

ORIGINAL ARTICLE OPEN ACCESS

A Flaw in Sider's Vagueness Argument for Perdurantism: Endurantism Endures

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Received: 16 March 2024 | **Revised:** 25 February 2025 | **Accepted:** 21 May 2025

Keywords: *endurantism* | *perdurantism* | *Sider* | *vagueness*

ABSTRACT

Sider's vagueness argument for perdurantism (2001: 126ff.) has long been seen as one of the most powerful, or perhaps the most powerful, in the perdurantist's arsenal. In its absence, the case against *endurantism* is significantly weakened. Despite its age, there is still no generally agreed view on its worth. I shall show that this argument fails. It is an extension of a modification Sider gives of David Lewis's argument for unrestricted mereological composition. I shall first set out Lewis's argument for unrestricted mereological composition, Sider's modification, and the problem with it. I will then turn to Sider's extension of the argument into an argument for perdurantism and show that it suffers from the same problem. As I shall explain, though Sider's modification of Lewis's argument for unrestricted mereological composition fails, this is not a crushing blow for proponents of that thesis, since Lewis's original argument is still available, which is valid and plausibly sound. But there is no available retreat for the perdurantist to a Lewisian form of Sider's argument for perdurantism.

1 | I

Sider's vagueness argument for perdurantism (2001: 126ff.) has long been seen as one of the most powerful, or perhaps the most powerful, in the perdurantist's arsenal.¹ In its absence, the case against *endurantism* is significantly weakened. Despite its age, there is still no generally agreed view on its worth. I shall show that this argument fails.

modification of Lewis's argument for unrestricted mereological composition fails, this is not a crushing blow for proponents of that thesis, since Lewis's original argument is still available, which is valid and plausibly sound. But there is no available retreat for the perdurantist to a Lewisian form of Sider's argument for perdurantism.

Lewis's argument for unrestricted composition is set forth in the following passage (Lewis 1986: 2012–2013):

2 | II

Sider's argument for perdurantism is an extension of a modification Sider gives of David Lewis's argument for unrestricted mereological composition. I shall first set out Lewis's argument for unrestricted mereological composition, Sider's modification and the problem with it. I will then turn to Sider's extension of the argument into an argument for perdurantism and show that it suffers from the same problem. As I shall explain, though Sider's

The only intelligible account of vagueness locates it in our thought and language. The reason it's vague where the Outback begins is not that there's this thing, the Outback, with imprecise borders; rather there are many things, with different borders, and nobody has been fool enough to try to enforce a choice of one of them as the official referent of the word 'Outback'. Vagueness is semantic indecision. But not all of

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language is vague. The truth-functional connectives aren't, for instance. Nor are the words for identity and difference, and for the partial identity of overlap. Nor are the idioms of quantification, so long as they are unrestricted. How could any of these be vague? What would be the alternatives between which we haven't chosen? The question whether composition takes place in a given case, whether a given class does or does not have a mereological sum, can be stated in a part of language where nothing is vague. Therefore, it cannot have a vague answer. There is such a thing as the sum, or there isn't. It cannot be said that, because the desiderata for composition are satisfied to a borderline degree, there sort of is and sort of isn't. What is this thing such that it sort of is so, and sort of isn't, that there is any such thing? No restriction on composition can be vague. But unless it is vague, it cannot fit the intuitive desiderata. So no restriction on composition can serve the intuitions that motivate it. So restriction would be gratuitous. Composition is unrestricted.

As Sider explains, this is valid, since the notion of composition is explained in terms of the notion of parthood and logical notions. So if 'part of' lacks vagueness (semantic vagueness, which both Lewis and Sider take to be the only vagueness there is)² it is not just valid but plausibly sound. But the assumption that parthood is not vague is disputable, so Sider refines Lewis's argument to dispense with it.

Sider's argument has three premises:

(P1) If not every class has a fusion, there must be a pair of cases connected by a continuous series such that in one composition occurs, but in the other composition does not occur.

(P2) In no continuous series is there a sharp cut-off in whether composition occurs.

(P3) In any case of composition, either composition definitely occurs or composition definitely does not occur.

