SIMPLE PERSISTENCE

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Author's Name Omitted*

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Abstract

In this paper, I discuss how theories of persistence are affected by the possibility of persisting mereological simples. Specifically, they entail the falsity of perdurantism, unless the perdurantist adopts other (what I consider costly) metaphysical theses. In §1, I define some terms and then argue that, necessarily, mereological simples lack temporal parts. I then consider popular answers to the Simple Question. Only MaxCon allows for simples to have temporal parts. On most views, if simples persist, they must endure or exdure. In §2, I offer some implications of this. In §3, I discuss what conclusions ought to be drawn.

1 The Simple Question and Temporal Parts

Much recent work in metaphysics is in the areas of persistence and mereology. *Persistence* is the phenomenon of objects continuing through time. The task of a theory of persistence is to offer necessary and sufficient conditions for an object to exist at different times. *Mereology* is the study of parts and their relation to wholes. This paper will deal heavily with the notion of a mereological *simple*; a mereological simple has no parts except itself. Despite the frequent occurrence of these topics in the literature, there is little discussion of the relationship between the two. In this paper, I aim to discuss that relationship. Specifically, I argue that one theory of persistence, *perdurantism*, suffers from an inability to allow for persisting mereological simples.

*Acknowledgements omitted.

There are three main views of persistence. *Perdurantism* holds that objects persist by having *temporal parts*. Perdurantists take the temporal dimension to function much like the spatial dimensions; much as an ordinary object occupies different regions of space by having a part at each region, perdurantism claims that it also occupies different regions of time by having a part at each region. Usually those regions are thought of as instants and temporal parts are thought of as instantaneous. A popular definition of 'temporal part' is as follows:

> x is an *instantaneous temporal part* of y at $t=_{df.}$(i) x exists at t, but only at t; (ii) x is part of y at t; and (iii) x overlaps[1] at t everything that is part of y at t.[2]

According to (ii), a temporal part of an object is literally a part of the object.[3] An object is identical to the collection of its temporal parts.[4]

Endurantists, by contrast, say that objects lack temporal parts; material objects persist by being *wholly present* at each time they exist.[5] *Exdurantists* think that ordinary objects are instantaneous,[6] and are related by a counterpart-like relation to objects at other instants, which are their *temporal counterparts*.[7] Some classify this as a type of perdurantism (stage-theoretic);

[1]Overlap is a mereological notion which can be defined in terms of parthood as follows: x overlaps $y=_{df.}$ there exists a z such that z is a part of x and z is a part of y. I define other mereological notions below.

[2]Sider (2003, p. 59). Sider notes that those who reject instantaneous temporal parts can allow for t to range over intervals of time and define 'x is an extended temporal part of y at t.' But then t could identify the entire interval of time at which an object exists, in which case the object has only one temporal part, and it is an *improper part* (x is an improper part of $y=_{df.}$ $x=y$). However, an enduring object can have an improper temporal part, namely, itself. So, perdurantists who allow for objects to have only one temporal part must in some other way distinguish themselves from endurantists.

[3]This point is also argued by Thomson (1983), Heller (1984) and Sider (2003).

[4]I take it that most perdurantists think that an object is identical to the collection of its temporal parts. But some perdurantists might offer a relation other than numerical identity. What is clear is that perdurantists believe that persisting objects have more than one temporal part and that objects persist by having temporal parts.

[5]I discuss whole presence in more detail in §3.

[6]Many exdurantists are committed to both instantaneous objects and collections of them. Thus, they do not differ in their ontologies from perdurantists; rather, they differ with respect to which entities they hold as fundamental and as the objects referred to in normal discourse. However, this is not implied by exdurantism.

[7]Sider calls this relation between temporal counterparts 'genidentity' in his (1996) and (2003).

but, in the interest of clarity, I will follow Haslanger and Kurtz (2006) in reserving the term 'perdurantism' for worm-theory.

