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Abstract

This paper addresses a mereological paradox which faces proponents of endurantism, the theory of persistence according to which objects may be wholly located at several times. The paradox is intended to demonstrate that endurantism is false because it entails that enduring objects are both 3D and 4D. I offer three ways for the endurantist to avoid the paradoxical conclusion by demonstrating that the fusion principle required to generate the paradox is untenable.

Currently Persisting Paradoxes: Getting Clear about Endurantism

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Abstract

This paper addresses a mereological paradox which faces proponents of endurantism, the theory of persistence according to which objects may be wholly located at several times. The paradox is intended to demonstrate that endurantism is false because it entails that enduring objects are both 3D and 4D. I offer three ways for the endurantist to avoid the paradoxical conclusion by demonstrating that the fusion principle required to generate the paradox is untenable.

One central thesis championed by many endurantists¹ is what has been called *multi-location*. An object is multi-located if it exists at two or more distinct space-times. Very roughly, endurantists believe that a persisting object is multi-located at each of the times during which it exists. Just as we can imagine an object existing at more than one place at one time, so we can conceive of an object existing "wholly" at multiple times. If this thesis were undermined, it would be a significant and possibly fatal blow to the endurantist's theory. Stephen Barker and Phil Dowe² present a series of related paradoxes which, based largely on mereological notions, supposedly cause a lot of problems for the endurantist thesis of multi-location. I will show that these paradoxes fail to be troubling for the endurantist because it is open to the endurantist to question the legitimacy of the mereological fusion required to generate them.

Although Barker and Dowe present several paradoxes, they are all very similar and, as far as I can tell, rely upon the same mistaken fusion principle. I will, therefore, only address the central mereological paradox. The paradox is formulated in a way which assumes eternalism about space-time, but this is no serious concern since many

¹ See for example (McCall & Lowe, 2006)

² (Barker & Dowe, Paradoxes of Multi-Location, 2003), (Barker & Dowe, Endurance Is Paradoxical, 2005)

(perhaps most) endurantists assume eternalism anyway. According to Barker and Dowe, if one accepts multi-location, then one is forced to conclude that enduring entities are both three- and four-dimensional in nature. Let's first look at a summary of the paradoxical argument.

The Paradox

Consider an object, O , which persists from time t until t^* . For simplicity, imagine that O is a small spherical object. Suppose further that O is multi-located throughout the space-time region, R , bounded by t and t^* . R can be divided into sub-regions r_i , and O is located at each sub-region r_i within R . Call the particular manifestation of O at a given sub-region an O_r . Intuitively, each O_r is identical to O , since O is multi-located, and O is a three-dimensional persisting sphere; so each of the O_r s is a three-dimensional thing. Now suppose that we take the mereological sum or fusion of all of the O_r s within R . Call this the $F(O_r)$. $F(O_r)$ is such that it is temporally extended by having temporal parts, the O_r s of which it is a fusion, and so $F(O_r)$ must be a four-dimensional entity. However, $F(O_r)$ is just the fusion of identical entities O_r , so $F(O_r)$ must just be identical to every O_r . But each O_r is identical to O , and O is three-dimensional. Therefore, $F(O_r)$ is three-dimensional. So $F(O_r)$ is both three- and four-dimensional, and since $F(O_r)$ is identical to O_r is identical to O , it follows that O is also both three- and four-dimensional. This is our paradox.

There have been a couple responses to this paradox³, and at least one of them⁴ points out what I believe to be essentially wrong with the paradox. Namely, it is not at all clear that O could be a genuine fusion of itself. More fundamentally, one might worry that the fusion principle is being taken with too much metaphysical seriousness and that a proper investigation into its nature should be made before we accept the paradoxical conclusion. Below I will address this concern and try to do the requisite investigation. Before we go into this, however, let's look at one solution which has generally been ignored in the literature: mereological nihilism.

Nihilism

Mereological nihilism⁵ is the thesis that there are no instances of composition. That is, however many mereological objects there are, each is a partless simple, and fusions or sums are strictly impossible. There are no objects of ordinary discourse such as tables and chairs. There are lumps of mereological simples arranged chair-wise and table-

³ (McDaniel, 2003), (Beebe & Rush, 2003)

⁴ (Beebe & Rush, 2003)

⁵ The pluralistic version: see (Sider, *Against Parthood*, 2013), and (Schaffer, 2007)

wise, and these lumps have all of the causal powers necessary to be considered ordinary everyday objects.⁶

If nihilism is true, then Barker and Dowe's paradox is not formulable, since there can be no F(Or) in the first place because there cannot be a fusion of anything. Fusions are simply not possible. But the ability of the Ors to be fused into F(Or) is necessary for the conclusion that O is both three- and four-dimensional.

