by appeal merely to relative fundamentality, where a property instance is relatively more fundamental than another if the former grounds the latter. So long as the presence and intrinsic natures at certain times of cars, pencils, particles and so forth are grounded by certain pluralities of property instances, plurdurantism succeeds in its explanatory and dialectical goals. For example, suppose some metaphysically possible particle is grounded in an infinite descent of property instances, each grounded by some others. Still, what jointly explain the persistence of the particle over time are facts about pluralities and sub-pluralities of those property instances.

The importance of this second response notwithstanding, my preference is to leave Plurdurantism intact as formulated above and to continue to appeal to fundamental property instances, in part for reasons outlined in the first response. Those inclined to the contrary are free to insert ‘relatively’ before ‘fundamental’ to yield a suitably modified version of Plurdurantism.

38. See Giberman 2015a.
5.3 Gunk
In addition to being more qualitatively fine-grained than substantial particulars like apples or quarks, fundamental property instances are also temporally fine-grained. If time decomposes into instants, then the individuation of fundamental property instances reflects differences in single times. Quark a’s being F at time t and world w is a numerically distinct property instance from a’s being F at t’ (≠t) at w. Alternatively, suppose that time is gunky at some world w.39 That is, all of time’s parts (sub-intervals) at w have proper parts. In such a case, instantaneous times are not available for use in individuating fundamental property instances. Instead, fundamental property instances at w simply come and go with the passage of time. For any interval i at temporally gunky world w, the fundamental property instances present at the beginning of i are numerically distinct from those present at the end of i. (Notice that i is guaranteed to have a distinct beginning and end in virtue of w’s status as temporally gunky.) This ensures that plurdurantism, like perdurantism, is compatible with temporal gunk, for it yields an explanatory basis in terms of fundamental property instances without requiring instantaneous times.

The need to accommodate gunk brings us to the advertised worry for stage theory. The simplest version of the worry is that stage theory cannot accommodate temporal gunk because the former requires stages to be instantaneous while the latter precludes instantaneous entities.40 A more recent and potentially deeper worry is that even if stage theory can be modified so as not to require instantaneous stages, it still fails to account for many possible gunky worlds, namely those at which certain intrinsic change occurs within non-instantaneous stages.41 If this is right then, given the arguments of the present essay, the space of possible temporal mereological structures would show plurdurantism to be a uniquely appealing brand of four-dimensionalism. For it alone can accommodate both junk and gunk.

5.4 Summary
Putting all this together and returning to the going example, the existence and nature of the cola over its full career is grounded by a certain plurality of fundamental property instances. Whichever property ontology one favors, the collection of fundamental property instances in question jointly determine the presence of certain atoms, molecules, liquidity, fizziness, flavor, and so forth. The precise persistence conditions for quantities of cola are unimportant for present purposes, for whichever such conditions one prefers can be imported for use in the plurdurantist framework. What is it for the cola to exist at some time t? It is for a certain sub-plurality of the plurality of cola-grounding fundamental property instances to exist and ground the cola at t. Why does the cola persist? Because the plurality of cola-grounding fundamental property instances is arranged as it is across space and time, in accord with the persistence conditions for cola. What is it for the cola to be fizzy at t and flat at t’? It is for one sub-plurality of the plurality of cola-grounding fundamental property instances to exist exactly at t and to (fully) ground the cola’s being fizzy then, and for some other such sub-plurality to exist exactly at t’, and to (fully) ground the cola’s being flat then.

To see how plurdurantism accounts for the persistence of continuants that plausibly are fundamental, consider again a basic physical particle. The particle’s being physically fundamental does not preclude its being grounded by some plurality of fundamental property instances. It simply will be a less inclusive plurality than those that ground non-fundamental, middle-sized continuants. For example, the grounding plurality may be just a few physically fundamental magnitude instances individuated across the relevant times.

