TWO ARGUMENTS FROM SIDER'S *FOUR-DIMENSIONALISM*

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1 Introduction

Theodore Sider's *Four-Dimensionalism*[1] is a well-organized and clearly written book that is chock-full of important arguments. Both friends and foes of the views defended by Sider will benefit enormously from careful study of the book. I am going to focus on just two of Sider's many arguments for Four-Dimensionalism: his argument from vagueness, which I take to be the most important and powerful argument in the book, and his argument from time travel, which I find to be the funnest to think about.

2 The Argument from Vagueness

Sider's argument from vagueness for Four-Dimensionalism is adapted from his reconstruction of David Lewis's argument for the following conclusion about fusions.[2]

> **The Principle of Universal Fusions (PUF):** Every class of objects has a fusion.

Here are some definitions that feature in Sider's reconstruction of Lewis's argument.[3] To say that a class has a fusion is to say that there is an object that

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[1]   Oxford University Press, 2001.

[2]   Lewis's argument from vagueness for PUF appears in his *On the Plurality of Worlds* (Basil Blackwell, 1986), Section 4.3.

is composed of the members of that class. A "continuous series of cases" is a series of cases such that each pair of adjacent cases in the series is extremely similar with respect to qualitative homogeneity, spatial proximity, unity of action, comprehensiveness of causal relations, etc.[4] And a "sharp cutoff" in such a series is a pair of cases that are adjacent in the series and that differ with respect to whether composition occurs.

Here is Sider's reconstruction of Lewis's argument for PUF.

> **P1:** If not every class has a fusion, then 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.
> _____
>
> **PUF:** Every class of objects has a fusion.

Sider's argument from vagueness for Four-Dimensionalism is a variation on this argument. It involves these technical terms.

> f is an *assignment* =df f is a function that takes one or more times as arguments and assigns non-empty classes of objects that exist at those times as values.
>
> x is a *diachronic fusion* (or *D-fusion*) of assignment f =df for every time, t, in f's domain, x is a fusion of $f(t)$ at t.
>
> x is a *minimal D-fusion* of assignment f =df (i) x is a *D-fusion* of f, and (ii) x exists only at those times in the domain of f.

Here is an important question we can ask using these terms.

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[3]   The following definitions, Sider's reconstruction of Lewis's argument from vagueness for PUF, the additional definitions appealed to in Sider's argument from vagueness for Four-Dimensionalism, and the latter argument, are all from Chapter 4, Section 9 of *Four-Dimensionalism*.

[4]   These are the factors that, according to Lewis, our intuitions suggest will be relevant to composition.

The Minimal D-fusion Question (MDQ): What are the necessary and jointly sufficient conditions for any *assignment*'s having a *minimal D-fusion*?

I.e., if you have a series of times, and a corresponding series of classes of objects (with one class for each of your times), under what circumstances is it true that there is an object that exists at exactly those times, and is a fusion of the first class at the first time, the second class at the second time, and so on?

Sider's answer to MDQ is analogous to PUF. He says that it is automatically true of every assignment that it has a minimal D-fusion. Sider calls this thesis "(U)"; his argument for Four-Dimensionalism has (U) as a lemma, and his argument for (U), like Lewis's argument for PUF, involves considerations about vagueness. Here is the argument.

P1': If not every assignment has a minimal D-fusion, 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.

P3': In any case of minimal D-fusion, either minimal D-fusion definitely occurs, or minimal D-fusion definitely does not occur.
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(U): Every assignment has a minimal D-fusion.
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4D: Necessarily, each spatiotemporal object has a temporal part at each moment at which it exists.[5]

(U) has various counterintuitive consequences. Here's one.

C1: There is an object that is a fusion of 10 million widely scattered quarks at noon on New Year's Day, 1066; is a fusion of the Mona Lisa and the Eiffel Tower at noon on New Year's Day, 1961; is a fusion of the heads of all the

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[5] I have argued elsewhere (in "The 3D/4D Controversy and Non-present Objects," *Philosophical Papers* **23** (1994), pp. 243-249) that Four-Dimensionalism should instead be formulated as the claim that, necessarily, each spatiotemporal object has a temporal part at each moment at which it <u>is present</u>. But I will here set that issue aside.