From these premisses the conclusion follows that, if there is any composition, composition is unrestricted. Sider explains this: 'P1, P2 and P3 imply the desired conclusion. P1 requires that if composition is not unrestricted, we have a case of composition connected by a continuous series to a case of non-composition. By P3, there must be a sharp cut-off in this series where composition abruptly ceases to occur; but this contradicts P2' (2001: 125).

Sider's version of the argument for unrestricted composition does not differ from Lewis's in its premisses or conclusion, but only in its defence of the third premiss. A Lewisian defence of (P3) is straightforward. Given the linguistic theory of vagueness (vagueness consists in multiple precisifications) together with the assumption that 'part of', as well as the logical terms, lacks vagueness (P3) is an obvious necessary truth. But Sider does not wish to rely on the Lewisian assumption about parthood. He claims (2001: 126–27):

'Fortunately, (P3) may be supported without making any assumption about parthood, for if it were vague whether a certain class had a fusion, then it would be vague how many concrete objects existed. Lewis's assumptions about vagueness can be replaced by weaker assumptions that concern only logical vocabulary'.

It is precisely at this point that Sider's argument is wanting (I here build on and extend (Noonan 2010)). The defence he gives of (P3) is one no supporter of the linguistic theory of vagueness, like himself and Lewis, can make. Since the aim of the argument as a whole is precisely to show that a defender of the linguistic theory of vagueness must accept unrestricted mereological composition the argument has no advantage over Lewis's. Without Lewis's stronger assumption Sider's argument fails; if it is made Sider's argument is unnecessary.

To see this we need to see how Sider elaborates his defence of (P3), first defining 'concrete' as a semantically determinate term meaning 'non-abstract', where 'abstract object' is stipulatively defined by a list of semantically determinate predicates ('set or class', 'number', etc.). The crucial passage then occurs:

Suppose now for *reductio* that (P3) is false – that is, that it can be vague whether a given class has a fusion. In such a case imagine counting all the concrete objects in the world. One would need to include all the objects in the class in question, but it would be indeterminate whether to include another entity – the fusion of the class. Now surely, if (P3) can be violated, then it could be violated in a 'finite' world, a world with only finitely many concrete objects. That would **mean that** some *numerical sentence* – a sentence asserting that there are exactly *n* concrete objects, for some finite *n* – would be indeterminate. But numerical sentences need contain only logical terms and the predicate 'C' for concreteness... Mereological terms are not needed to express numerical sentences, and so need not be assumed to lack precisifications.

(Sider 2001: 127), my bold **emphasis**

What is going on here? The thought appears to be that if it is indeterminate whether some things compose another it must also be that it is indeterminate whether there is an additional entity (that they compose). Now imagine a world containing just two concrete simples (extended or unextended entities without proper parts), *a* and *b*, so related that it is indeterminate whether their fusion exists. Call this '*the two simples scenario*'.

The inference Sider signals ('That would **mean that** some *numerical sentence* ... would be indeterminate') is that it follows that:

It is indeterminate whether three concrete objects exist.

That is, it follows that there is *count indeterminacy*.

3 | III

But it doesn't follow. For this to follow it must be that it is *not the case* that there is something such that it is indeterminate whether it is the fusion of *a* and *b*. There is a key conditional which must be false, of the form 'If it is indeterminate whether something is *F* then there is something such that it is indeterminately *F*'.

But a defender of the linguistic theory of vagueness, who accepts (with Sider) the semantic determinacy of logical vocabulary, *what-ever* he says about 'part of', 'composes' and 'fusion', must say that this is the case. He must say that 'It is indeterminate whether something is *F*' entails 'There is something such that it is indeterminate whether it is *F*'. There are two cases. Either '*F*' is precise or it isn't. If it is 'It is indeterminate whether something is *F*' is necessarily false. Hence it trivially entails 'There is something such that it is indeterminate whether it is *F*'. If '*F*' is imprecise, again 'It is indeterminate whether something is *F*' entails 'There is something such that it is indeterminate whether it is *F*'. For if it is indeterminate whether something is *F* there is a precisification of '*F*' (the only piece of non-logical vocabulary in the sentence), according to the linguistic theory, on which 'something is *F*' is true. So, something is *F* under the relevant precisification. But this is not so under all precisifications, otherwise 'something is *F*' would be determinately true. So it will be *F* under some precisifications, and not others. That is, it will be indeterminately *F*. So 'there is something such that it is indeterminately *F*' will be true.

