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Temporal Parts Unmotivated

Michael C. Rea

In debate about the nature of persistence over time, the view that material objects endure has played the role of “champion” and the view that they perdure has played the role of “challenger.”¹ As in other contests, the champion’s job is merely to defend her title, whereas the challenger’s job is to prove herself worthy. I have no view about how these roles came to be assigned; but the historical fact is that perdurantists have traditionally borne the proverbial burden of proof in this debate. It has fallen to the perdurantists rather than the endurantists to motivate their view, to provide reasons for accepting it that override whatever initial presumption there is against it.

Perdurantists have sought to discharge their burden in several ways. For example, perdurantism has been recommended on the grounds that: (i) it solves several of the puzzles that raise the problem of material constitution; (ii) it is (at least) suggested by the special theory of relativity (hereafter “SR”); (iii) it is the only view that makes sense out of the possibility of intrinsic change; (iv) it is the only view consistent with the doctrine of Humean supervenience; and (v) it makes better sense than its competitor out of the possibility of fission. These are the primary and most powerful claims that have been made on behalf of perdurantism.² They are

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¹Following the usual conventions, I say that an object “endures” if it persists by being wholly present at every time at which it exists and that an object “perdures” if it persists by being only partially present at every time at which it exists. Objects which perdure are said to have “temporal parts” at every time at which they exist. Thus, I will use the terms “perdurantism” and “the doctrine of temporal parts” interchangeably to refer to the same family of views.

²I should note that some time after the present article had been accepted for publication, Theodore Sider published in this journal a new argument in defense of the doctrine of temporal parts (Sider 1997). I regret that I am unable to incorporate a discussion of Sider’s interesting argument here.

individually persuasive and together they constitute a formidable assault upon the hegemony of endurantism.

Endurantists, of course, have not been without reply. However, since endurantists typically respond to these claims one at a time and in different ways, it is easy to get the impression that perdurantism offers a single, neat solution to a host of problems whereas endurantism requires a patchwork of different strategies. But this impression is an illusion. In Rea 1995, I argued that though perdurantism does solve some of the puzzles that raise the problem of material constitution, it does not solve the problem of material constitution itself. Thus, the problem of material constitution really has no bearing on the debate between endurantists and perdurantists. In this paper, I will show that the same is true with respect to SR, the problem of intrinsic change, the doctrine of Humean supervenience, and the possibility of fission. In short, I will argue that none of (ii–v) is true and that therefore the doctrine of temporal parts stands unmotivated.

1. Special Relativity

It is often said that perdurantism is at least suggested by SR.³ However, those who maintain that there is some connection between SR and the doctrine of temporal parts are not always entirely clear about what exactly that connection is supposed to be. As far as I can tell, there are only two arguments to be made from SR to the doctrine of temporal parts. The first is that SR supports the so-called “argument from spatial analogy”; the second is that SR entails the denial of “presentism” which, in turn, implies (or at least suggests) the doctrine of temporal parts. I will consider each of these arguments in turn.

1.1 *The Argument from Spatial Analogy*

The argument from spatial analogy is one of the most popular arguments for perdurantism. It comes in a variety of versions, but the basic line of reasoning is as follows: (i) Space and time are

³Among those who hold that there is some connection between SR and the doctrine of temporal parts are David Armstrong (1980), C. D. Broad (1927, chap. 2), Sir Arthur Eddington (1978, chap. 3), Kurt Gödel (1949), W. V. Quine (1960), and J. J. C. Smart (1972).

fundamentally alike in nature (call this the “Similarity Thesis”); (ii) therefore, there is no reason to think that objects relate differently to time than they do to space; (iii) therefore, if objects are extended in space by being only partially present at every spatial point at which they exist, then similarly they must persist over (or, perhaps more appropriately, be extended in) time by being only partially present at every temporal point at which they exist; but (iv) objects *are* extended in space by being only partially present at every spatial point at which they exist; (v) therefore, endurantism is false. Endurantists typically reject the Similarity Thesis, pointing out that there are some obvious differences between space and time (for example, time seems to be inherently ordered whereas space does not; time seems to “pass” whereas space does not). But, according to some, SR shows that these differences between space and time are only apparent. If this is right, then the Similarity Thesis is true and the usual endurantist response to the argument from spatial analogy is blocked.

Why do people think that SR supports the Similarity Thesis? The chief reason is that SR seems to support the following “Spacetime Thesis”: Space and time (as we know them) are in fact merely appearances of a more fundamental reality—namely, spacetime. The locus classicus for the claim that SR supports the Spacetime Thesis is H. Minkowski’s “Space and Time” (1908). Minkowski’s paper opens with the now famous statement, “Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality” (1908, 75). In defense of this claim, he points out that whereas in Newtonian physics space and time are absolute—that is, distances and durations are *invariant* across inertial frames of reference (or, in other words, different observers in different inertial frames of reference will *agree* about distances and durations between events)—in SR they are not. Rather, SR entails that observers will *disagree* about distances and durations. But it also entails that observers will agree about a quantity called the “interval” between two events. The interval is a kind of combination of distance and duration, including as “components” all three spatial dimensions and the temporal dimension. Thus, what it measures is a separation in *spacetime*. And since SR entails that it is the *spacetime interval* between two events rather than the distance or duration between them that is invariant across inertial frames of

reference, Minkowski concludes that it is spacetime, rather than space by itself and time by itself, which is absolute (and therefore ontologically basic) within the context of SR.⁴ In his own words:

We . . . have in the world no longer *space*, but an infinite number of spaces, analogously as there are in three-dimensional space an infinite number of planes. Three-dimensional geometry becomes a chapter in four-dimensional physics. Now you know why I said at the outset that space and time are to fade away into shadows, and only a world in itself will subsist. (79–80).

It is important to keep in mind, however, that Minkowski's view is just one of at least two possible interpretations of the facts. Despite Minkowski's strong language, SR does not *entail* that the Spacetime Thesis is true. What it entails is just that different observers in different inertial frames of reference will disagree about distances and durations but will agree about spacetime intervals. The Spacetime Thesis is one way of making sense of this phenomenon, but it is not the only way. Another is to suppose that space and time are ontologically basic and that spacetime is derivative.⁵ Both views have disconcerting implications. The Spacetime Thesis, for example, implies that there really is no such thing as space as we know it or time as we know it; but it allows us to save the intuition that there is some objective, observer-independent manifold in which all objects and events are located. The alternative view, on the other hand, saves the intuition that space and time as such really do exist; but the price is that we must concede genuine (not merely apparent) relativity in the world. It is not clear to me which intuitive price is the higher to pay, but my point here is simply that SR alone does not decide the matter in favor of one interpretation or the other. And since the second interpretation clearly does not support either the Spacetime Thesis or the Simi-

⁴Minkowski does not use the term 'ontologically basic', but the term seems appropriate in light of the opening remark of his paper, quoted above. F. M. Christensen (1981) expresses doubt about the strength of the textual evidence for attributing to Minkowski the view that spacetime (as opposed to space and time) is ontologically basic; but he seems to agree that even if Minkowski did not in fact hold this view, the line of reasoning presented above is the main line of reasoning that would lead someone to hold it.

⁵Belousek (unpublished) and Christensen (1981) attribute this view to Einstein, though, again, Christensen expresses doubt about the strength of the textual evidence.

larity Thesis, it is not clear how SR alone can be said to support either of those theses.

But suppose we are persuaded by Minkowski's line of reasoning: let us concede the Spacetime Thesis. Should we then accept the Similarity Thesis (and with it the argument from spatial analogy)? I think that we should not. The reason, in short, is that either the Spacetime Thesis fails to imply the Similarity Thesis (in which case there seems to be no reason to accept the latter), or else it trivially implies the Similarity Thesis but undermines the argument from spatial analogy.

The problem is that there seem to be at least four ways of interpreting the Similarity Thesis in light of the Spacetime Thesis. One way to take it is at face value:

(SIM1) Space (as we know it) and time (as we know it) are fundamentally similar in nature.

