EXTENDED SIMPLES AND THE ARGUMENT FROM HETEROGENEITY

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An extended simple is an object which is extended in space (or spacetime) but lacks proper parts. Perhaps the most commonly discussed argument against the possibility of extended simples is what I will call the *argument from heterogeneity*:[1]

    (1) If extended simples are possible, then heterogeneous extended simples are possible.

    (2) Heterogeneous extended simples are not possible.

       Therefore, extended simples are not possible.

I use the term *heterogeneous extended simples* to refer to extended simples which exhibit intrinsic qualitative variation across their spatial (or spatiotemporal) axes. To get a handle on what this means, imagine a wall painted with black and white stripes, or a white tie which has pink polka-dots on it.[2] On the assumption that colour properties are intrinsic, such objects are (spatially) heterogeneous. Their colour properties are non-uniform across at least two spatial dimensions. Premise (1) of the argument above states that, if extended simples are possible, extended simples with heterogeneous properties like these are also possible.

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[1] See e.g., Markosian (1998), Parsons (2000), McDaniel (2003; 2009), Hudson (2005; 2007), Spencer (2010; 2014), Jaeger (2014), and Gilmore (2018).

[2] See Parsons (2004) for a more detailed overview of heterogeneous properties.

Most of the attention in the literature has been on premise (2) and ways of rejecting it.[3] In support of premise (2), it is argued that what it is to be heterogeneous is to be (for want of a better name) *mereologically heterogeneous*. This is just to say that, necessarily, to have a heterogeneous property is just to have proper parts with certain homogeneous properties (like *being black* or *being white*). On this view, what it is for something to be black and white, for instance, is (at least roughly) for it to have black proper parts and white proper parts. And the same goes for all other heterogeneous properties. Facts about heterogeneous properties of objects reduce to facts about the homogenous properties of their proper parts.

Here is the key premise:

(MH) Necessarily, to be heterogeneous is to be mereologically heterogeneous.

It is impossible for an extended simple to be mereologically heterogeneous since extended simples lack proper parts. Thus, if (MH) is true, then it is impossible for an extended simple to be heterogeneous. Premise (2) follows. Those who reject premise (2) therefore argue in favour of accounts of heterogeneous properties on which it is possible for something to have heterogeneous properties without having proper parts. That is, they argue in favour of the possibility of *non-mereologically heterogeneous* objects. Perhaps the most obvious way to do this is to index homogeneous properties to regions—the wall is black at regions $r_1...r_n$ and white at regions $r_n...r_m$—though a number of more sophisticated (and arguably better) accounts exist.[4]

I will not have anything to say about the debate over (MH). Even if (MH) is true, I do not think the argument from heterogeneity is a good argument against the possibility of

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[3] See e.g., Markosian (1998; 2004; 2015), Parsons (2000), and McDaniel (2003; 2009), Hudson (2005; 2007), Spencer (2010; 2014) and Jaeger (2014) for discussion of the argument on both sides.

[4] See Markosian (1998; 2004; 2015), Parsons (2000), and McDaniel (2009) for three different alternatives.

extended simples.[5] I think this not because I think premise (1) of the argument is indefensible, but because I think the best defences of that premise undermine (MH). Thus, although there seem to be strong arguments for each premise, these arguments cannot all be sound.

1. FOUR ARGUMENTS FOR PREMISE (1)

Let us consider some reasons for endorsing premise (1). Most authors writing on the subject have said little or nothing in defence of this premise. Presumably, this is because it seems very plausible, and because defenders of extended simples are generally inclined to accept it. Nevertheless, arguments can be given in its defence. Four kinds of argument in particular seem to me to have merit. I outline a version of each kind of argument below.

The Argument from Conceivability. Ideal positive conceivability entails metaphysical possibility.[6] (Weaker version: conceivability is a good guide to metaphysical possibility.) On the assumption that extended simples are possible, heterogeneous extended simples are ideally positively conceivable. Therefore, if extended simples are possible, then heterogeneous extended simples are possible as well.[7]

The Argument from Recombination. If extended composite objects can have heterogeneous properties, and if extended simples are possible, then—by plausible principles of recombination—extended simples can have heterogeneous properties too. Extended

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[5] This is not to say that I think the argument is not an important one. I think it is, at very least for the attention it draws to issues relating to heterogeneous properties.