So, whether '*F*' is precise or not, according to the linguistic theory, 'it is indeterminate whether something is *F*' entails 'there is something such that it is indeterminately *F*'. So, 'it is indeterminate whether there is something of which the simples *a* and *b* are parts' entails 'there is something of which it is indeterminate whether the simples *a* and *b* are parts of it'. So, the inference Sider signals cannot be accepted by the linguistic theorist.³

'Concrete' is stipulated to be precise. So one of:

There is some concrete thing such that it is indeterminate whether it is the fusion of simples, *a* and *b*.

and:

There is some non-concrete thing such that it is indeterminate whether it is the fusion of simples, *a* and *b*.

is determinately true. There is no count indeterminacy.

If 'if something is the fusion of concrete simples *a* and *b* it is concrete' is true under every precisification (which is a plausible penumbral connection), the second is ruled out. So it will be determinately true in *the two simples scenario* that there are (at least) three things, in fact, exactly three concrete things (the thing of which it is indeterminate whether it is the fusion cannot be *a*, since that is a simple, nor can it be *b*, because that is a simple).

So, if the linguistic theory of vagueness is correct, and if the logical terms, including the quantifiers, are precise, and fusions of

concrete objects are concrete objects, the description of *the two simple scenarios* as one in which it is indeterminate whether the fusion of *a* and *b* exists entails that it is *determinate* that there are three concrete objects.

In short, Sider thinks that the denial of (P3) entails the possibility of count indeterminacy and because this is so his vagueness argument is not just another *Sorites*. But if the linguistic theory of vagueness is correct and the logical terms are semantically determinate the denial of (P3) does not entail count indeterminacy—unless trivially, if, as Lewis thinks and Sider does not want to assume, 'part of' is semantically determinate and (P3) is a necessary truth. So, the vagueness argument is just another *Sorites*.

This point can be put another way. Consider the conjunction of the views that all vagueness is linguistic and that not all language is vague, and, in particular, that the logical expressions—the truth-functional connectives, the quantifiers and the expression for numerical identity—are not. Call this 'the Standard View'. Then the argument just given is that it is a consequence of the Standard View, which is Sider's own view in 2001, that the inference Sider signals, 'that would **mean that** some numerical sentence ... would be indeterminate', fails. Hence it follows that his defence of (P3) fails, and so, that his vagueness argument for unrestricted mereological composition fails. Given the Standard View there is no count indeterminacy *whether or not composition is vague*. That is, given the Standard View there is no count indeterminacy *even if* composition is vague. So assuming the Standard View, denying count indeterminacy gives no reason to deny compositional vagueness.

It has been noted by several philosophers (Hawley 2004, Korman 2010, esp. section 4, Magidor 2016a, esp. section 3.2.2) that there are philosophical positions according to which it can be determinate how (finitely) many concrete objects there are but indeterminate how the relation of parthood holds between them,⁴ so that it can be determinately true, for example, as in the illustration above, that there are three concreta, two of which are definitely simples, but indeterminate whether the third concrete object is composed of them.

What the preceding argument establishes is that *it is a consequence of the Standard View that some such philosophical position is correct*.

So, after studying Sider's argument, defenders of the Standard View of vagueness can rest content with the view that sometimes things compose, sometimes they do not, and sometimes it is indeterminate whether they do. They must accept that when it is indeterminate whether things compose something, there is something such that it is indeterminate whether they compose it; but, of course, they can happily deny that whenever there are two things, however spatially separate and disconnected, there is another thing. They need not accept Lewis's plenitudinous ontology.

In sum, a proponent of the Standard View of vagueness, which is Sider's own in 2001, cannot accept the crucial inference in his defence of (P3) without assuming, with Lewis, the semantic determinacy of 'part of'. Sider's argument for unrestricted mereological composition does not improve on Lewis's. Without

Lewis's assumption of the semantic determinacy of 'part of' it fails, and if that assumption is made, it is not needed.