> members of the APA right now; and exists only at those three times.

Since this journal's readers have good imaginations, I won't spend the next several pages spelling out additional examples along these lines. Suffice it to say that (U) has some consequences that many of us will consider to be tremendously implausible.

In addition, there are also special problems facing (U) that involve certain specific consequences of the view. For example, (U) entails the following.

> **C2:** There is an object that comes into existence when my colleague Hud Hudson comes into existence, exactly overlaps Hudson right up until the time when Sider begins to exist, alternates daily between exactly overlapping Hudson and exactly overlapping Sider for as long as Hudson and Sider both exist, exactly overlaps whichever one of the two will last longer from the time the other one goes out of existence until the time the longer-lasting one goes out of existence, and goes out of existence when the longer-lasting one goes out of existence.

Let's call this putative object "Tud". Here are some questions about Tud: Have I met him? Is Tud conscious? Does he think? Does he feel pain? Does Tud have moral status? Is he a person? When he utters the word 'I', do the relevant utterances refer to Tud? If not, is this a counterexample to the thesis that every utterance of 'I' refers to its speaker? If Tud's utterances of 'I' do sometimes refer to Tud, does this mean that every utterance of that word is ambiguous among an infinite number of different possible referents?

I do not take these considerations to refute (U), in the sense that the only reasonable response available to Sider is to give up his view. But I do take these considerations to show that (U) has consequences that raise some interesting questions. Moreover, although I think that Sider will be able to give suitable answers to these questions, I also suspect that in some cases the relevant answers may commit him to additional costs of his view beyond the mere ontological commitment to diachronic fusions that goes with accepting (U).

Some Four-Dimensionalists don't accept (U). These Four-Dimensionalists will need to find a way to reject this lemma of Sider's argument (even though

they already agree with the conclusion). Meanwhile, since (U) entails Four-Dimensionalism,[6] Three-Dimensionalists will also have to find a way to reject the lemma of Sider's argument. The way that I recommend involves rejecting the second premise. I begin by discussing an analogous objection to the argument from vagueness for PUF.

I deny P2 of the argument from vagueness for PUF. I say there is a pair of cases that are arbitrarily close with respect to the factors Lewis mentions, but that differ with respect to whether composition occurs. I can say this because I endorse the following thesis.[7]

> **Brutal Composition (BC):** There is no true, non-trivial, and finitely long answer to the question, *What are the necessary and jointly sufficient conditions for any class's having a fusion?*

In general, I take the argument from vagueness for PUF to show that we have four main options in response to Peter van Inwagen's Special Composition Question (SCQ), concerning the conditions under which a given class has a fusion:[8]

1. Nihilism, according to which it is never the case that two or more objects have a fusion.

2. PUF.

3. Some "moderate" answer to the SCQ, according to which some sets have a fusion and others don't, but also

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[6]   Or so says Sider (and I concur). Kathrin Koslicki raises doubts in her paper, "The Crooked Path from Vagueness to Four-Dimensionalism," *Philosophical Studies* **114** (2003), pp. 107-134.

[7]   I defend BC in "Brutal Composition" (*Philosophical Studies* **92** (1998), pp. 211-249), where I also defend this thesis:

> **The Brutality of Compositional Facts (BCF):** For any class, S, if S has a fusion, then it is a brute fact that S has a fusion.

And I suggest that, although BC does not strictly entail BCF, nevertheless, the BCer ought to endorse BCF.

[8]   For a detailed discussion of SCQ, see van Inwagen's *Material Beings* (Cornell University Press, 1990).

according to which there is genuine vagueness in the world.

4. BC.

And I take the first three options to be sufficiently unpalatable that the argument in effect gives us a very good reason to endorse BC.