Given that the cola and the particle are each respectively some concrete non-junky whole at the actual world, it may well be that the times at which they exist and have certain natures also correspond to

41. See Giberman 2019.
the existence of familiar temporal proper parts. Moreover, these proper parts may well exemplify simpliciter fizziness or spin, respectively. What plurdurantism rules out is that these mereological and predicative facts are what metaphysically explain material persistence over time. That is the job of plurality membership and ground.

6. Plurdurance and Temporal Material Junk

Plurdurantism yields a substantial theoretical payoff without loss of plausibility, ideological economy, or motivation. Namely, it furnishes the same account of persistence for junky pluralities as for familiar, non-junky material continuants such as individual persons or particles. Junky and non-junky entities alike persist over time by being grounded by pluralities of fundamental property instances and they possess qualitative properties at times in virtue of sub-pluralities of grounding property instances that exist at those times. Consequently, it is no problem that junky structures do not have temporal parts. To return to an earlier example, particle \( b \) persists at \( w_b \) through the 1980s by virtue of being grounded by certain property instances at certain times during that decade, and particle \( a \) persists exactly the same way at \( w_a \). That \( a \) has no temporal parts while \( b \) does makes no difference to their persistence. The thought that entities as similar as \( a \) and \( b \) ought to persist in the same way is respected.

In addition to its theoretical payoff, plurdurantism comports well with standard motivations for four-dimensionalism. For example, it respects the general four-dimensionalist analogy between space and time better than does perdurantism. To see this, consider spatial junk. Let \( C \) be a spatially junky cosmos: a plurality of spatial entities such that (i) each member of the plurality is a proper part of some others and (ii) the plurality satisfies the ordinary functional sortal ‘cosmos’. Let \( C \) contain a planet qualitatively identical to earth so that some of \( C \) is water and some of \( C \) is dirt. What explains this? The perdurantist answer to the parallel question about the actual cosmos is that it possesses some water molecules and some dirt particles as proper parts. But this kind of answer is unavailable as a response to the question about \( C \), for \( C \) possesses no proper parts (though it contains many). The better answer in \( C \)'s case is that some water molecules and some dirt particles are members of the plurality that is \( C \) (or better still, that they are grounded by sub-pluralities of the plurality of fundamental property instances that ground \( C \)). Spatial junk thus limits the force of the four-dimensionalists's analogy between space and time when four-dimensionalism is fleshed out via perdurantism, for it shows that certain spatial questions — in this case a spatial analog of the problem of temporary intrinsics — are not answerable by recourse to parthood facts. By contrast, it bolsters the analogy when four-dimensionalism is fleshed out via plurdurantism, for the relevant spatial questions are answered helpfully by membership and grounding facts.

7. Two Objections and Replies

In this penultimate section, I wish to address two final objections.

7.1 The Objection That Plurdurantism is Ill-Motivated

Plurdurantism as defended above is ill-motivated, for fundamental property instances and ground are superfluous to an adequate account of temporal junk. All that is needed is a shift in packaging from a parts framework to a pluralities framework. Material continuant \( x \) has property \( F \) at time \( t \) just in case \( x \) corresponds to a plurality of objects across its career, one of whose members is exactly located at \( t \) and is \( F \) simpliciter.

While the suggestion behind this first objection is interesting as far as it goes, it does not go far enough to carry much force. Plurdurantism’s appeal to pluralities of grounding property instances is needed both for explanatory value and for properly respecting the classical anti-endurantist “intuition” that temporary intrinsic properties are exemplified simpliciter.\(^{42}\)

To see the point about explanatory value, notice that the four-dimensionalist who takes up the objector’s suggestion owes an explication of the relevant notion of correspondence. In the absence of