An anonymous referee usefully emphasizes that a key point in the argument of this section is the distinction between *count indeterminacy*, 'It is indeterminate precisely how many concrete objects there are', and mere *compositional indeterminacy*, 'There is at least one material object such that it is indeterminate precisely which concrete objects are its parts'. The description of *the two simples scenario* as exhibiting compositional indeterminacy can be accepted whilst its description as exhibiting count indeterminacy is rejected. The reason is that the statement of compositional indeterminacy uses the word 'part'; the statement of count indeterminacy does not. Appealing only to the Standard View one can explain why *the two simples scenario* exhibits compositional indeterminacy; to explain why it exhibits count indeterminacy one needs to appeal to the vagueness of unrestricted quantification. So, if one wishes to deny that the *two simples scenario* exhibits counts indeterminacy one need only to reject the vagueness of unrestricted quantification. But to deny the scenario exhibits compositional indeterminacy one must reject the Standard View, endorsed by Lewis and Sider, and any view of vagueness which validates the move from 'it is indeterminate whether something is *F*' to 'something is such that it is indeterminately *F*'. In this way rejection of *the two simples scenario* as exhibiting count indeterminacy is less problematic than rejection of it as exhibiting compositional indeterminacy. The supporters of Sider's defence of (P3) face a challenge. The challenge is to say what account of vagueness, other than Sider's own Standard View—which must be one that does not validate the inference the Standard View validates—they endorse. This is not an easy thing to do. For example, an alternative account of vagueness is the Williamson (1994). But it is not clear that that does not validate the inference validated by the Standard View. So, it is not clear that Sider's defence of (P3) can be supported by an epistemicist (Magidor 2016b). In addition, if Williamson's epistemicism is combined with his necessitism that inference is validated, so Sider's defence of (P3) is undermined (Williamson 2013: Ch 1 note 9). In short, it is not clear what, if any, theoretical ground can be given for denying the inference from 'it is indeterminate whether something is *F*' to 'something is such that it is indeterminate that it is *F*'. What is clear is that a defender of the Standard View, like Sider himself, cannot deny it. Of course, defenders of the Standard View can reject outright the possibility of *the two simples scenario*, but only by appeal to Lewis's denial of the vagueness of 'part of'. Once this is denied unrestricted mereological composition can be established and the detour through Sider's defence of his premiss (P3) set aside. But, crucially for our purposes, as the next section explains, *perdurantism* cannot so easily be defended by going back to Lewis from Sider.

4 | IV

Though a proponent of the Standard View need not accept unrestricted mereological composition, the defender of this might be relatively unperturbed. This is because a retreat to Lewis's argument, which *is* valid, is available and the assumption of the semantic determinacy of the atemporal, dyadic, predicate 'part of' which Lewis introduces, which is necessary for its soundness,

does not seem so implausible. At least at first sight, this does not seem, like 'is a friend of', to be semantically indeterminate. And if it is not, nor is 'is composed of', which is defined in terms of it. If all vagueness is linguistic, a matter of semantic indecision, what can have been left undecided so that 'part of' is vague? So, Lewis may be right. And if he is the failure of Sider's attempt to improve on his argument for unrestricted mereological composition, by reducing its assumptions, does not leave the defender of unrestricted mereological composition unarmed.

But Sider's modification of Lewis's argument is intended to pave the way for his argument for perdurantism. So we now turn to that.

The argument Sider gives for perdurantism relies on three premisses, which are the direct analogues of (P1)–(P3) in his modification of Lewis's argument for unrestricted mereological composition. The analogue of (P3) is:

(P3') In any case of minimal D-fusion, either minimal D-fusion definitely occurs or minimal D-fusion definitely does not occur.⁵

Here the crucial notion is that of a minimal D-fusion, which Sider defines using the notion of temporally indexed parthood, '*x*'s part of *y* at *t*' (and the derivative notion of 'fusion at *t*'), and it is this notion of temporally indexed parthood in terms of which he defines perdurantism. He has to employ this endurantist-friendly notion of temporally indexed parthood here so as to avoid begging the question against the endurantist. This is why it is not open to someone who finds Sider's argument for perdurantism wanting just to retreat to Lewis and his notion of atemporal dyadic parthood. Sider is not merely using fewer assumptions than Lewis. He is also dispensing with what is, in the context of the debate, a problematic Lewisian concept.