My objection to Sider's argument from vagueness for Four-Dimensionalism is very similar: I deny P2'. I say there is a pair of cases that are arbitrarily close with respect to the factors in question, but that differ with respect to whether minimal D-fusion occurs. In one case, the relevant assignment has a minimal D-fusion, and in the other case, the relevant assignment does not have a minimal D-fusion.

That there is no true and informative answer to MDQ follows from BC, since, according to BC, there is no true and informative answer to the question of when a class of objects that exist at a given time has a fusion at that time, and a necessary condition for an assignment's having a minimal D-fusion is that the relevant classes of objects all have fusions at the relevant times.

Here is a question that is closely related to MDQ.

> Assignment *f* is a *candidate assignment* =df *f* is an assignment such that for every time, *t*, in the domain of *f*, *f*(*t*) = a class of objects that do in fact have a fusion at *t*.

> **The Restricted Minimal D-fusion Question (RMDQ):** What are the necessary and jointly sufficient conditions for any *candidate assignment*'s having a *minimal D-fusion*?

Here is a simpler way to put this question: If you have a series of ordered pairs, each one consisting of a time and an object that exists at that time, under what circumstances is it true that there is an object that exists at exactly those times, and is identical to the first object at the first time, the second object at the second time, and so on?

It is open to the BCer to say that RMDQ, unlike MDQ, <u>does</u> have a true and informative answer, and that this answer does not entail the possibility of genuine vagueness in the world. That is, the BCer can say that while there is no systematic answer to the question of when some objects that exist at a time have a fusion at that time, there nevertheless is an answer to the question of when an object that exists at a time and an object that exists at another time

are the same object. But BC is also consistent with the claim that RMDQ, like MDQ, does not have a true and informative answer.

In any case, the important point for our purposes is that once we have accepted BC, we do not have to accept premise P2' of Sider's argument. In general, I take Sider's argument from vagueness for Four-Dimensionalism to show that we have four main options in response to MDQ:
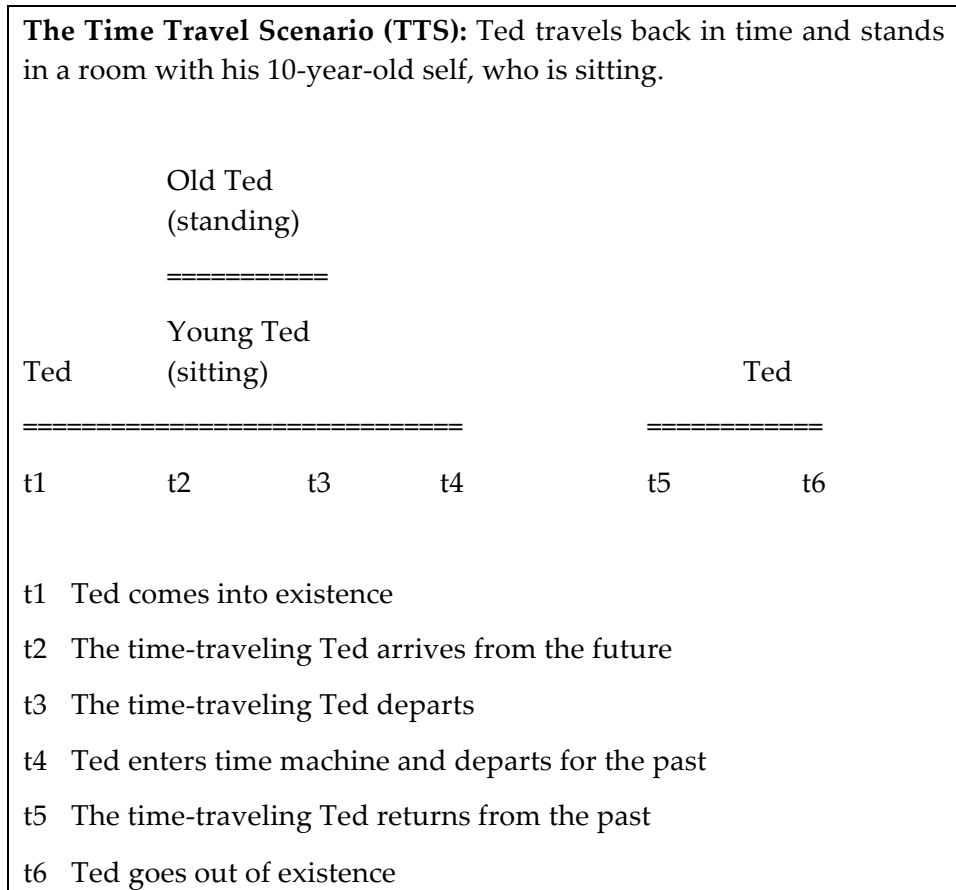
1. Nihilism about minimal D-fusions, according to which (roughly) an assignment has a minimal D-fusion iff that assignment involves just one mereological simple, and all of the times at which it exists.