Mereology is the study of relations between wholes and parts. I will take 'part' as primitive, and define the other mereological terms in terms of parts. The parthood relation is reflexive (x is a part of x), antisymmetrical (if x is a part of y and y is a part of x, then x is identical to y), and transitive (if x is a part of y and y is a part of z, then x is a part of z). A *proper part* is then defined as:

> x is a *proper part* of $y =_{df.}$ x is a part of y and y is not a part of x.[8]

An object has only one *improper part* – itself. Mereological *simples* are objects that lack proper parts. Something is made of atomless *gunk* iff all its parts have proper parts.

We are now in position to consider an argument to the effect that mereological simples cannot perdure. Any perduring object has more than one temporal part.[9] Perdurantists do not think that each temporal part of a persisting object is identical to the object itself, so they must be proper parts. Since temporal parts are proper parts, then any perduring object has proper parts. Simples lack proper parts; therefore, they cannot perdure.

Traditionally, the term 'proper part' is used to refer to spatial parts, so one might object that I am using the term in an unfamiliar and unfitting way. But a temporal part of a material object is itself a material object, so clearly it occupies a region of space.

However, there is not much discussion of what proper parts are beyond their use within mereologies. Definitions on offer typically rely on a primitive parthood relation. But both 'proper part' and 'part' are mereological notions, so we have a recursive definition that doesn't provide informative (that is, non-mereological) necessary and sufficient conditions for an object's being a proper part of another object. Perhaps, depending on what objects one thinks count as proper parts, one can hold that temporal parts are not proper parts.

There are attempts to clarify the necessary and sufficient conditions of an object's having or lacking proper parts. They show up in the literature as the

[8]Some favor: x is a proper part of $y =_{df.}$ x is a part of y and $x \neq y$. A virtue of my definition is that it relies only on the notion of parthood, not both parthood and identity.

[9]I assume that instantaneous objects do not perdure, since a necessary condition for an object's perduring is its persisting.

Special Composition Question (hereafter 'SCQ') and the *Simple Question*.[10] The SCQ asks for an informative instance of the following schema:[11]

> For any xs, there exists a y such that the xs compose y iff _____.

An answer to the Simple Question is an informative instance of the following schema:

> Necessarily, for any x, x is a simple iff _____.

One's answers to these questions will define what one thinks are the necessary and sufficient conditions for an object's being a proper part. One's answer to the SCQ will identify which objects one thinks have proper parts, and one's answer to the Simple Question will identify which objects one thinks lack proper parts. The *explanans* of one's answer to the SCQ will be biconditionally co-variant with the *definiens* of the definition of a composite object; that is, one's answer to the SCQ will be the same as one's answer to the following:

> For any y, y has proper parts iff _____.[12]

The *explanans* of one's answer to the Simple Question will be biconditionally co-variant with the *definiens* of the definition of a simple; that is, one's answer to the Simple Question will be the same as one's answer to the following:

> For any x, x lacks proper parts iff _____.[13]

[10]The SCQ is first posed in Van Inwagen (1987) and discussed more extensively in his (1990). The Simple Question is first posed in Markosian (1998) and discussed in Hudson (2007) and McDaniel (2007).

[11]In order to be informative, answers must provide necessary and sufficient conditions without employing mereological notions in the *explanans*.

[12]Note that 'y is a composite object' and 'there exists an x such that x is a part of y and y is not a part of x,' respectively, are definitions which use mereological notions, and are thus uninformative.

[13]Note again that 'x is a simple' and 'it is not the case that there exists a y such that y is a part of x and x is not a part of y,' respectively, are definitions which use mereological notions, and are thus uninformative.

How one thinks of proper parts will inform whether one thinks temporal parts qualify as such. In the remainder of this section, I consider four popular answers to the Simple Question. Only one of these views allows for simples to have temporal parts, and the additional metaphysical theses that must be adopted might prove to be too costly for some.