The trouble with this, however, is that if the Spacetime Thesis is true, space and time are *appearances* of spacetime. But, of course, it is hardly the case that *qua appearances* space and time are fundamentally alike in nature. As we noted earlier, time appears to be inherently ordered whereas space does not; time appears to "pass" whereas space does not. So it seems that, strictly speaking, the Spacetime Thesis implies the *denial* of SIM1.

Another way to interpret the Similarity Thesis is to take either the term 'space' or the term 'time' (but not both) as referring to spacetime, the reality underlying the appearance. Thus, we might interpret the Similarity Thesis as equivalent to one of the following:

(SIM2) Spacetime is fundamentally similar to time as we know it.⁶

(SIM3) Spacetime is fundamentally similar to space as we know it.

The problem with these, however, is that the Spacetime Thesis does not seem to support them. Suppose we grant that SR supports the claim that space and time are in fact just appearances of spacetime. Why think that it follows from this that spacetime is spacelike or timelike? I can see no reason. The Spacetime Thesis tells us nothing beyond the fact that spacetime can *appear* both timelike and

⁶Granted, this is a rather implausible interpretation of the Similarity Thesis; but it has been taken seriously in the literature (see, for example, Čapek 1961).

spacelike; but obviously it does not follow from this that spacetime is therefore *really* spacelike or timelike. Even F. M. Christensen (1981), who wants to endorse SIM3, seems to concede that it does not strictly follow from the Spacetime Thesis that spacetime is like space as we know it. He says that (i) it is implausible to think that spacetime is timelike, and (ii) it is hard to see what else spacetime could be like. But why would it be reasonable to conclude from this that SIM3 is true? It certainly seems no more reasonable to suppose that spacetime is spacelike than simply to suspend judgment about the matter, and in fact the latter alternative seems to me to be the more reasonable of the two. Thus we need to look for yet another interpretation of the Similarity Thesis if we are to have any hope of appealing to the Spacetime Thesis as a reason to accept it.

The one alternative left is to take both 'space' and 'time' as referring to spacetime. Thus, we might interpret the Similarity Thesis as equivalent to:

(SIM4) Spacetime is fundamentally similar in nature to space-time.

SIM4 has the dubious advantage of being a trivial consequence of the Spacetime Thesis.⁷ But if we understand the Similarity Thesis as being equivalent to SIM4, then it turns out that the argument from spatial analogy begs the question. To see why, consider again premise (iv):

(iv) Objects are extended in space by being only partially present at every spatial point at which they exist.

On the usual interpretation (where 'space' is taken to refer to space as we know it rather than to spacetime), premise (iv) is neutral with respect to the endurantism/perdurantism debate. It is a statement that endurantists and perdurantists alike can and will accept, despite the fact that, together with premise (iii), it implies that endurantism is false. But if the Similarity Thesis is to be understood as equivalent to SIM4, then, by parity of reasoning, premise (iv) ought to be understood as equivalent to

⁷And if one thinks that, for example, "Pegasus is similar to Pegasus" expresses a true proposition, then SIM4 has the further distinction of following trivially from any true proposition.

(iv*) Objects are extended in spacetime by being only partially present at every spatiotemporal point at which they exist.

But (iv*) is not neutral with respect to the endurantism/perdurantism debate. On the contrary, it is just the *denial* of endurantism. For, according to the endurantist, there are some objects—namely, point-sized enduring objects—which are extended in spacetime by being wholly present at every spatiotemporal point at which they exist.⁸

So SR does not support the argument from spatial analogy, for two reasons. First, it is not clear that SR supports the Spacetime Thesis. But, as I said earlier, the fact that SR seems to support the Spacetime Thesis is the chief reason for thinking that SR supports the argument from spatial analogy. Second, even if SR does support the Spacetime Thesis, once we accept that thesis, it turns out that either we have no reason to accept the Similarity Thesis (in which case we have no reason to accept the conclusion of the argument from spatial analogy) or premise (iv) of the argument begs the question against the endurantist.

We are now almost ready to move on to the argument from eternalism; but before we do there is one loose end that remains. Endurantism is typically stated as a thesis about how objects relate to time. But if the Spacetime Thesis is correct, endurantism ought to be stated as a thesis about how objects relate to *spacetime*. I have already briefly explained what the endurantist would say about how point-sized enduring objects relate to spacetime. But what will she say about how composite objects relate to spacetime?

Here is what the endurantist cannot say: She cannot say that an object endures iff it is wholly present at every region of spacetime at which it exists. The reason, obviously, is that there are regions of spacetime (for example, the region occupied by my left foot at

⁸If there are no point-sized objects, then the argument from spatial analogy does not beg the question; it is simply invalid. If the terms 'space' and 'time' both just refer to spacetime, then premise (iii) turns out to be trivial. Thus, the conclusion that endurantism is false must follow (if at all) directly from premise (iv*). But if there are no point-sized objects, then premise (iv*) is perfectly consistent with endurantism. For the endurantist will not be committed to there being objects that are wholly present at more than one spatiotemporal *point*; she will (as I point out in the next paragraph) be committed only to there being objects that are wholly present in more than one spatiotemporal *region*.

the present moment) at which an enduring object is only partially present. But she can endorse the following weaker thesis: an object endures iff it is wholly present at multiple regions of spacetime. This does not tell us everything we might want to know about endurance. For example, it doesn't tell us how the various regions at which an enduring object is wholly present are related to one another. Thus, it is not a complete account of endurance. But it does suffice to distinguish endurance from perdurance; for, in a Minkowskian universe, a composite object perdures only if it is wholly present in exactly one region of spacetime.⁹

There are at least two objections one might raise against this characterization of endurance; but they are not crippling. The first is that, for any particular enduring object, it is not clear which regions are supposed to count as the ones at which the object is wholly present. The problem arises because SR implies that objects have different properties in different frames of reference. A limousine, for example, might be ten feet long in one frame of reference and twenty feet long in another. Thus, J. J. C. Smart writes:

Two parts of an extensive [enduring] object might, for example, simultaneously have the same colour with respect to one set of axes and have different colours with respect to a different set of axes. . . . So with respect to what axes must the [endurantist] think of an object as being 'all at once'? A natural answer might be: a set of axes with respect to which the object is at rest. This would appear at first sight to remove ambiguity. However, what about an extensive [enduring] object rotating rapidly on its axis? And what about a complex of [enduring] objects all moving at different velocities relative to one another? (1972, 63–64)

These are indeed difficult questions. But it is not at all clear that they are questions the endurantist needs to answer. The endurantist is committed to there being some set of axes with respect to which the object counts as being "all at once," for otherwise there would not be definite regions at which the object counts as being

⁹I say "only if" rather than "if and only if" because more might be needed for perdurance. We can imagine there being something like a "momentary sphere"—a sphere that exists for but an instant (in a particular frame of reference). We might want to say that such a sphere does not perdure even though it is wholly present in exactly one region of spacetime. Thus, being wholly present in exactly one region is necessary for perdurance but (perhaps) not sufficient.

wholly present. But why think she should be able to specify the relevant axes (or regions)? Moreover, it seems that a similar problem will plague the perdurantist. A perdurantist who believes in persisting persons will, I take it, think that there is some “right” way to carve up a person into thought-bearing person-stages. And yet it seems she will have exactly the same difficulty the endurantist has specifying the relevant axes and regions.

The other objection is a bit more serious.¹⁰ Consider an object *O* that is wholly present at two regions of spacetime, *R1* and *R2*. As we will see in more detail in the next section, SR seems to imply that the universe is tenseless. If this is right, then the present moment (in any frame of reference) is not ontologically privileged. So, for example, when we ask what properties an object *has*, it is just as appropriate to list properties it had ten years ago as it is to list properties that it has now. This raises a general problem for endurantism known as the problem of temporary intrinsics. I will discuss that problem in detail in section 2; but for now I just want to focus on the following special instance of it. If the universe is tenseless, it also turns out that when we ask *what parts O has*, it is just as appropriate to list parts in *R1* as it is to list parts in *R2*. But then neither *R1* nor *R2* contains *all* of *O*’s parts. Hence *O* is not wholly present at either *R1* or *R2*, contrary to hypothesis.