What we can learn from this is that in order to subvert the paradox, the endurantist only needs to show that a fusion of the Ors is not possible. Below I will show how this can be done without recourse to mereological nihilism. Even if I am not successful, it is still open to the endurantist to endorse nihilism—an acceptable conclusion for those with a very strong aversion to four-dimensionalism.⁷

Fusion

The problem then lies in a mistaken understanding of the fusion principle. The paradox is given in somewhat a rough fashion in that it glosses over the importance of certain hidden premises. For example, how strongly are we to be committed to the fusion principle in the first place? It is assumed that the fusion of the Ors is just plain old fusion and that the fusion principle applies equally to multi-located objects as it would to anything else. The paradox is supposed to show that endurantism is false because multi-location is impossible, but why should we not think instead that certain kinds of fusions are impossible? To explore this further let's look at what it would mean for something to be multi-located in space.⁸

Take an object, O, that is multi-located in space. Let's not worry about how O persists through time for now. We can focus on a solitary instant if we want. Take O at an instant. O is multi-located over a spatial region, R. Let R contain only two subregions, *here* and *there*, which are five centimeters apart. Then O exists both *here* and *there*. Call the manifestation of O at *here*, O_{here}, and at *there*, O_{there}. Then O_{here} and O_{there} are five centimeters apart. Now O_{here}, O_{there}, and O are identical, since O is wholly present at both locations.

⁶ Indeed: a large motivation for Merricks' defense of nihilism (Merricks, 2001) involves the fact that lumps have the same causal powers as the supposedly existing objects which they do not in fact compose, and that composition is therefore ontologically redundant.

⁷ Characterized either as perdurantism (Heller, 1990); Stage theory (Sider, Four-Dimensionalism, 2001) and (Hawley, 2001); or (possibly) chain-theory (Brennan, 1988).

⁸ Barker and Dowe (Barker & Dowe, Paradoxes of Multi-Location, 2003) use spatial examples to their advantage and claim that it is no gross spatialization of time to do so; it might be a bit *ad hominem*, but I see no reason we cannot do the same.

Suppose that we take the fusion of *Ohere* and *Othere*. Call it $F(O)$. On the one hand, $F(O)$ just is the fusion of O itself. According to classical mereology,⁹ the fusion of O just is O . Then it must be the case that the fusion of O is identical to $F(O)$ since the objects being fused by $F(O)$ are each identical to O .

This is all well and good, but we can easily demonstrate a paradoxical conclusion from this. *Ex hypothesi*, *Ohere* and *Othere* are five centimeters away from one another. If $F(O)$ is a genuine entity in our ontology (which our commitment to mereology suggests it is), then $F(O)$ has a certain intrinsic property which it would seem that O lacks.¹⁰ Namely, $F(O)$ has the property of there being five centimeters between its parts. $F(O)$ has the property of *Ohere* being five centimeters from *Othere*.¹¹ But we know that *Ohere* is identical to O is identical to $F(O)$. So if *Ohere* has the property of being five centimeters from *Othere*, then $F(O)$ has the property of being five centimeters from *Othere*. *Othere* is identical to O . So $F(O)$ is five centimeters from O . But O is identical to $F(O)$. So O is five centimeters from itself. It might be claimed that this is nothing paradoxical but is instead just a trivial feature of somethings being multi-located. But notice that since *Ohere* is identical to O , we could conclude that *Ohere* is five centimeters from itself which does seem genuinely paradoxical.

What are we to conclude from this? One solution is to say, with Barker and Dowe, that this paradox proves that multi-location is impossible. However, it seems an equally good solution, to me at least, to accept the possibility of multi-location with the proviso that multi-located objects cannot be classically fused. By classically fused, I mean that it is a derivable theorem of classical extensional mereology that the fusion principle is idempotent, i.e. a thing fused with itself just is itself.¹² Multi-location is a strange possibility, to be sure, and it is not surprising if our intuitions start to break down here a bit. In light of this, it is not clear why we should think that if multi-located objects are possible that their fusions would be classical fusions, or even that they could be fused at all. The strength of the conclusion that endurantism is false because multi-location is impossible is directly proportional to the plausibility of a classical fusion principle. If one simply assumes the strong classical fusion principle, then the paradox can be generated, but it's far from clear that the endurantist should be compelled to accept classical fusion.

⁹(Simons, 1987)

¹⁰ See Lewis (Lewis, 1988) for an example of intrinsic relations obtaining between two simples.

¹¹ It has to be assumed that the properties of the parts of an object are properties of the object—but this should be no problem in the identity case where $F(O)$ is identical to either *Ohere* or *Othere*.

¹² See (Simons, 1987, p. 37).