Sider gives the following definitions. He defines '*x* is an instantaneous temporal part of *y* at *t*' to mean: (i) *x* exists at *t*, but only at *t*; (ii) *x* is a part of *y* at *t*, (iii) *x* overlaps at *t* everything that is part of *y* at *t*. Then perdurantism (four-dimensionalism) is defined to be the view that:

For any object *x* and for every time *t* at which *x* exists, there is an instantaneous temporal part of *x* at *t*.

Endurantism is the denial of this. The notion of a minimal D-fusion is defined as follows (2001: 133). Let an *assignment* be a (possibly partial) function from times to classes of objects that exist at those times. Given an assignment *f*, let a D-fusion of *f* be an object *z*, such that for every time in *f*'s domain, *z* is the fusion at *t* of *f*(*t*). Given an assignment *f*, let a minimal D-fusion of *f* be an object *z*, which is a D-fusion of *f* and exists only at the times in *f*'s domain. Sider's argument for perdurantism is that his three premisses entail the thesis (U), that every assignment *f* has a minimal D-fusion (2001: 138), that is, that any filled region of spacetime is the total career of some object (2001: 120), and that (U) entails perdurantism as defined above.

In fact, perdurantism, as so defined by Sider, is not exactly analogous to (spatially) unrestricted mereological composition. The latter says that given any objects *a*, *b*, ... there is their mereological fusion. It does not *also* imply that given *any* (spatially

extended) object, for any spatial point within its boundaries (or even: for any extended region within its boundaries) there is a numerically distinct object that is wholly located there. That would be required by a spatial analogue of Sider's perdurantism.

However, this is by-the-by. The important point is that even if we consider only the strict temporal analogue of spatially unrestricted mereological composition,⁶ Sider's argument (or Sider's argument refashioned just to target this claim) fails to establish it because it relies on (P3') as his argument for unrestricted mereological composition relies on the unwarranted (P3). However, (P3') is as unwarranted as (P3) is.⁷

Sider thinks that (P3') can be established by parallel reasoning to that which he gives for (P3), that is, that admitting exceptions to (P3') requires acknowledging count indeterminacy, that some numerical sentence asserting that there are n (finitely many) concrete objects is indeterminate in truth-value.

But this argument fails for precisely the reason that Sider's argument for his original (P3) fails—assuming the Standard View (all vagueness is linguistic but the logical particles, including the quantifiers are precise).

Sider does not offer a general argument that any exception to (P3') entails count indeterminacy. Rather, he gives several illustrative examples in which he argues that this is so, that is, that vagueness in whether a minimal D-fusion exists entails count indeterminacy.

We can illustrate the fault in Sider's reasoning by considering one of these examples, the case of Old Ted and Young Ted. Suppose that there are two instantaneous person-like objects existing at t and t' (and let us suppose for simplicity that no other times or objects are relevant). Old Ted is to some degree psychologically continuous with Young Ted so that it is tempting to say, but not utterly clear, that there is one person existing at both times. Now Sider's thought is that if we say that it is indeterminate whether there is something composed of Old Ted and Young Ted, that is, whether the minimal D-fusion of the relevant function f^8 exists, we have to say that the case is one in which it is vague whether there are two or three objects.

But in fact, given the Standard View we need not, and cannot, say this. We must say that the case determinately involves three objects, Young Ted, Old Ted and an object of which it is indeterminate whether it is the D-fusion of the relevant function. The mereological relations of Young Ted and Old Ted to this third object are not determinate, just as in the case of the relation of the two simples to the third object in *the two simples scenario*.⁹

I conclude that Sider's vagueness argument for perdurantism should not trouble those with endurantist sympathies, not even if they wish to insist that continuants, which they will sharply distinguish from events and processes, have *no* temporal (as opposed to *temporary*) proper parts (whether defined using the atemporal *part of relation* Lewis employs or Sider's temporally indexed *part of relation*) and are *never* temporal parts of other things.