One answer to the Simple Question is *MaxCon*.[14] If you endorse the MaxCon view of simples, then you think that simples are *maximally continuous* objects; you answer the Simple Question with 'x is a maximally continuous object.' An object is maximally continuous if and only if it is spatially continuous and the region of space it occupies is not a proper subregion of a spatially continuous region of space all of whose points fall within some object or other.[15]

It is open to the proponent of MaxCon to say that simples can have temporal parts. She can merely revise MaxCon to include the temporal dimension: an object is maximally continuous if and only if it is spatio-temporally continuous and the region of space-time it occupies is not a proper subregion of a spatio-temporally continuous region of space-time all of whose points fall within some object or other.

On this view, then, if there are no "gaps" between the temporal parts of an object, then they need not be metaphysical proper parts; they can instead be *conceptual proper parts*. Conceptual part are the matter filling a

[14]Ned Markosian proposes and defends MaxCon in his (1998). For a critique, see McDaniel (2003). For Markosian's response, see his (2004).

[15]I follow Markosian (1998) and McDaniel (2007) in using Cartwright's (1987, pp. 171-175) definition of 'continuous' (Cartwright uses 'connected' instead of 'continuous' and 'disconnected' instead of 'discontinuous'):

> R is *continuous* $=_{df}$ R is not *discontinuous*.
>
> R is *discontinuous* $=_{df}$ R is the union of two non-null *separated* regions.
>
> R and R' are *separated* $=_{df}$ the intersection of either R or R' with the *closure* of the other is null.
>
> The *closure* of $R =_{df}$ the union of R with the set of all its *boundary points*.
>
> p is a *boundary point* of $R =_{df}$ every *open sphere* about p has a non-null intersection with both R and the *complement* of R.
>
> R is an *open sphere* about $p =_{df}$ the members of R are all and only those points that are less than some fixed distance from p.
>
> The *complement* of $R =_{df}$ the set of points in space not in R.

sub-region of the region occupied by an object, and are not objects.[16]

But the doctrine of temporal parts is heralded as a solution to the *Problem of Temporary Intrinsics*, and, on this view, temporal parts no longer work as a solution.[17] Consider a sphere which is maximally continuous and is red all over at t_1 and blue all over at t_2. What bears the incompatible properties of redness and blueness? If it is the temporal parts of the sphere at t_1 and t_2, then the temporal parts are objects that can be quantified over, and are metaphysical parts, not conceptual parts; this makes them proper parts.

But not so fast! To answer an analogous problem, the *Problem of Spatial Intrinsics*, Markosian makes a distinction between *things* (objects) and *stuff* (the matter that constitutes objects).[18] Perhaps the MaxConist can make the same distinction here. The thing is the space-time worm, and the stuff is the temporal parts of the worm. However, this characterization fails to satisfy the definition of 'temporal part,' since it is thing-quantifiers, not stuff-quantifiers, that are used to define temporal parts. But it is open to the MaxConist to offer a new definition of 'temporal part' using stuff-quantifiers.[19] A consequence of this is that 'temporal part' becomes a mass term, not a count-noun, which seems odd. But perhaps not so odd for the advocate of stuff. If you think stuff can bear properties like redness, you probably think stuff can be temporal parts of objects. Problem solved (I think). If you're a MaxConist who believes space and time are continuous and who makes a distinction between things and stuff, then you can offer a new definition of 'temporal part' that eschews 'x is a temporal part of y at t' and uses stuff-quantifiers. If you call the temporal parts of a simple's space-time worm 'stuff,' then you will think temporal parts are not proper parts, and that therefore simples can have temporal parts.

A second account of simples is *Pointy View*, which claims that an object is a simple if and only if it is a point-sized object.[20] This view answers the simple question with 'x is a *pointy* object.' An object is pointy if and only if it *occupies* a point-sized region of space-time; occupation is a relation between

[16]You'd need irreducible stuff quantifiers to do this; I discuss the idea below.

[17]David Lewis discusses The Problem of Temporary Intrinsics in his (1986, pp. 202-204). Very simply, the problem is that persisting objects have incompatible intrinsic properties, and an account is needed of how this is possible.

[18]cf. Markosian (1998), Kleinschmidt (2007), Zimmerman (1997).