In light of this, it might appear that endurance is impossible in a Minkowskian universe. But the endurantist can avoid the problem simply by endorsing a restriction on the conditions under which composition can occur. In order to state this restriction and explain how it solves the endurantist’s problem, I need the following two definitions:

- (TC) the \mathcal{x} *t*-compose $y =_{df}$ (a) t is a time in y ’s frame of reference F , (b) all of the \mathcal{x} are parts of y , (c) all of the \mathcal{x} exist at t in F , and (d) every part of y that exists at t in F overlaps at least one of the \mathcal{x} .¹¹

¹⁰I am grateful to Trenton Merricks for convincing me to address this objection, and I have benefited from Merricks (unpublished) in formulating it.

¹¹I use the phrase ‘ y ’s frame of reference’ to refer to whatever frame of reference is privileged in the way described in my response to Smart’s objection above. (Again, it appears that both perdurantists and endurantists are committed to there being some such frame of reference.) Furthermore, ‘exists at t ’ is to be understood in a way compatible with the claim that some things that exist at t do not exist at other times. Thus, to

(WP) y is wholly present at $t =_{df}$ there are x s such that (a) the x s t -compose y , and (b) for any object O and time t^* ($t^* \neq t$), if O has t^* -parts, no sum of the x s is a proper part of O .

Two things are worth noting about these definitions. First, a perdurantist could make use of TC to explain what it is for some x s to compose a temporal slice of an object. (The perdurantist might say that the x s compose the t -slice of an object O just in case they t -compose O .) This is important because, on a Minkowskian conception of spacetime, the chief difference between the endurantist and the perdurantist is that where the perdurantist sees a series of temporal slices, the endurantist sees multiple occurrences of the very same object. Second, WP entails that (i) temporal slices of perduring objects are wholly present at the times at which they exist, but (ii) perduring objects themselves are not wholly present at any time. Hence, WP is (as one would hope) a definition that the perdurantist as well as the endurantist can accept.

Now for the restriction on composition. In short, I propose that the endurantist hold that composition is restricted to times in frames of reference. More exactly, I propose that the endurantist endorse the following claim:

(R) There is a y such that the x s compose y only if there is a time t such that the x s t -compose y .

(R) guarantees that objects existing at different times in the same frame of reference cannot be parts of the same object. Hence, it guarantees that any object satisfying condition (a) in (WP) will also satisfy condition (b). Thus, the conjunction of (R) with (WP) entails that every object that exists at multiple times in the same frame of reference is an enduring object. Moreover, endorsing (R) solves the endurantist's problem because it implies that 'the x s compose y ' and 'part' are temporally relativized terms, even though they don't appear to be. Consider again our object O that is wholly present at regions R1 and R2.¹² To say that O has X as a

say that O exists at t is, on a Minkowskian conception of spacetime, not the same as saying that, at t , it is true that O exists. For on a Minkowskian conception of spacetime, it is true at every time t that everything past, present, or future relative to t exists, though, of course, not all of those things exist *at* t .

¹²I assume that R1 and R2 don't exist at the same time in the same

part is, given (R) and a Minkowskian conception of spacetime, to say one of the following two things: (i) X is a *t*-part of O, and *t* is the present moment, or (ii) there is a time *t* such that X is a *t*-part of O.¹³ Thus, it won't follow from the fact that O has parts in both R1 and R2 that O is not wholly present in both R1 and R2. Moreover, we can give sense to the claim that each of R1 and R2 contains *all* of O's parts. We can say that what it is for a region to contain all of O's parts is just for it to contain all of the things that O *has in that region* as parts. And, of course, these will just be all of O's *t*-parts for whatever time *t* is defined by the region in question.¹⁴

It is noteworthy that if (as it appears to me) restricting composition in some way is the only way for an endurantist to reconcile her view with a Minkowskian conception of spacetime, then the debate between perdurantists and endurantists, at least within a Minkowskian framework, ultimately turns on facts about the conditions under which composition can occur. Perdurantists are committed to the view that objects that don't exist at the same time in the same frame of reference can nonetheless compose something. Endurantists are committed to the denial of this view.¹⁵ This will turn out to be an important point in section 3 below. Moreover, it raises interesting questions in its own right. If the Spacetime Thesis were false, would the debate still turn on issues about the conditions under which composition occurs? Are facts about composition necessary truths? If the answers to both of these questions are affirmative, then it would appear that endurantism and perdurantism are such that if they are true they are necessarily true. But this latter thesis many philosophers are inclined to reject. As I said, these are interesting questions; but pursuing them would take us

frame of reference. If they did, then obviously O could not be wholly present at both regions.

¹³In my usage, 'X is a *t*-part of O' means 'there are *x*s that *t*-compose O and X is one of the *x*s'.

¹⁴My response to this special instance of the problem of temporary intrinsics thus parallels a popular endurantist response to the general problem of temporary intrinsics—namely, adverbialism. Both the problem and the response are discussed in detail in section 2.

¹⁵Or, more conservatively, they are committed to the denial of that view for composite objects of the sort that they think endure. But perhaps they could grant that composition works the way the perdurantists say that it does in the case of events; for many endurantists are comfortable with the claim that events perdure.

too far afield. Thus, having shown that endurantism is at least compatible with the Spacetime Thesis (and hence with both interpretations of SR), I now move on to consider the second argument from SR to perdurantism.

1.2 *The Argument from Eternalism*

Presentism, as I understand it, is the thesis that, for any x , x exists only if x is present. Eternalism is the denial of that thesis.¹⁶ According to the eternalist, the present moment is just one moment among many, all of which are ontologically on a par. Hence, on this view, ‘the present time’ is *merely* an indexical term like ‘this place’.

The second argument from SR to perdurantism is that SR commits us to eternalism and that eternalism entails (or makes it more reasonable than not to believe in) perdurantism. I will discuss this argument in two parts. First, I will consider whether SR really commits us to eternalism. Then I will consider whether eternalism entails (or makes it more reasonable than not to believe in) perdurantism.

There are two reasons for thinking that SR commits us to eternalism. The first is that eternalism seems to follow directly from SIM3, the thesis that time is fundamentally similar to space as we know it. After all, if time is spacelike, then just as it is false that, for any x , x exists only if x is *here*, so too we would expect it to be false that, for any x , x exists only if x is present. But, as we have already seen, there seems to be no reason to think that SR supports SIM3.

The second “reason” is better presented as an argument, and it is much more persuasive than the first. The argument is fairly well known, though my version differs somewhat from those that I have seen in print.¹⁷ It begins with two definitions and three assumptions.

(D1) x is simultaneous with y in a frame of reference $S =_{df}$ light signals traveling from x and y would be observed at the

¹⁶As I understand the debate, presentists endorse what McTaggart calls the “A-theory” of time and eternalists endorse what McTaggart calls the “B-theory” of time.

¹⁷For example: Putnam 1967, Rietdijk 1966 and 1976, Maxwell 1985, Sklar 1976 and 1981, and Stein 1968 and 1991.

same time by a detector at rest in S and equidistant from x and y .

- (D2) x is future relative to $y =_{df}$ there is some causal signal which can travel from y to x .
- (A1) Light travels with constant velocity in all directions and electromagnetic theory is Galilean invariant. (That is, SR is true.)
- (A2) For all events x and y , if x exists and x is simultaneous with y in some frame of reference then y exists.
- (A3) If x is present and y is future relative to x , then y is not present.

If (A1) is true, then there are in fact three events A, B, and C such that A exists, A is simultaneous with B in some frame of reference, B is simultaneous with C in some frame of reference, and C is future relative to A. Given this, the argument proceeds as follows:

- (0) For any x , x exists only if x is present. (Assume for *reductio*.)
- (1) A exists and is simultaneous with B in some frame of reference. (Premise)
- (2) B is simultaneous with C in some frame of reference. (Premise)
- (3) C is future relative to A. (Premise)
- (4) A is present. (0, 1)
- (5) B exists. (1, A2)
- (6) C exists. (2, 5, A2)
- (7) C is present. (0, 6)
- (8) C is not present. (A3, 3, 4)
- ** Contradiction: 7, 8.