2. (U).

3. Some "moderate" answer to MDQ, according to which some assignments have a minimal D-fusion and others don't, but also according to which there is genuine vagueness in the world.

4. BC.

And I take the first three options to be sufficiently unpalatable that the argument in effect gives us another very good reason to endorse BC.

3   The Argument from Time Travel

Sider's argument from time travel is based on the following scenario.[9]

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[9]   The argument appears in Section 7.2 of Sider's book. I have added names for the relevant times.

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The Time Travel Scenario (TTS): Ted travels back in time and stands
in a room with his 10-year-old self, who is sitting.


            Old Ted
            (standing)

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            Young Ted
Ted         (sitting)                                    Ted

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t1          t2          t3          t4          t5          t6


t1   Ted comes into existence

t2   The time-traveling Ted arrives from the future

t3   The time-traveling Ted departs

t4   Ted enters time machine and departs for the past

t5   The time-traveling Ted returns from the past

t6   Ted goes out of existence
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This appears to be a case in which, at t2, Ted is both sitting and standing. How can that be?

Sider says,

> The four-dimensionalist's answer is that there are two distinct person stages, one standing, the other sitting. (Given the Chapter 3 definition of a temporal part, the fusion of these two stages counts as my temporal part at the time in question, so let us understand 'person stage' to refer to 'person-like' parts of temporal parts. Ordinarily my temporal part at any time is a person stage, but not in cases of time travel.)[10]

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[10] *Four-Dimensionalism*, p. 101.

Sider's account of TTS, then, is that there are two distinct, person-like spatial parts of the t2 temporal part of Ted, one sitting and the other standing.

Sider says the case poses a real problem for the Three-Dimensionalist, however, since according to Three-Dimensionalism, the case involves only a single "wholly present" person at t2, who seems to be both sitting and standing.

The argument against Three-Dimensionalism, then, is simple. TTS is a genuine possibility. But the Three-Dimensionalist cannot account for this possibility without a contradiction. Therefore Three-Dimensionalism is false.

Here is my response. I don't know about the first premise (on the possibility of TTS), but I think that the Three-Dimensionalist can give an account of TTS that is analogous to the Four-Dimensionalist's account. At t2, there are two distinct, person-like spatial parts of Ted. One (Young Ted) is sitting, while the other (Old Ted) is standing. Since Young Ted is distinct from Old Ted, we have no contradiction here. Thus, the apparent contradiction is avoided by the Three-Dimensionalist in just the way the Four-Dimensionalist avoids it.

Sider suggests that there is a problem facing this approach, however. He writes, concerning this proposal,

> Where did these spatial parts come from? Presumably they popped into existence upon arrival of the time machine; there seem to be no future or past objects with which they could be identified. But then 'a meeting of my former self and me' no longer seems an apt description of the event. Rather, it seems to be an event in which two wholly *new* persons meet each other.[11]

But I think it is possible for the Three-Dimensionalist to solve this problem. And I think the Four-Dimensionalist account of TTS can be used as a model for generating a Three-Dimensionalist solution to the problem. Here's how.

Recall that on the Four-Dimensionalist account of TTS, neither of the two person stages present at t2 is identical to the t2 temporal part of Ted. This means that there is an important sense in which neither Young Ted nor Old Ted is identical to any past or future person; for there is no extended object that is a person (with temporal parts before and after t2) that has either Young

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[11] *Four-Dimensionalism*, p. 102.