[6] See Chalmers (2002) for an overview and defense of such a position. Similar arguments to the argument from conceivability, can of course, be made with other notions of conceivability.

[7] A similar argument might be made in terms of consistency (or lack of inconsistency) of sentences describing heterogeneous extended simples. This kind of argument for possibility is not popular, however, and faces the same problem that I raise for the argument from conceivability below. Thus, for the sake of brevity, I focus on conceivability alone in what follows.

composites can have heterogeneous properties; therefore, it is possible for extended simples to have heterogeneous properties too.

The Argument from Strangeness. If extended simples were possible, and heterogeneous extended simples were not, this would be very strange. If you were to try to draw a line on an extended simple, for instance, you wouldn't be able to do so, at least without turning it into a composite object (Hudson, 2005, p. 109; 2007, p. 295).[8] But why not? What would stop you? It is unbelievable that you could not draw a line on an extended simple, or, more generally, cause an extended simple to be heterogeneous. Therefore, if extended simples are possible, heterogeneous extended simples are possible.

The Argument from Insufficient Reason. There are no brute or unexplainable impossibilities. If there is no reason for something to be impossible, then it is possible. (Weaker version: if there is no reason for something to be impossible, then it is likely to be possible.) If extended simples are possible, then there is no reason why heterogeneous extended simples should be impossible. Therefore, heterogeneous extended simples are possible if extended simples are.

These four arguments (allowing for variation in the specific details) appear to represent the most promising ways of defending premise (1). Arguments like these (and in particular, arguments from conceivability and recombination) are given for the possibility of non-actual entities quite generally. [9] One wouldn't expect things to be any different with

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[8] Note that although Hudson puts forward a version of the argument from strangeness he does not appear to take it to be decisive.

[9] One of the most famous examples of a conceivability argument is the zombie argument against physicalism in the philosophy of mind (e.g., Kripke, 1972; Chalmers, 1996, pp. 93–171). Recombination arguments appear frequently in metaphysics (e.g., Sider, 2000; McDaniel, 2007; Saucedo, 2011; Kleinschmidt, 2016). Spencer (2010, p. 180) offers a version of an argument from strangeness.

extended simples.[10] Furthermore, it is arguments like these that support the possibility of extended simples. For this reason they are not arguments that defenders of extended simples can easily reject.

2. THE PROBLEM

The four arguments outlined above are fairly persuasive. Given that (MH) itself has support, and therefore premise (2) as well, the argument from heterogeneity seems to pose a genuine threat to the possibility of extended simples. How, then, can it be a bad argument?

The problem is that each of the four arguments for premise (1) also motivates rejection of (MH) and with it premise (2).

Consider the argument from conceivability. I think it is true that, on the assumption that extended simples are possible, heterogeneous extended simples are conceivable. But just as one can conceive of an extended simple which has heterogeneous properties, one can also conceive of an extended composite, which is exactly like it, besides lacking proper parts, and which has the same heterogeneous property. Note that the heterogeneous property conceived of must be a non-mereological one. Extended simples cannot, after all, be mereologically heterogeneous. Proponents of the argument from conceivability must therefore conclude that extended composites with non-mereologically heterogeneous properties are possible. That is in plain contradiction with (MH), which, recall, states that, necessarily, to be heterogeneous is to be mereological heterogeneous. According to (MH), there can be no non-mereologically heterogeneous entity, simple or composite.

Now of course it might not be true that heterogeneous extended simples are conceivable. No contradiction would then arise. However the argument would then fail to

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[10] Other arguments for possibility of course exist—see e.g., Sider (1993)—but those arguments seem to have no application here.

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support premise (1), as well. Thus, the argument does not provide a way to support premise (1) without undermining premise (2).