There are several questions one might raise about the assumptions of this argument.¹⁸ For example, one might wonder why we ought to endorse assumptions (A2) and (A3). The crucial terms 'simultaneous with' and 'future relative to' are technical terms in the context of those assumptions, and therefore we cannot really appeal to our pre-relativistic notions about simultaneity and futu-

¹⁸For detailed criticism of the argument see Stein 1968 and 1991 and Sklar 1976 and 1981.

rity in order to evaluate them. And if we cannot appeal to pre-relativistic intuitions about those terms, one might wonder what we *can* appeal to in order to evaluate the assumptions in which they occur. On the other hand, one might rest content with (A2) and (A3) and instead raise worries about (A1). SR is a successful theory; but it is a matter of some debate whether the success of a theory is enough to warrant belief in its truth.

I am inclined to think that, given these options, rejecting (A1) is the most plausible way of resisting the argument. (I do not *recommend* rejecting (A1); I just think that doing so is the most plausible of three bad alternatives.) Granted, we cannot appeal to pre-relativistic intuitions about simultaneity and futurity in order to evaluate (A2) and (A3); but despite this, I am inclined to think that they ought to be accepted. It certainly *seems* that if A is present and a light signal can travel from A to B, then B is not present. (Recall that B is supposed to be an event—and we may assume that it is a point-sized event—not an enduring object.) Furthermore, it seems that if A exists and if light signals traveling from A and B will arrive at the same time at a detector at rest in S and equidistant from A and B, then B exists. For that matter, B's existence seems to follow trivially from the fact that it can stand in any relation at all with A. Therefore, it seems to me that rejecting (A1) is the best way to resist this argument. But, of course, to say this is just to grant the first part of the argument from SR to perdurantism: SR does indeed commit us to eternalism.¹⁹

But why think that eternalism commits us to perdurantism? Let us begin with a fairly intuitive reason. If presentism is false, past, present, and future events all exist. Past and future events are like distant places: they are real, but located elsewhere. This implies, among other things that Socrates' birth exists and Socrates' death exists, though the two events exist at different locations in space-time. But now we have a situation that might seem rather puzzling for endurantism. The endurantist will want to say that Socrates is wholly present at his birth *and* wholly present at his death, but this obviously implies that one thing exists in its entirety at two different

¹⁹Gödel (1949) argues (in effect) that the General Theory of Relativity entails eternalism as well. To consider and evaluate that argument here, however, would take us too far afield; and, since I have just conceded that SR entails eternalism, it would seem to make no difference to the central thesis of this paper whether Gödel's argument is sound.

“places” in spacetime. Why is this puzzling? After all, it is not as if Socrates exists at two different places *at the same time*. It is puzzling because when we imagine the eternalist’s universe, we tend to think of locations in spacetime as *places* rather than as *placetimes*. Thus we naturally extend the principle that one object cannot exist at the same time in two places to rule out an object’s existing in two placetimes as well. The perdurantist, on the other hand, will not be puzzled. On her view, Socrates is not wholly present at either his birth or his death. Rather, Socrates is only partially present at each of those events, and the part of Socrates that is present at his birth is distinct from the part present at his death. And so there is no violation of the principle that one object cannot exist in two placetimes.

Initially, such considerations might make perdurantism seem rather attractive given eternalism. But it is important to note that we really have no *argument* here from eternalism to perdurantism. Granted, it is *natural* to extend the principle that one object cannot exist at the same time in two places to rule out an object’s existing in two placetimes; but it is also illegitimate in the present context. Presumably the endurantist will accept the principle that one object cannot exist at the same time in two places; but, as we saw in section 1.1, she will deny that it is impossible for an object to exist at more than one placetime. Indeed, once we have made the transition from thinking in terms of space + time to thinking in terms of spacetime, the very heart of her thesis is that some composite objects are wholly present at more than one region of spacetime. Thus, to assume without argument that objects cannot exist in multiple placetimes is just to beg the question against the endurantist.

Is there an *argument* available for the conclusion that eternalism entails perdurantism? I know of only one. In a recent article (1995), Trenton Merricks argues that an endurantist who rejects presentism cannot solve the problem of temporary intrinsics. Since I will discuss the problem of temporary intrinsics at length in the next section, and since Merricks’s argument is the only one that I know of that purports to show that eternalism entails perdurantism, I will end the present section with a conditional conclusion: *If the endurantist can (plausibly) solve the problem of temporary intrinsics without embracing presentism, then SR is neutral with respect to the debate between endurantists and perdurantists. As we have seen, SR does not support the argument from spatial anal-*

ogy and, though it does commit us to eternalism, there appears to be no reason apart from the problem of temporary intrinsics for thinking that this commitment in turn commits us to perdurantism.

2. The Problem of Temporary Intrinsics

Perhaps the most familiar argument for perdurantism apart from the problem of material constitution is the so-called problem of temporary intrinsics.²⁰ According to David Lewis this problem constitutes the “principal and decisive objection against endurance, as an account of the persistence of ordinary things” (1986b, 203).

To set up the problem, we begin with the commonplace assumption that persisting things change their intrinsic properties. Lewis is bent at one time, straight at another; Philip is drunk at one time, sober at another; and so on. The problem is that it appears that such change is impossible. Let the name ‘Lewis-bent’ refer to Lewis when he is bent, and let ‘Lewis-straight’ refer to Lewis when he is straight. Now, it seems that the following propositions are true:

- (1) Lewis-bent has the property of being bent.
- (2) Lewis-straight does not have the property of being bent.

Therefore, given the indiscernibility of identicals, we may conclude that

- (3) Lewis-bent \neq Lewis-straight.

But, since the names ‘Lewis-bent’ and ‘Lewis-straight’ are both supposed to refer to Lewis, it also seems that the following propositions are true:

- (4) Lewis-bent = Lewis.
- (5) Lewis-straight = Lewis.

But then, given that identity is transitive, it follows that

²⁰Among those who take this to be a genuine problem are David Armstrong (1980), David Lewis (1986b), and Julius Moravcsik (1976). The strongest replies on behalf of the endurantist are to be found in Chisholm 1976 (appendix A), Haslanger 1989, Johnston 1987, Merricks 1994a, and van Inwagen 1990. Chisholm and Merricks give presentist replies; Haslanger, Johnston, and van Inwagen give replies consistent with eternalism.

(6) Lewis-bent = Lewis-straight,

Obviously, (6) contradicts (3); hence we have our problem.

According to Lewis, the only way to solve this problem without embracing the doctrine of temporal parts is either to claim that what appear to be intrinsic properties are in fact disguised relations whose relata are an object, a property, and a time, or else to deny the reality of past and future times. He rejects the former alternative because it amounts to a denial of the existence of temporary intrinsic properties. He rejects the latter because he thinks that it amounts to a denial that we have a future.

It is worth noting here that in fact this catalog of alternatives is a bit misleading. If SR is true, it is not at all clear what sense it makes to speak of “times” as such. Furthermore, it is not clear that if Lewis-bent is bent at a time in a particular frame of reference then he is *intrinsically* bent. As I noted earlier, SR implies that a limousine may be ten feet long in one frame of reference and twenty feet long in another; but obviously it cannot be intrinsically ten feet long and intrinsically twenty feet long. The natural response to the limousine example is to say that the limousine has the following two properties intrinsically: *being ten feet long relative to frame of reference F1* and *being twenty feet long relative to frame of reference F2*. But this sounds a lot like a disguised-relation view of properties. Similarly, then, the property of being bent might turn out to be a disguised relation of some sort; but if so, then merely claiming that bentness is a disguised relation will not do much with respect to solving the problem of temporary intrinsics.