As for the anti-endurantist intuition that persistence is a matter of property possession simpliciter across a continuant’s temporal proper parts, the problem for shifting to bare plurality membership without plurdurantism is twofold. First, the plurality of objects invoked in the objector’s suggestion is numerically distinct from the persisting object \( x \). Second, the perdurantist holds that for any sub-interval \( i \) of \( x \)’s career, \( x \) has a corresponding proper temporal part that exemplifies its intrinsic properties simpliciter. Yet the plurality suggested by the objector is at least partially extrinsic to \( x \)-at-\( i \), thus disrupting exemplification simpliciter. (To appreciate that partial extrinsicality is all that is needed to disrupt the classical perdurantist picture, recall that even characterizing bentness as a dyadic relation between object \( x \) and time \( t \)—the quintessential Lewis-offending move—involves only partial extrinsicality to \( x \)-at-\( t \); \( x \), for example, is not extrinsic to \( x \)-at-\( t \). What matters is that dyadic bentness—like most of the objector’s plurality—is extrinsic.) Notice that, setting aside composition-as-identity, these two factors hold even in the non-junky case whereby correspondence is explicated via mereology. The problem is that these factors directly run afoul of the prohibition that intrinsic exemplification simpliciter places on explanatory recourse to entities numerically distinct from or extrinsic to the bearer of the relevant properties.\(^{43}\)

Plurdurantism, by contrast, honors the anti-endurantist Lewisian intuition. On any plausible characterization of fundamental properties, no object has any property at any time (whether ‘having’ is simpliciter or not) independently of some (at least relatively) fundamental property instances. Consequently, a full explanation for why a given temporal part has a property simpliciter must take recourse to (relatively) fundamental property instances, independently of plurdurantism. Even for Lewis, a complete account of the exemplification simpliciter of bentness by one of his proper temporal parts involves eventual explanatory recourse to fundamental properties (what Lewis calls ‘sparse’ properties), for the complete characterization of the world need not invoke relatively abundant properties such as bentness.

7.2 The Objection That Temporal Junk is Prohibitively Recherché\(^{44}\)
There is little reason to care about recherché scenarios like material temporal junk that are probably impossible anyway. Thus, for all that has been said here, perdurantism is fine as is. The above efforts to position plurdurantism as an important alternative are much ado about nothing.

As stated, this objection claims that material temporal junk is both too recherché to care about dialectically and of little threat to perdurantism, since it is probably impossible. Let us take the latter issue about possibility first. I have argued already that temporal material junk is at least as plausibly metaphysically possible as it is plausibly metaphysically impossible, since the reasons that have been offered against its possibility rest on a highly controversial claim, namely, that composition necessarily is unrestricted. The present objector’s claim that junk probably is metaphysically impossible thus begs the question. Moreover, I have pointed out that one principal reason for taking seriously the metaphysical possibility of many other widely discussed recherché scenarios in philosophy, namely, that they are coherently conceivable, applies just as well to temporal material junk. I acknowledged that this reason is controversial, but its status as such has not diminished the dialectical impact of the well-known thought experiments it has been, and continues to be, deployed to support.

\(^{43}\) See Giberman 2017.

\(^{44}\) Thank you to an anonymous referee for suggesting discussion of this objection.
8. Conclusion

Plurdurantism is a novel four-dimensionalist account of persistence for material continuants that meets the goal of unified treatment across metaphysically possible worlds. Moreover, it does so without violating the chief merits of perdurantism within the persistence dialectic. Indeed, it exceeds perdurantism in its ability to uphold the four-dimensionalist’s valued analogy between space and time.

The last two decades have seen the persistence literature evolve beyond debates about the existence of temporal parts, both within the four-dimensionalist camp and across the four-dimensionalist/endurantist divide. Yet those moved by the perdurantist’s analogy between space and time, the semantic challenge it poses to stage theory, and Lewis’s original and offshoot arguments from temporary intrinsics, have continued to defend temporal parts as the fundamental explanantia of material persistence. Plurdurantism offers a new way forward. One can now (i) doubt that the most interesting debate concerns the existence of temporal parts, (ii) be moved by anti-endurantist and anti-stage-theoretic considerations that motivate perdurantism, (iii) reject perdurantism on grounds of explanatory limitation, and yet still (iv) offer a unified explanatory theory of material persistence.

References


45. See Black 1952.

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