Next is the argument from recombination. Suppose it is true that if extended composite objects can have heterogeneous properties then (by some principle of recombination) so too can extended simples if they are possible. This can only be the case if the heterogeneous properties subject to recombination are non-mereological. The property of having some black proper parts and having some white proper parts, for instance, clearly cannot be freely recombined with extended simples given that they have no proper parts. Thus, the recombination argument is plausible only if it is possible for extended composites to be non-mereologically heterogeneous. That, however, contradicts (MH). The argument from recombination, then, cannot support premise (1) of the argument from heterogeneity without undermining premise (2). Anyone who finds it persuasive must already be implicitly committed to the possibility of non-mereologically heterogeneous composites, and so committed to denying (MH).

Next, consider the argument from strangeness. Assuming that extended simples are possible, there does indeed seem to be no obstacle to drawing a line on an extended simple (and having it remain simple). Imagine taking a pencil and running it down what seems like the side of an extended simple. It seems unbelievable that the pencil would not leave a mark. And if it would leave a mark, then heterogeneous extended simples are possible if extended simples are. This time one might think that the same argument cannot be used to show that non-mereologically heterogeneous composites are possible. Surely one *could* draw a line on an extended composite even if there were no non-mereologically heterogeneous properties.

I don't disagree. However, this response equivocates upon the term "draw a line on". It is indeed possible to draw a line on an extended composite if there are no non-mereologically heterogeneous properties; but what drawing-a-line-on consists in in that case

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is drawing a line on a line-shaped proper part of the composite and nothing more. In carrying out this action, one would still fail to draw a line on the composite in the sense of making a mark on *it* and not merely on one of its proper parts. That is, one would still fail to cause the composite object to instantiate a non-mereologically heterogeneous property. Once we hold fixed the meaning of the term "draw a line on" it is clear that one can no more draw a line on an extended composite than one can draw a line on an extended simple if there are no non-mereological heterogeneous properties. If it is unbelievable that one could not cause an extended simple to instantiate a non-mereological heterogeneous property (for that is the only kind of heterogeneous property it could instantiate), then it should be unbelievable that one could not cause an extended composite to instantiate such a property as well. What would stop the pencil from making a mark on the extended composite itself and not merely on one of its proper parts? Proponents of the argument from strangeness should thus conclude that it is possible for extended composites to be non-mereologically heterogeneous. This means also rejecting (MH).

The argument from insufficient reason has the same flaw as the others. If there is no reason why heterogeneous extended simples shouldn't be possible if extended simples are, then there is no reason why non-mereologically heterogeneous extended composites shouldn't be possible as well. But the possibility of non-mereologically heterogeneous composites contradicts (MH). Worse, the claim that, if extended simples are possible, then there is no reason why heterogeneous extended simples should be impossible is flatly inconsistent with the usual arguments for (MH). Those arguments require that there is something about non-mereologically heterogeneous properties that suggests they are impossible. Consider, for example, an objection to the relativisation approach: namely that *black* and *white* are intrinsic properties and not properties had relative to places (*cf.* McDaniel, 2003, p. 273). Insofar as this objection favours (MH), it must be because it

identifies something about heterogeneous colour properties which reduce to homogenous colour properties had in relation to places which suggests that they are impossible. In this case, what suggests that they are impossible is the fact that *black* and *white* are (by their very nature) not relational properties, and so cannot stand in relation to places. Notice, though, that if this is correct, that same fact also explains why any such heterogeneous properties are impossible. But if *black* and *white* being intrinsic explains why any such heterogeneous properties are impossible, surely it also explains why it is impossible for extended simples to instantiate such properties, even on the assumption that extended simples are possible. Thus, the usual arguments for (MH) imply—contrary to the argument from insufficient reason--that there are reasons for heterogeneous extended simples to be impossible, even if extended simples are possible.

Each of the four arguments, then, fails to support premise (1) of the argument from heterogeneity without undermining support for premise (2). This, of course, does not show conclusively that no argument can be given for premise (1) which does not undermine premise (2). But the four arguments discussed seem to cover the usual arguments for possibility that philosophers have found convincing (or at least those which apply in this context). It is hard to see what other good options there are.

3. THE MAXIMALLY CONTINUOUS VIEW OF SIMPLES

For a defence of premise (1) to not undermine support for premise (2) it would need to establish that (non-mereologically) heterogeneous are possible if extended simples are without also implying that non-mereologically heterogeneous extended composites are possible (independent of the possibility of extended simples). It would therefore have to rely on some difference between extended simples and extended composites. The only such difference that defenders of extended simples *must* accept (on pain of contradiction) is that

extended simples lack proper parts. That, however, would only help establish premise (1) if the fact that extended simples lack proper parts entails, if they are possible, that it is possible for them to instantiate heterogeneous properties. I can see no reason to think this is true. That leaves us with arguments which appeal to further differences between extended simples and extended composites.