So it is not clear that the alternatives Lewis presents us with are really, strictly speaking, alternatives that we have. Moreover, similar problems infect the various further alternatives that have been proposed in the literature. In fact, the whole debate has been cast in terms that presuppose a Newtonian view of space-time, and this despite the fact that the problem seems to be pressing only once we have abandoned that view.²¹ Nevertheless, I will continue in this paper to use the standard terminology. I do not think that it would be difficult to recast the debate in relativistic terms. We would need to take different paradigms for intrinsic

²¹I say this because within a Newtonian framework the presentist solution seems wholly unproblematic.

properties, and talk of times would need to be replaced by talk of placetimes; but once that were done, all of the relevant alternatives would, I think, remain intact and retain their varying degrees of plausibility. Still, it would take us too far afield to try. Therefore, having done my duty to raise the relevant warnings about the terminology I will be using, I will now, for the sake of convenience, proceed to ignore them.

So we return to Lewis's list of alternatives. The latter of the two (denying the reality of past and future times) is the presentist solution. According to presentism, only present objects and present times exist. Thus, if an object has a certain property, it has it at the present time, and if it lacks that property, it lacks it at the present time. So, if presentism is true, it cannot be the case that Lewis both has and does not have the property of being bent. Either he has it (now) or he doesn't. Therefore, since Lewis-bent and Lewis-straight are just names for Lewis, it can't be the case that Lewis-bent *is* bent whereas Lewis-straight *is* not bent. The conjunction of (1) and (2) is impossible; therefore, the argument is unsound.²² As I said, Lewis thinks that this reply is unacceptable since it "goes against what we all believe" (1986b, 204), implying that we have neither past nor future. But why should we agree with this? In fact, it seems that the presentist can make perfect sense of the claim that we have both past and future: We have a past just in case there were times at which we did exist; we have a future just in case there will be times at which we will exist.²³

But what of the eternalist? Is she left in the grips of Lewis's argument? According to Merricks, yes. He writes:

Given [eternalism], we can conclude that if a single object is F at one time, and is $\neg F$ at another, then that object both is and is not F . But that is, of course, contradictory. Granting the obvious, that objects undergo change, we can see that endurantism and [eternalism] are inconsistent. . . . The argument for [this] is the rather familiar argument that change, endurance, and the indiscernibility of identicals leads [*sic*] to absurdity. My only addition is to make explicit the role played by [eternalism]. (1995, 526–27)

²²This reply is sketched in Chisholm 1976 and developed in detail in Merricks 1994a.

²³I am indebted for this point to Merricks 1994b.

There are various ways one might attempt to reconcile endurantism with eternalism. One way, already mentioned, is to say that what appear to be temporary intrinsic properties are really disguised relations whose relata are an object, a property, and a time. Thus, for example, we might say that Lewis-bent does not really exemplify the property of being bent; rather, he stands in the bent-at relation to a particular time. But this would be an unfortunate solution since, as I pointed out earlier, it amounts to a denial of the very plausible claim that there really are temporary intrinsic properties.²⁴ Another way to reconcile endurantism with eternalism is to view all properties as time-indexed.²⁵ On this view, Lewis-bent and Lewis-straight *both* exemplify the time-indexed properties “being-bent-at-*t*” and “being-straight-at-*t*,” but neither exemplifies the property “being bent” or “being straight.” But, as Merricks points out, this solution is little better than the first. It saves intrinsic properties, but it still rejects *temporary* intrinsic properties such as “being bent” and “being straight.”²⁶

A third, more hopeful way, is to adopt the so-called “adverbialist” solution. This sort of solution has been defended at length by both Mark Johnston (1987) and Sally Haslanger (1989). The core of the solution is to deny that Lewis-bent has (tenselessly) the property of being bent and to say instead that he “has-at-*t*” or, in Johnston’s words, “has *th*y” the property of being bent. Thus, the temporal modifier ‘at *t*’ modifies not the property but rather the *having* of the property, and an object *a* and an object *b* are identical just in case they have all of the same properties *in all of the same ways*. If this is right, then endurantism, eternalism, and temporary intrinsic properties are mutually compatible.

Surprisingly, Merricks has nothing to say against adverbialism in

²⁴However, a referee for this journal has pointed out that the solution is not quite so implausible as Lewis makes it out to be. For the solution does not imply that we can make *no* genuine distinctions between properties like *being bent* which we take to be intrinsic and properties like *being in Princeton* which we take to be relational. On the contrary, it seems that we can. An object will bear the *being in Princeton* at relation to *t* only if it bears certain relations to other objects that exist at *t*, whereas an object need stand in no relations to other objects at *t* in order to bear the *bent at* relation to *t*. Thus we get a sort of intrinsic/relational distinction even if it is not quite as robust as we might have hoped for.

²⁵This is the solution Peter van Inwagen (1990) advocates.

²⁶See Merricks 1995, 527–28.

his 1995; but elsewhere he does. In his 1994a (168–70), Merricks raises three objections to adverbialism:

- (A) Adverbialism does not allow for “genuine change of the sort found when an object exemplifies a property at one time in one way and lacks it at another in the same way.” On the adverbialist view, “[o]nce *fly bent*, always *fly bent*.” (169)
- (B) It is not impossible on adverbialism for an object to exemplify complementary properties. What is impossible is simply that objects exemplify complementary properties *in the same way*.
- (C) Concepts like “being *fly bent*” cannot be analyzed in terms of everyday concepts like “being bent.”

The first of these objections is not pertinent to our present discussion since it is more an objection to eternalism in general than to adverbialism in particular. Any solution to the problem of temporary intrinsics which embraces eternalism will be forced to deny the possibility of “genuine” change of the sort described in (A). Of course, this objection might constitute good reason for rejecting adverbialism in favor of a presentist solution; but my aim here is just to show that *given* eternalism, adverbialism is an acceptable endurantist response to the problem of temporary intrinsics. If adverbialism fails on *that* score, it will be because of (B) or (C).

It is hard to see why anyone would be moved by objection (B). One might just as well object to the view that it is possible to have a red and green T-shirt on the grounds that such a view does not deny that an object can exemplify contrary colors, but denies only that an object can exemplify contrary colors in the same part of itself at the same time. Such an objection would be absurd because nobody *wants* to deny that an object can exemplify contrary colors; they only want to deny the latter, suitably qualified claim. Similarly, nobody wants (or should want) to unqualifiedly deny that objects can exemplify complementary properties. They want (or should want) only to deny a suitably qualified claim—that is, the claim that no object can exemplify complementary properties in the same part of itself in the same way at the same time. But, as the objection itself concedes, the adverbialist does not deny this latter claim.

And so we are left with objection (C). The objection, again, is

that adverbialism does not allow us to analyze unfamiliar concepts like “being *dy* F” in terms of familiar ones like “being F.” The reason is as follows. According to adverbialism, there are no temporary properties which an object has simpliciter; there are only those which it *has-at-t*, or *has tly*, for some time *t*. But, according to Merricks, analyzing a concept like “being *dy* F” in terms of “being F” presupposes that “being F” is an “ingredient” of “being *dy* F”; and if “being F” is an ingredient of “being *dy* F,” then it would seem to follow that an object *could* simply be F after all, contrary to the central thesis of adverbialism.

One problem with this objection is that it does not seem to follow from the fact that “being F” is an ingredient of “being *dy* F” that it is possible for something simply to be F. Consider a parallel case. “Running ϕ ly” (where ‘ ϕ ’ takes as substitution instances adjectives like ‘quick’ or ‘slow’) is analyzable in terms of “running” simpliciter; but it does not follow from this that it is possible for something to run simpliciter—that is, to run without running quickly, slowly, or ϕ ly for some other ϕ . Everything that runs runs *somehow*, but this in no way impugns the fact that there is such a thing as running or that “running ϕ ly” is analyzable in terms of “running.” Thus, similarly, the adverbialist can say that everything that *has* (a property) *has dy* (that property), but this in no way impugns the fact that there is such a thing as having or that “having *dy*” is analyzable in terms of “having.”

Thus, objection (C) seems to be incorrect. But even if it were correct, there is a further question that would arise: Why should we think that (C) constitutes an *objection* to adverbialism? Merricks gives little by way of answer to this other than to say, “I think that if I have a property now, it follows that I simply have it.” But *this* isn’t contradicted by the adverbialist’s thesis. For, again, on the adverbialist view there are no temporary properties that I have (simpliciter) now or at any other time.