[19]Markosian commits to irreducible stuff-quantifiers in his (2004, p. 336).

[20]Hud Hudson defends this view of simples in his (2001) and (2006). The view is also discussed in Markosian (1998) and McDaniel (2007).

an object and a region of space-time:

> *O occupies* $R =_{df.}$ R is the set containing all and only those points that lie within O.

On the Pointy View, for any simple O, if O occupies R, then R contains only one point. Since points are not extended, and simples occupy only one point, this view implies that spatially extended simples are impossible.

Additionally, the Pointy View implies that, necessarily, simples lack temporal parts because, if a simple perdures, then it is temporally extended and thus, it is not point-sized. Proof: assume for *reductio* that there exists a point-sized simple, x, that perdures and exists at t_1 and t_2. If x exists at t_1 and t_2, then x has a temporal part (call it 'y') at t_1 and a temporal part (call it 'z') at t_2. y and z occupy different regions of space-time. So, x has temporal parts located at distinct regions of space-time. So, x is located at more than one region of space-time.[21] Therefore, x is not point-sized. Contradiction. Thus, either x is not a simple, or x does not perdure. The Pointy View of Simples, which is the traditional (if not predominant) view of simples, implies that simples cannot have temporal parts.

A third answer to the Simple Question is the *Indivisibility View*, which answers the Simple Question with 'it is impossible to divide x.' There are two ways to read 'impossible': as metaphysical impossibility or as physical impossibility. If one reads 'impossible' as 'metaphysically impossible,' then it seems like nothing is a simple, for it is difficult to imagine anything having the property of *being-essentially-indivisible*, except, perhaps, things that are essentially point-sized. But, then, this collapses into the Pointy View. If you read 'impossible' as 'physically impossible,' then too many things count as simples. Anything made of the hardest material in a given world will be physically impossible to divide; but it might very well have what we would intuitively consider proper parts.[22] I think neither reading of 'impossible' yields a good answer to the Simple Question.

Suppose you're undeterred by these worries, and you think simples are all and only indivisible things. Could such objects have temporal parts? On the 'metaphysically impossible' reading, they cannot. As I said above, I think

[21] I assume the *Inheritance of Location* (Sider 2007, p. 71): an object is located where its parts are located. That is, for any x and y, if y is a part of x, then for every R, if y is located at R, then x is located at R.

[22] Markosian offers an unbreakable chain as an example in his (1998, p. 220).

the only objects that are metaphysically impossible to divide are those which are point-sized in all worlds in which they exist, and those objects cannot have temporal parts. On the 'physically impossible' reading, simples can have temporal parts. Consider again a chain made of unbreakable material; whether or not the chain has temporal parts has no bearing on its physical indivisibility.

The final answer to the Simple Question is the *Brutal View of Simples*.[23] The proponent of the Brutal View claims that there is no correct, non-circular, non-mereological answer to the Simple Question. That is, there is no informative set of necessary and sufficient conditions for an object's being a simple. The only criterion we have to guide us in our quest to find which objects are simples is that simples lack proper parts. And the only criterion we have to guide us in our quest to find out which parts are proper parts is that proper parts are those parts of a whole of which the whole is not a part. Temporal parts are parts of a whole of which the whole is not a part, so they satisfy that criterion. Without answering the Simple Question and thus filling out the concept of a proper part, the most intuitive reading of the Brutal View implies that simples must lack temporal parts.

I have surveyed various answers to the Simple Question, and I hope to have shown that although MaxCon allows for simples to have temporal parts, it comes at the cost of denying certain intuitions and/or accepting other controversial theses. On most views, simples cannot have temporal parts.

2 Implications

If simples lack temporal parts, they must persist either by enduring or exduring. This has interesting implications. First, I take it that perdurantism is construed, like most metaphysical theories, as metaphysically necessary. That is, perdurantism implies that:

> Necessarily, for any object x and any times t_1 and t_2, x exists at t_1 and t_2 only if x has a temporal part at t_1 and t_2.