Ted or Old Ted as its t2 temporal part. It also means that Ted goes from being a person before t2 to being a non-person (composed of two distinct person stages) at t2.

But still, there is a sense in which the Four-Dimensionalist can say that each of the two person stages that compose the t2 temporal part of Ted is identical to Ted's pre- and post-time-traveling person stages. For the Four-Dimensionalist can say that one person stage, x, stands in the "personal temporal counterpart" relation to another person stage, y, iff x and y stand in some other appropriate relation (perhaps involving causal, bodily, and psychological continuity); and also that the stages of a single person can be ordered according to that individual's "personal time," which in the case of a time traveler will differ from the ordering of those stages in "external time."[12] Then the Four-Dimensionalist can say that Old Ted and Young Ted are personal temporal counterparts of one another, and are both personal temporal counterparts (but from different moments in Ted's personal time) of Ted's pre- and post-time-traveling person stages.

Here is a way that the Three-Dimensionalist can say something analogous. Consider Ted's entire life. It is an event that divides into shorter events – the temporal parts of Ted's life.[13] Since Ted is a time traveler visiting his former self at t2, the t2 temporal part of Ted's life has two distinct spatial parts, each of which resembles an ordinary person's life at a moment. (This is analogous to the way that, according to Four-Dimensionalism, Ted's t2 temporal part is made up of two distinct person-like spatial parts.)

Now, the "person-like" spatial parts of the temporal parts of Ted's life (or, for short, Ted's "person-events") stand in a relation to one another that is analogous to whatever relation the Four-Dimensionalist thinks relates the

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[12]   The time traveler's "personal time" is, roughly, time as measured by the time traveler's watch, while "external time" is, roughly, plain old time. See David Lewis's "The Paradoxes of Time Travel," *American Philosophical Quarterly* **13** (1976), pp. 145-152.

[13]   I am assuming that Three-Dimensionalists are willing to countenance temporal parts of events, even though we generally reject temporal parts of objects. But Three-Dimensionalists who do not believe in temporal parts of events will still be able to avail themselves of the account of TTS spelled out below, provided they can find some other suitable items (such as person-time ordered pairs) to play the role of the temporal parts of person-events in my account.

different person stages of a single person. So the Three-Dimensionalist can say that two person-events that stand in this relation to one another are "person-event temporal counterparts" of one another; and also that the person-events that make up a person's life can be ordered according to that individual's personal time (which in the case of a time traveler will differ from the ordering of those person-events in external time).

What's more, each one of the person-events that make up Ted's life will correspond straightforwardly to a person-like spatial part of Ted at some moment of external time. (In most cases, this will be an improper spatial part of Ted at the time in question, but at times like t2 it will be a proper spatial part of Ted.) Thus, the Three-Dimensionalist can characterize a personal temporal counterpart relation between objects as follows. For any x and y, x is a personal temporal counterpart of y iff x corresponds to some person-event, e1, y corresponds to some person-event, e2, and e1 and e2 are person-event temporal counterparts. This will allow the Three-Dimensionalist to say that there is a sense in which Young Ted is identical to the Ted who, before t2, was not yet a time-traveler, insofar as the two are personal temporal counterparts of one another.[14] And since Young Ted and Old Ted likewise turn out to be personal temporal counterparts of one another, the Three-Dimensionalist can, on this approach, legitimately characterize TTS as a meeting between Ted and his former self.[15]

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[14]   There is also a sense in which Young Ted is not identical to the Ted who, before t2, was not yet a time-traveler. For Ted is an object that, at t2, is the fusion of Young Ted and Old Ted, and no object is ever identical to something of which it is a proper part. Notice that this sense in which, according to Three-Dimensionalism, Young Ted is not identical to the Ted who, before t2, was not yet a time-traveler is exactly analogous to the sense (mentioned above) in which, according to Four-Dimensionalism, Young Ted is not identical to any stage of Ted before t2.