Maybe the real objection here is just that it seems that we do *have simpliciter* some temporary properties, and it does not seem that we *have-tly* any of our properties. But these are intuitions that (if we are endurantists) seem to presuppose presentism. In the present context, however, we are assuming that presentism is *false* in order to see whether the eternalist can possibly avoid the problem of temporary intrinsics. Once we assume that, adverbialism does not seem nearly so implausible. (For that matter, neither do

the other eternalist solutions.) I have no intuition whatsoever which supports the claim that Lewis has tenselessly the properties of being bent and being straight. But that is what is entailed by assuming that (i) presentism is false, (ii) 'Lewis-bent' is just another name for Lewis, and (iii) Lewis-bent *has simpliciter* the property of being bent. My intuition that there are some temporary properties which I have simpliciter seems therefore to be an intuition that presupposes presentism. Thus it is not one which, *given the denial of presentism*, will lead me to reject adverbialism.

Assuming that presentism is false, adverbialism seems to be a perfectly acceptable and coherent endurantist response to the problem of temporary intrinsics. If it is, however, then Merricks's claim that endurantism and eternalism are incompatible is false. This is important, for it means that the problem of temporary intrinsics is not a problem for the endurantist. There is no reason for either the presentist or the eternalist to accept the conjunction of the first two premises of Lewis's argument. Moreover, it turns out that, in light of the conditional conclusion of section 1, SR is completely neutral with respect to the perdurantism/endurantism debate.

3. Humean Supervenience

So neither SR nor the "problem" of temporary intrinsics provides any reason for believing the doctrine of temporal parts. But one might think that Humean Supervenience does. In his 1983, David Lewis sketches an argument which seems to show that the doctrine of Humean Supervenience entails the doctrine of temporal parts. In this section, I will argue that it does not.

In the introduction to his 1986a, David Lewis explains the doctrine of Humean Supervenience as follows:

Humean supervenience is named in honor of the great denier of necessary connections. It is the doctrine that all there is to the world is a vast mosaic of local matters of particular fact, just one little thing and then another. (But it is no part of the doctrine that these local matters are mental.) We have geometry: a system of external relations of spatiotemporal distance between points. Maybe points of spacetime itself, maybe point-sized bits of matter or aether or fields, maybe both. And at these points we have local qualities: perfectly natural intrinsic properties which need nothing bigger than a point at which to be instantiated. For short: we have an arrangement of qualities. And that is all.

There is no difference without difference in the arrangement of qualities. All else supervenes on that.

First say it, then qualify it. I don't really mean to say that no two possible worlds differ in any way without differing in their arrangements of qualities. For I concede that Humean supervenience is at best a contingent truth. Two worlds might indeed differ only in unHumean ways, if one or both of them is a world where Humean supervenience fails. (ix-x)

We might have doubts about whether Humean supervenience holds in the actual world. Lewis believes that it does, but even he concedes that physics might tell us otherwise. Moreover, he concedes that there are objections to Humean supervenience which pose no small problem for the thesis. One objection arises in light of the fact that there might be objective chances in the world. If there are, then how the world is will supervene not just on the distribution of Humean qualities, but on that distribution plus all the chances.²⁷ Another objection is that the thesis is vague. In Lewis 1994, Lewis describes Humean supervenience as the thesis that no two "worlds like ours" differ without differing in their distributions of Humean qualities; but he does not spell out in any detail what it takes for a world to be like ours. He notes that he used to say that a world is like ours (in the relevant sense) just in case it is free from fundamental properties and relations alien to our world. But he concedes that this proposal is inadequate and offers no further proposal to replace it.

So Humean supervenience is not without its problems. But for now let us simply pass them over. For present purposes, let us say that Humean supervenience holds in our world just in case (i) there is some class of worlds just like ours in precisely the relevant sense (call them " α -worlds"), and (ii) no two α -worlds differ without differing in their distributions of Humean qualities.²⁸ We will suppose that Humean supervenience *does* hold in the actual world, and we will examine whether this has any implications for the perdurance/endurance debate.

Lewis's argument from Humean supervenience to the doctrine of temporal parts proceeds as follows.²⁹

²⁷Lewis 1986a, xiv. Lewis 1994 is an attempt to solve this problem.

²⁸Note that this is not a general formulation of what it is for Humean supervenience to hold in just *any* world. To try to give such a formulation that precisely captures what Lewis has in mind would take us too far afield.

²⁹The following argument may be found (in slightly different form) in Lewis 1983, 76-77.

- (1) Humean supervenience holds in our world. (Premise)
- (2) It is possible that there be a world of stages exactly like our own world in its point-by-point distribution of intrinsic local qualities over space and time. (Premise)
- (3) Such a world of stages might also be exactly like our own in its causal relations between local matters of particular fact. (Premise)
- (4) Such a world might also be an α -world.³⁰ (Premise)
- (5) Then such a world would be exactly like our own simpliciter. (From 1–4)
- (6) Then our world is a world of stages. (From 5)

The crucial premises here are (2), (3), and (4). They assert, in short, that there is an α -world that is a “Humean duplicate” of our world and lacks enduring objects. If this is true, then it follows immediately that our world lacks enduring objects. For if our world *includes* enduring objects, then there could be a Humean duplicate of our world which lacks enduring objects only if endurance does not supervene on our world’s distribution of Humean qualities. But if endurance is instantiated in our world and yet does not supervene on our world’s distribution of Humean qualities, then Humean supervenience fails, contrary to premise (1).

Of course, the crucial question here is why we should think there is an α -world just like ours in its distribution of Humean qualities which lacks enduring objects. Lewis does not explicitly answer this question, but Sally Haslanger fills in an answer on his behalf:

even if in some worlds micro-qualities are instantiated by enduring particulars, we can always replace the enduring subject of a given micro-quality with a [non-enduring] point-sized particular that instantiates the same micro-quality, without altering the distribution of the Humean base. In short, a micro-quality never *needs* an enduring thing in order to be instantiated; [non-enduring] point-sized things are enough. (1994, 347)

More generally, it seems that the *whole career* of *any* enduring object (point-sized or larger) could be replaced by a series of non-enduring things, one existing right after the other, without disrupting the distribution of Humean qualities over spacetime. But, of

³⁰This premise is not stated in Lewis 1983, but given our present understanding of Humean supervenience, it is needed in order for the argument to be valid.

course, to say this is just to say there could be a Humean duplicate of our world in which endurance fails to be instantiated. Could such a world be an α -world? That is, could a world that duplicates ours in its distribution of Humean qualities but fails to instantiate endurance be a world that is “like ours” in the sense relevant to Humean supervenience? If so, then I think it is clear that Humean supervenience is incompatible with endurance.

I have two objections to raise against Lewis’s argument. The first is really *ad hominem*. Lewis apparently endorses a Minkowskian conception of the universe. But, as we saw at the end of section 1.1, it appears that a Minkowskian universe can include enduring objects only if composition is restricted so that objects can compose something only if they exist at the same time in the same frame of reference. So, if our world includes enduring objects, then a world in which those objects are replaced by qualitatively identical perduring objects would be a world in which the conditions for composition are different, and vice versa. But surely a world in which the conditions for composition are different would not be an α -world. Thus, if our world includes enduring objects, then no world of stages could be an α -world; and if our world is a world of stages, then no world that includes enduring objects could be an α -world. But if this is right, then the argument from Humean supervenience to perdurantism crumbles. For that argument depends on the premise that even if our world includes enduring objects, there could be a Humean duplicate of our world *which is also an α -world* that does not include enduring objects.

Of course, a Minkowskian conception of the universe might be wrong, and I have said nothing to indicate that the debate between endurantists and perdurantists would turn on facts about composition under just any conception of the universe. But even if the Minkowskian conception is wrong and the debate does not turn on facts about composition, there is still a second objection to be reckoned with. Suppose we grant, on the basis of Lewis’s argument, that our world contains no enduring objects. If it is really true that any enduring object could be replaced by a series of successive non-enduring objects without disrupting the Humean base, then presumably there is some series of successive non-enduring objects in our world that could be replaced by an enduring object without disrupting the Humean base. Perhaps not *every* perduring object

could be so replaced,³¹ but surely at least one could. But then there could be a Humean duplicate of our world in which endurance *is* instantiated. Could there be such a world that is also like ours in the sense relevant to Humean supervenience? If so, then it follows that either Humean supervenience does not hold in our world or endurance *is* instantiated in our world. But by hypothesis, endurance is not instantiated in our world; therefore Humean supervenience is false. But, obviously, if Humean supervenience is false, it no longer constitutes a reason to deny that endurance is instantiated in our world.