If perdurantism is true, then persisting simples are metaphysically impossible; if anything persists, it is composite, since it will have at least two temporal parts as proper parts. So if persisting simples are possible, then

[23] Kris McDaniel argues for the Brutal View in McDaniel (2007).

perdurantism cannot be a necessary truth. It is at best contingent, holding in worlds that do not contain persisting simples, or possibly holding for composite objects in all worlds. In that case, in worlds containing persisting simples and persisting composite objects, at least two theories of persistence are correct. But if either endurantism or exdurantism must account for persisting simples, and since either theory is able to account for persisting composite objects, why think that composite objects perdure?

Second, *mereological nihilists* believe that there are no composite objects.[24] Thus, the only physical things that exist are simples. Since simples endure or exdure, the mereological nihilist must believe that every material object in the world endures or exdures, and no material thing perdures. However, she can still hold that immaterial objects perdure.

Third, Trenton Merricks has argued that no world can contain both enduring and perduring entities.[25] He argues that: 1) endurantism implies presentism, 2) perdurantism implies eternalism, 3) it is not the case that both presentism and eternalism are true, therefore 4) it is not the case that both endurantism and perdurantism are true. If Merricks is correct, then any world containing enduring simples contains no perduring objects; only in worlds where everything is composed of exduring simples or atomless gunk can there exist perduring objects.

3 Conclusion

Inasmuch as theories of persistence seek to describe continuation through time, they ought to account for how every object (or at least every physical object) continues through time. The theory of perdurance suffers from an inability to account for extended simples' persistence. This counts against perdurantism. The perdurantist has a few options. First and most obviously, the perdurantist can adopt a MaxCon view of simples. Then she can follow Markosian in making the things/stuff distinction, call temporal parts 'stuff,' and treat them as conceptual parts.

[24]Examples include Cian Dorr (2002, especially pp. 23-76), Trenton Merricks (2000) and (2003), and Peter van Inwagen (1990). Neither Merricks nor van Inwagen are strict mereological nihilists. Merricks answers the SCQ with something like 'the xs exhibit a non-redundant top-down causal power' (2003) and van Inwagen answers it with 'the xs are interrelated by *Life*,' where *Life* is a relation the xs bear to one another if their activity constitutes a life. Basically, van Inwagen answers the SCQ with 'y is a living thing' (1990).

[25]Merricks (1995).

Second, the perdurantist can hold to the metaphysical impossibility of simples. Since it is quite easy to conceive of an object lacking proper parts and difficult to think of an argument for the impossibility of simples, this is probably not the route the perdurantist will want to take.

Third, the perdurantist can say that when we talk about simples having no proper parts, we're only talking about *spatial* parts. Unfortunately, no definitions of simples make this explicit, so this response seems ad hoc. Perhaps the perdurantist can claim that simples are instantaneous, and suitably related simples at different times compose a simple*, where a simple* is a four-dimensional object composed of all and only simples and mereological sums of them. While it is not itself a simple (since it has temporal parts which are proper parts), there is no instant at which it exists and is not a simple, and all of its instantaneous temporal parts are simples. Of course, we are no longer talking about persisting simples, but persisting simples* composed of instantaneous simples. This, then, amounts to the denial of persisting simples, and ought to be avoided.

What conclusions ought to be drawn from this? Perdurantists may not claim that temporal parts are not proper parts; after all, they *want* temporal parts to be proper parts. If they aren't proper parts (and they certainly aren't improper parts), then in what sense are they "parts?" So, if they are parts at all, they must be proper parts.

One could make the case that this is a strong argument against perdurantism, since persisting simples seem metaphysically possible. The perdurantist could argue, however, that while simples cannot perdure, "spatial simples" (that is, simples having no proper spatial parts) can, and supplement that with the claim that spatial simples is what we've been interested in all along. However, that will be a tough argument to make. The role that simples play in classical extensional mereology is that of objects lacking proper parts, and "proper part" is a term defined in terms of other mererological notions. To add wording about spatial parts into the definition is a departure from classical extensional mereology, and thus ought to be accompanied by very good reasons.

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