But, finally, suppose Sider's argument is modified by replacing the temporally indexed *part of relation* throughout by the

Lewisian atemporal, dyadic, *part of relation*—which, as emphasized, Sider carefully avoids appeal to so as not to beg the question against the endurantist—and this is assumed, with Lewis, to be semantically determinate. Note now that Sider's argument for unrestricted mereological composition in fact only excludes mereological nihilism by its first premiss (P1). In the case of the argument for perdurantism now being envisaged, then, the obvious choice for the endurantist is to choose nihilism and reject (P1'), that is, to say that that no continuants have temporal parts—in the now understood *Lewisian* sense—other than themselves, nor are such temporal parts of other things. This is, I think, the common sense view which most of us are inclined to accept before we are hit with the philosophical arguments for perdurantism.

To expand on the final point, what I mean by 'common sense' here is something like: 'would be unhesitatingly assented to by anyone prior to exposure to philosophical and/or scientific arguments against it'. David Lewis explains what he means by a temporal part of a person (a person-stage): 'A person-stage is a physical object, just as a person is. ...It does many of the same things that a person does: it talks and walks and thinks, it has beliefs and desires, it has a size and shape and location.' (1983:76). This is Sider's conception too. So Sider's perdurantism ('for any object x and any time t at which x exists there is an instantaneous proper part of x at t ') entails that as I sit here now there is an instantaneous physical object here which is thinking (because Sider is a stage-theorist, this *is* me). This will be succeeded by another and another ... and has been preceded by many others. There are many such thinkers successively coming and going, where anyone, prior to exposure to the philosophical arguments, would say that there was just one persisting thinker. *Prima facie*, this is what we think. Of course, Sider (like Lewis) explains why we say this. But if perdurantism is to be accepted this explanation is *needed*. We say, and it seem think, that there are not many thinkers, but only one (which may have many successive thoughts, of course). In that sense, it is endurantism, not perdurantism, that is in accord with common sense. The perdurantist can expect 'incredulous stares'.¹⁰ My claim has been that Sider's vagueness argument provides no reason to shift from this endurantist position. Perhaps others do, but Sider's vagueness argument is the most widely known and discussed. It is also I think the most promising. But it fails. It does so because it is just an extension of a failed modification of Lewis's argument for unrestricted mereological composition. I conclude that endurantism endures.

Conflicts of Interest

The author declares no conflicts of interest.

Endnotes

¹ Magidor (2015:113) writes: 'One of the most influential arguments in favour of perdurantism is the Argument from Vagueness' and notes in a footnote that Sider himself classifies the argument as 'one of the most powerful' and that Koslicki maintains that 'if it were not for the argument from vagueness, there would be a relative stand-off between three-dimensionalist and four-dimensionalist' (Koslicki 2003: 108).

² Sider is explicit that he is assuming without argument the linguistic theory of vagueness (2001: 129), so perhaps it is unfair to characterise him as arguing unqualifiedly that composition is unrestricted, rather

than that, conditionally on the assumption that the linguistic theory of vagueness is correct, composition is restricted. However, my argument will be that, on his own assumption that the linguistic theory is correct, Sider's argument fails, because his defence of the third premiss of his argument fails. There is the question whether, if the linguistic theory of vagueness is replaced by some other as the starting point of Sider's argument, it can be rescued from my criticism. I consider this question in the final part of section III. I conclude that it is dubious.

³ My main point is that the linguistic theory of vagueness entails that 'it is indeterminate whether something is *F*' entails 'there is something such that it is indeterminately *F*' in general. So, it entails that if 'it is indeterminate whether there is something which is a heap/tall/orange/John's friend' is true, it follows that 'there is something such that it is indeterminate whether it is a heap/tall/orange/John's friend'. And it also entails that 'if it is indeterminate whether there is something of which *a* and *b* are parts' is true it follows that 'there is something of which it is indeterminate whether *a* and *b* are parts of it' is true. Again, it entails that if 'it is indeterminate whether there is something of which *a* is a proper part' is true, 'there is something of which it is indeterminate whether *a* is a proper part of it' follows. But it also seems to me that these latter entailments of the linguistic theory, like the former, are correct. For example, if it is the case that it is indeterminate whether *a* is a proper part of something, what more would have to be added for it to be the case that there is something of which it is indeterminate whether *a* is a proper part of it, given that the quantification here is understood unrestrictedly throughout?