What might Lewis say about this argument? He might resist the claim that there could be a Humean duplicate of our world that includes endurance. But then, in parallel fashion, the endurantist might simply deny that there could be a Humean duplicate of our world that lacks endurance. The trouble with both strategies is that they beg the question. Either a series of successive non-enduring objects can replace *and be replaced by* an enduring object without disrupting the distribution of Humean qualities over spacetime, or not. If so, then it seems to follow from what has been said above that Humean supervenience is false. If not, then there seems to be no reason to believe or deny that there could be a Humean duplicate of our world that includes enduring objects.

The other way to resist the argument would be to deny that a world that includes endurance is like our world in the sense relevant to Humean supervenience. Here, however, the debate is vexed by the fact that we don't know *what* sense of resemblance we are talking about. As I mentioned earlier, Lewis once held that α -worlds are just worlds that contain no fundamental properties or relations alien to our world. Furthermore, he held that if there were enduring objects, there would have to be such alien properties. But this latter claim is true only if endurance doesn't supervene on the Humean base. And, as Haslanger explains, there are only some conceptions of endurance according to which endurance would not supervene, and these are not among the most plausible conceptions.³² Moreover, Lewis has conceded that this

³¹Though, if I understand her argument correctly, Sally Haslanger (1994) appears to take seriously such a possibility.

³²Haslanger 1994, esp. 354–59. In short, Haslanger's point is that whether either perdurance or endurance supervenes depends largely upon what sorts of background assumptions one makes about the circumstances under which composition occurs, what kinds of objects there are, and the

account of what it is for a world to be “like ours” probably won’t do. And in the absence of any account to replace it, I am at a loss to imagine a non-question-begging reason for thinking that worlds that include endurance wouldn’t be like ours in the relevant sense.

In light of the foregoing, I think it is clear that the argument from Humean supervenience is unsound. Unless we assume from the outset that our world contains no enduring objects, any non-question-begging reason for thinking that there could be a Humean duplicate of our world which is both an α -world and a world that *lacks* enduring objects will also be a reason for thinking that there could be a Humean duplicate of our world which is both an α -world and a world that *includes* enduring objects. If we think that the universe is Minkowskian, we should grant neither claim, in which case the argument from Humean supervenience is doomed. On the other hand, if we do grant one of the claims, it appears that we must also grant the other. But if we grant both claims, then it follows immediately that Humean supervenience is false.

4. Fission

We have now exhausted the main arguments that have been given explicitly by perdurantists to motivate their position. One might think, however, that there is implicitly in the work of David Lewis (1976) an argument for perdurantism from the possibility of fission. Fission is indeed puzzling for endurantism; but in this section I will argue that accepting perdurantism does absolutely nothing with respect to making it any less puzzling.

The standard example of fission is the now merely possible process of “brain division.” It is well known that a person can survive the removal and destruction of either one of the hemispheres of her brain. Moreover, it seems reasonable to think that if a brain hemisphere can be removed from a skull, it can also be “installed” in one. That is, it seems at least logically possible that someone (or

like. Some assumptions will prevent one or the other property from supervening; others won’t. Thus, if Humean supervenience is incompatible with either endurance or perdurance, it will be only because certain background assumptions about ontology are true. And it seems to be question-begging in the present context simply to assume that supervenience-unfriendly assumptions would have to be made by anyone who endorses endurantism.

something) receive a brain hemisphere transplant. Thus, the following possibility emerges. Suppose Sam's brain is removed from his skull and divided in half. It seems that Sam will survive this process if the *left* half of his brain is subsequently destroyed and the right half is transplanted into another body. It also seems that Sam will survive if the *right* half of his brain is destroyed and the left half is transplanted. But now we have a problem. Suppose *neither* half of Sam's brain is destroyed and that *both* are transplanted. Surely Sam will survive this process as well; but the question is, *which of the resultant persons will he be?*

Posing the problem in a slightly different way, Derek Parfit (1971) claims that we can say only one of three things about this double transplant case: Either Sam fails to survive, Sam survives as one of the persons, or Sam survives as both of the subsequent persons. According to Parfit, it is unreasonable to say that Sam fails to survive. After all, he *would* have survived if one half of his brain had been destroyed. So how can he fail to survive simply because it is not? Parfit also thinks that it is unreasonable to say that Sam survives as only one of the two resultant persons. Presumably the reason here is something like that there is no relevant difference between the two resultants that could possibly account for Sam's surviving as one rather than the other.³³ Therefore, Parfit concludes, Sam survives as *both* of the resultant persons.

There is a lot that might be said about Parfit's reasons for rejecting the first two alternatives.³⁴ However, for the time being let us simply ignore any objections and assume that Parfit is right to reject the first two alternatives. In other words, let us assume

- (P) In the double transplant case, it is not the case that Sam fails to survive and it is not the case that Sam survives as just one of the resultant persons.

³³In fact, Parfit isn't quite clear about what the reason is supposed to be. Parfit asks "What can make [Sam] one rather than the other?" (1971, 5). But, of course, one answer to this question (if in fact Sam survives as one of the resultant persons) is, "The process of brain fission." Thus, I take it the real question is something like: "What *accounts* for my being one rather than the other?"

³⁴For some of what has in fact been said, see Cartwright 1993 and Merricks 1997.

What I want to focus on is whether accepting (P) has any bearing on the question of whether we should accept perdurantism.

No one that I am aware of has explicitly argued that the possibility of fission (much less the truth of (P)) provides a reason for rejecting endurantism. But, as I said earlier, one might think that there is an implicit argument to be found in the work of David Lewis. Here is why one might think this. Parfit argues that if we accept (P), then we ought to reject

(S) Necessarily, for any a and b , a survives as b only if $a = b$.

In his 1976, however, David Lewis shows how, within the context of a perdurantist ontology, one might accept (P) without rejecting (S). If one thinks that Lewis's way of saving (S) is more plausible than any endurantist way of saving (S), and if, moreover, one thinks that Lewis's way of saving (S) is more plausible than the denial of (S), then the possibility of fission together with the truth of (P) will provide a reason for accepting perdurantism. I will argue that perdurantism provides no advantage over endurantism with respect to saving (S) and that therefore the truth of (P) (and, in general, the possibility of fission) has no bearing on the debate between endurantists and perdurantists.

Let's begin by examining Parfit's reasons for thinking that if we accept (P) we ought to reject (S). As we saw, Parfit thinks that it follows from (P) that Sam in some sense survives as both of the resultant persons. We shall see shortly that he is mistaken; but suppose for now that he is not. What could it mean to say that Sam survives as both of the resultant persons? Let us call the resultant persons "Lefty" and "Righty." (Lefty is the recipient of the left hemisphere of Sam's brain, Righty is the recipient of the right hemisphere.) Given this terminology, Parfit's claim can be taken one of three ways:

- (P1) Sam survives as Lefty and Sam survives as Righty and Lefty \neq Righty.
- (P2) Sam survives as Lefty and Sam survives as Righty and Lefty = Righty.
- (P3) Sam survives as Lefty + Righty (that is, Lefty and Righty *compose* Sam.)

But the conjunction of any of these with the claim that survival entails identity is absurd. (P1) together with (S) implies that iden-

tity is intransitive. (P2) on its own, and hence, *a fortiori*, together with (S), entails the denial of the Indiscernibility of Identicals (since, by hypothesis, Lefty and Righty receive *different* hemispheres of Sam's brain). (P3) together with (S) implies either that Sam comes to be a person with two bodies or that he comes to be a person composed of two distinct persons (depending upon whether Lefty and Righty count as persons or merely as parts of persons). Each of these alternatives seems absurd; none seems to be more palatable than denying that survival entails identity.