Other Solutions

What are an endurantist's options then? If one wishes to avoid the paradox, then there are two options that I see as open to the endurantist. First, one might simply deny that fusions of multi-located objects are possible in the first place. This could be done either by accepting mereological nihilism, or by developing a fusion principle which restricts composition in some way which rules out fusions of multi-located objects. Secondly, one might develop a fusion principle which, although not ruling out fusions of multi-located things, fuses a multi-located object into an object which is non-identical to the parts of the fusion. Let's look briefly at these two options in a little more detail.

As we have already seen, it is still open to the endurantist to deny that composition is possible at all. In that case, it is not possible to generate F(Or) as a four-dimensional object, and so it is impossible to generate the paradox that O is both three- and four-dimensional. In this case, it is not even possible to claim that O is three-dimensional, unless O is a three-dimensional mereological simple.

Other than mereological nihilism, the endurantist might try to either develop a new fusion principle which restricts composition or qualify the existing fusion principle. It may seem *ad hoc* to do this, but there may be good metaphysical reasons to do so. Mereology, insofar as it is an axiomatic system is in general metaphysically austere. One may prefer different mereological systems for a variety of different reasons, and having strong intuitions about what is and is not metaphysically possible seems to be at least a somewhat justifiable reason for qualifying the classical fusion principle. To my knowledge, classical mereology does nothing by way of reference to multiply located individuals, so one can feasibly argue that the property of idempotence derivable from the classical system applies only to a single individual that is not multi-located.¹³ And if it turns out that such a principle cannot be derived from the classical system, then if our metaphysical intuitions are powerful enough, it is justifiable to develop one.

Developing a fusion principle which does not rule out fusions of multi-located objects but which treats such fusions as different from a fusion of a singly-located object itself is a much more intriguing possibility. To get a feel for what would motivate this kind of move, consider regular old fusions in contradistinction to fusions of an object with itself whether multi-located or otherwise. Ordinarily, when parts of a fusion are fused, the resulting fusion has properties not present in the parts. The fusion is, in some sense, over and above its parts in this way. It is a distinct existence. In addition to usually having contingent properties that its parts lack, ordinary fusions have certain features which a fusion of an object with itself necessarily lacks. An ordinary fusion, for example, has proper parts, but it is not possible for the fusion of an object with itself to have proper parts because objects are only improper parts of themselves. It looks as

¹³ It remains for someone to work this out formally, of course.

though only the very strange fusions of things with themselves result in violations of this pattern. Intuitively, it seems that while the fusion of a thing with itself singly-located may just be itself, the fusion of a multi-located thing might have properties differing from the constituent (improper) parts. In other words, if a thing is multi-located and then fused, the fusion is distinct from what would be the fusion of that same thing if it were only singly-located.

If this sounds impossible, it is worth noting that Barker and Dowe¹⁴ themselves give an example which makes this at least somewhat plausible. They imagine a time traveler who travels back in time several times and sits with himself on a bench. The fusion of the multi-located time traveler takes up the whole bench. It is claimed that since each time traveler is a human and no human is as wide as a bench that therefore, since the fusion of the time traveler just is himself, the fusion of the time travelers does not take up the whole bench, contradicting the fact that they (the time traveler's copies) are indeed taking up the whole bench. Although Barker and Dowe take this to be a counterexample to the multi-location view, one might simply bite the bullet and admit that fusions of multi-located time travelers have properties over and above their improper parts, such as being a bench wide.

If this solution is accepted, then the supposed paradox that O is both three- and four-dimensional is not paradoxical at all.¹⁵ We should not be surprised to find that the fusion of the Ors results in an object F(Or) which has properties that none of the Ors has because F(Or) is not identical to O in this case.

Conclusion

The mereological paradox of multi-location is only successful if one accepts the classical fusion principle as fundamentally more intuitive than the possibility of being multi-located. We have seen that there are three ways out of the paradox. The endurantist has open to her any of the following solutions. She can adhere to mereological nihilism, in which case no paradox can be generated because the fusion of the Ors is impossible. Alternatively, she could deny or modify the existing classical fusion principle so that either singly-located objects cannot be fused with themselves in the first case or multi-located objects cannot be fused in the second. Finally, the endurantist might modify the classical fusion principle so that fusions of several objects (even if they are identical) always result in the fusions having properties which their constituent parts lack. In the latter case, the fact that O is both three and four-dimensional is not paradoxical at all.

¹⁴(Barker & Dowe, Paradoxes of Multi-Location, 2003)

¹⁵ This solution may be preferred by those who are skeptical as to any genuine difference between three- and four-dimensionalism, see (Hirsch, 2008), and (McCall & Lowe, 2006).

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