⁴ Korman (2010: 896) suggests that this is true of supersubstantialism, for example. Korman himself denies that, as asserted above, the Vagueness Argument is just another *Sorites*. His argument (2010: 898) is: 'We have surveyed ... strategies for blocking the argument from vagueness, each of which required endorsing at least ... the vagueness of logical vocabulary, Barcan objects, eternalism ... borderline composite expansions, supersubstantialism, the sortal dependency of quantification, an eliminativism about familiar kinds of composites, or the brutality of compositional facts. None of these commitments is already mandated by the usual epistemic, linguistic or ontic treatments of vague predicates, vague singular terms, or sorites arguments.' But the argument in the text has been that the Standard View (which is the linguistic treatment of vagueness together with the assumption that logical vocabulary is not vague) does mandate that one or other of these commitments is necessary. Specifically, it mandates (strictly speaking, along with the assumption that 'concrete' is precise and that it is not determinately ruled out that something is a fusion of concrete simples and concrete) that there are what Korman (2010: 895) calls DECOs, Determinately Existing Concrete Objects (and hence DEOs), which the borderline composers are a borderline case of composing in any case of borderline composition.

⁵ The other premisses are: (P1') If not every class has a minimal D-function, then there must be a pair of cases connected by a continuous series such that in one minimal D-fusion occurs, but in the other minimal D-fusion does not occur, (P2') In no continuous series is there a sharp cut-off in whether minimal D-fusion occurs.

⁶ This would be that for any objects, the *x*s (say William the Conqueror, Henry VIII, King Charles and Prince Harry), there is an object which exists whenever one of them exists and at every time it exists is the fusion of the *x*s existing then.

⁷ of course, a defender of perdurantism can respond by saying that temporally indexed parthood, like, on Lewis's view, atemporal parthood, is a precise notion (i.e., the predicate expressing it is precise). Then his path is neither Sider's nor Lewis's. He is assuming more than Sider wishes to and his (endurantist-friendly) notion of temporally indexed parthood is not Lewis's. So, he cannot appeal to Lewis's arguments to defend his claim that it is non-vague. How can he defend it? This is an unexplored path.

⁸ $f(t) = \{\text{Young Ted}\}$ and $f(t') = \{\text{Old Ted}\}$.

⁹ Note that endurantists are committed to the existence of three objects in the case of Old Ted and Young Ted *only* because (a) the case is *given* to us as one in which the two instantaneous objects exist and (b) it is stipulated that their relation is such as to make it *indeterminate* whether there is a minimal diachronic fusion of the relevant function. Endurantists who responds to Sider's argument considered only as an argument for the strict temporal analogue of spatially unrestricted mereological composition as I suggested we can respond to his argument for (spatially) unrestricted mereological composition are not thereby committed to a 'plenitudinous' ontology mirroring that of the typical perdurantist. They need not accept, for example, the existence of a diachronically extended 'trout-turkey'—an object located where some nineteenth century trout was whenever it existed and where some twentieth century turkey was whenever it existed, since they need not accept the claim corresponding to (b) above, that is, that it is indeterminate whether they have a fusion. Their position is the same as that of someone who accepts the semantic indeterminacy of spatial parthood. The latter need not accept that if there are two concrete things, however spatially separate and disconnected, there are three. Likewise, defenders of the semantic indeterminacy of temporal parthood need not accept that if there are two temporally located things, however separated, then there are three. So, they are not committed to a plenitudinous temporal ontology like Sider's except for not being describable in terms of determinate parthood relations.

¹⁰ Thanks also to an anonymous referee for pressing me on this point. They suggest the possibility of a kind of mere perdurantism, which allows that objects are spread out over time and possess temporal parts but is not committed to the plenitudinous ontology of overlapping perduring temporal parts which Sider and Lewis believe in and so may not conflict with common sense. They suggest that when we make such remarks as, '18-year-old-me thought himself a bit of a rebel', this may be interpreted as suggesting such a kind of perdurantism. This is not in accord with Sider's stage theory, of course, which allows only instantaneous thinkers (and provides a Lewisian-inspired interpretation of de re tensed utterances), but it is none the worse for that. But it does not seem to me that the perdurantism suggested by such remarks avoids the counter-intuitiveness (if it is such) of overlapping thinkers. I can speak also of 'teenage-me' and 'student-me'. If this talk is taken seriously it does appear to commit me to a multiplicity of overlapping thinkers.

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