So if we accept (P), and if it follows from (P) that Sam in some sense survives as both Lefty and Righty, then it seems that Parfit is right: we ought to reject (S). In fact, however, it does not follow from (P) that Sam survives as both Lefty and Righty. To see why, we must ask to what, exactly, the name 'Sam' is supposed to refer.

An endurantist might naturally take 'Sam' to refer to a whole person (one who exists in his entirety prior to the time of fission and whose post-fission existence is currently in question). Given (P), however, this claim does seem to imply (paradoxically) that Sam survives as both resultants. Parfit, on the other hand, is a sort of perdurantist and apparently takes 'Sam' to refer to a person-stage *whose career terminates at the time of fission*. The two resultants, Lefty and Righty, are mere person-stages as well; and their careers begin roughly where Sam's career ends. On this view, survival cannot entail identity because Sam survives despite the fact that nothing exists after the fission process that is identical with Sam. But this is not a problem according to Parfit; for on Parfit's view, survival (for persons) just involves psychological connectedness. Sam, Lefty, and Righty *are* psychologically connected; thus, Parfit's view leads also to the claim that Sam survives as both Lefty and Righty.

So we may grant that there are endurantist and perdurantist characterizations of our fission case which, together with (P), imply that Sam survives as both resultants. But there are others that don't. For example, an endurantist might hold that 'Sam' refers ambiguously to two persons who are co-located prior to the time of fission and who cease to be so afterward. She might say that Lefty is identical to one of these persons and Righty is identical to the other. On this view, it is not the case that Sam fails to survive, it is not the case that Sam survives as just one of the resultant persons, and it is not the case that Sam survives as both of the resultant persons. The reason is that there is no unique person

picked out by the name ‘Sam’ who does any of these things. (Compare: Two men, A and B, commit two separate crimes but we mistakenly think that both crimes are the work of a single man, C. Here, ‘C’ refers ambiguously to two men. But, though each man committed one of the crimes, ‘C committed just one of the crimes’, ‘C committed both crimes’, and ‘C failed to commit any crime’ all seem to be false since ‘C’ does not refer uniquely to anything.) Thus, this view is consistent with (P), and it does not require us to reject (S).

The trouble, however, is that this view commits us to the possibility of co-located persons. And this is precisely why perdurantism might start to look attractive. Faced with the alternatives of rejecting (S) or accepting the possibility of co-located persons, one might reasonably look for some way to avoid both. And there is a perdurantist characterization of the fission case that does avoid both. On David Lewis’s view, ‘Sam’ refers ambiguously to two persons. Each survives the transplant (that is, each exists before the transplant and each is identical with a person who exists after the transplant—that is, Lefty or Righty). But the persons do not fill exactly the same region of spacetime, so they are not co-located. Rather, they share a temporal part up until the time that fission occurs. Just as a local bumpkin might reasonably think that there is just one road occupying the region where two highways overlap, so too we are inclined to think that there is just one person in the region where two persons overlap. The bumpkin’s ignorance is explained by the fact that he hasn’t traveled far enough in space to find out that there are really two roads where he thinks there is only one; our ignorance is explained by the fact that we haven’t “traveled” far enough in time to find out that there are really two persons where we think there is only one.

So the argument from the possibility of fission to perdurantism comes to something like this: Given that the double transplant case is possible, and given (P), our alternatives are to follow Parfit in rejecting (S), accept endurantism and the possibility of co-location for persons, or accept something like Lewis’s perdurantist characterization of the case. Of these alternatives, the most reasonable is to accept Lewis’s characterization. Therefore, we should embrace perdurantism.

I will leave aside questions about whether Lewis’s way of saving (S) is really a *plausible* way of saving (S). Let us simply suppose it

is. Moreover, let us suppose that it is not plausible to accept co-location.³⁵ I still see no reason for thinking that perdurantism offers any advantage over endurantism with respect to preserving (S). The advantage, again, of perdurantism is that it allows us to accept (P) and (S) without accepting co-location for persons. But there are endurantist views that achieve the same result. One might think that instead of being co-located and called by the name 'Sam' prior to fission, Lefty and Righty merely overlapped by virtue of sharing the same body. (Perhaps, for example, Lefty was composed of all of "Sam's" parts except for those in the right hemisphere of the brain, and Righty was composed of all of "Sam's" parts except for those in the left hemisphere.) Again, this is consistent with (P) because there is no unique person picked out by the name 'Sam'; but, instead of committing us to co-location, this view only commits us to the possibility of body sharing. Of course, one might object that body sharing is implausible. But if two persons share *all* of their spatial parts up until a certain time (as Lefty and Righty do, according to Lewis) are they not sharing a body as well? If so, then Lewis's solution is, at bottom, no more plausible than the solution one gets by accepting the endurantist body-sharing solution.

Perhaps you will object that the sort of body sharing that goes on in Lewis's solution is different from the sort that goes on in this second endurantist solution. Point granted. Still, the core of both Lewis's solution and the solution one gets by accepting endurantism and the possibility of body sharing is to say that (i) 'Sam' refers ambiguously to two persons, (ii) those persons overlap in a way that we do not normally think that persons can overlap (that is, they do not overlap in the way that Siamese twins overlap), (iii) the reason we are not initially inclined to think that 'Sam' refers to two persons is that, prior to the fission, it does not appear to us that 'Sam' refers to two persons, and (iv) it is the process of fission that ultimately reveals the ambiguity of 'Sam'. Thus, it is not clear why perdurantism plus the possibility of overlapping persons should be considered any more plausible than endurantism plus the same possibility.

³⁵In fact, I am not convinced that embracing co-location is any less plausible than Lewis's solution. The strongest arguments against co-location appeal to what I call "supervenience-objections." But in Rea 1997, I provide two strategies by which co-locationists can easily circumvent these kinds of objections.

Moreover, it seems that the endurantist solution has at least one advantage over its competitor: If we embrace the former, we have reason to think that fission merely *reveals* rather than *creates* the ambiguity of 'Sam'. If we embrace the latter, on the other hand, then we must either claim that fission creates the ambiguity of 'Sam' or we must embrace co-location for persons. For suppose Sam never underwent fission. Then either there are two coincident persons who fully occupy the region of spacetime Sam occupies or there are not. If there are, then 'Sam' remains ambiguous, but we have co-location. If there are not, then 'Sam' is not ambiguous and we must assume (I think implausibly) that the fact of fission is what makes 'Sam' ambiguous.

I conclude, then, that the possibility of fission provides no reason for preferring perdurantism to endurantism. I have argued that, for the chief perdurantist strategy for making sense out of that possibility, there is an equally plausible parallel endurantist strategy. Of course, one might argue that neither of these strategies is ultimately plausible. One might think that we would do better to reject (P) or to follow Parfit in rejecting (S). But that would just reinforce the conclusion of the present section.³⁶

5. Conclusion

My aim in this paper has been to canvass the main arguments for perdurantism and to show that there is none sufficient to motivate that view. This task is now complete. We have seen that neither SR, nor the possibility of intrinsic change, nor the doctrine of Humean supervenience, nor the possibility of fission has any bearing on the question of whether to embrace perdurantism or endurantism. Moreover, we have seen that this is so even if we make substantial concessions to the perdurantist (for example, granting that SR supports the Spacetime Thesis, granting that (P) is true, and so on).

I have not attempted to argue that perdurantism is false. I suspect that any such attempt would fail in much the same way that perdurantist attempts to refute endurantism fail. In Wolterstorff

³⁶Though Parfit is a sort of perdurantist, one need not be a perdurantist to reject (S). The heart of Parfit's view is just that survival entails psychological connectedness but not identity; and one could accept this without accepting the claim that the objects that are psychologically connected in the fission case are person-stages rather than whole persons.

1960, Nicholas Wolterstorff argued that the debate between nominalists and realists about universals was moot; the world could be described equally well in the language of either. I am inclined to think that the same is true of the debate between endurantists and perdurantists. Of course, I have not said enough here to establish that conclusion; but if the above arguments are sound, I think that they constitute a large step in that direction.

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