I know of only one such difference which could work. According to the maximally continuous view of simples (*MaxCon*) championed by Markosian (1998),[11] if two extended simples are brought into contact they are destroyed and replaced by a new extended simple (p. 225). Since the same cannot be said of extended composites, MaxCon opens the door for the kind of argument we are looking for. Indeed, McDaniel (2003, pp. 273–274) uses just such an argument to challenge MaxCon.

Here is a variant of the argument given by McDaniel. If extended simples are possible, then it is possible to bring two extended simples, one blue and one gold, into contact. According to MaxCon, the simples would be destroyed and replaced by a new simple. The new simple would (presumably) be blue and gold, and so a (non-mereologically) heterogeneous extended simple. Premise (1) is therefore true if MaxCon and some plausible assumptions are. Note also that the same argument cannot be used to show that non-mereologically heterogeneous extended composites are possible. For that, it would need to be the case that bringing two extended composites, one blue and one gold, into contact guaranteed the existence of a non-mereologically heterogeneous object. But it does not. At best, there is reason to think that a mereologically heterogeneous object—one with a blue proper part and a gold proper part—would be created. Thus, the argument cannot be used to also show that non-mereologically heterogeneous composites are possible.

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[11] Roughly, MaxCon states that an object is simple iff it spatially continuous and not in contact with any other spatially continuous object.

We have what we were looking for; however, McDaniel (2003)'s argument is targeted only at MaxCon, and so shows—at best—only that extended simples are impossible if, were they possible, MaxCon would be true.[12] Defenders of extended simples can thus escape the argument by rejecting MaxCon.

Without a strong argument for MaxCon, then, McDaniel (2003)'s argument cannot be used to convincingly argue against the possibility of extended simples. But aren't there arguments for MaxCon? There are; however, most of the arguments that Markosian (1998) offers for it are arguments against views which preclude the possibility of extended simples. These arguments support not only MaxCon but also any view of simples which allows for the possibility of extended simples. The only argument that Markosian gives which appears to favour MaxCon over other views consistent with extended simples is an argument from intuition. The intuition is that if one were to look inside an object and find it to be continuous, one could justifiably conclude that the object is simple (Markosian, 1998, §7). In my opinion, this argument is not very strong. I do not share Markosian's intuition, and I suspect that many defenders of extended simples would not share it either. It seems entirely possible that a maximally continuous object—e.g., a perfectly solid sphere, to use Markosian's favoured example—could have proper parts. Thus, I don't think Markosian's argument is convincing.

Not only is the argument not convincing, but there are reasons to reject MaxCon.[13] We have already come across two. First, MaxCon entails, counter-intuitively, that extended simples are destroyed if they come into contact.[14] Second, it entails, counter-intuitively, that it is impossible for a maximally continuous object to have proper parts. There is no reason that I am aware of for any defender of extended simples who finds these consequences

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[12] Although the argument he gives in his (2003) targets only MaxCon, McDaniel does take the argument from heterogeneity to apply to extended simples generally (see McDaniel, 2009). He offers no argument for premise (1) of the general version of the argument, however, and in his (2009) no longer finds premise (2) plausible.

[13] See McDaniel (2003) for critical discussion of MaxCon, and Markosian (2004) for a response.

[14] Markosian, of course, has a response, but even he admits that this is counterintuitive (see pp. 225–226).

unpalatable not to reject MaxCon.[15] Overall, then, there seem to be no good reasons to endorse premise (1) of the argument from heterogeneity which do not also undermine premise (2).

4. CONCLUDING REMARKS

To recap, let me put the argument of the paper in a slightly different way. Opponents of extended simples argue that, if extended simples are possible, then heterogeneous extended simples are. But heterogeneous extended simples face the spatial analogue of the problem of temporary intrinsics: the problem of explaining how the same object can instantiate incompatible intrinsic properties at different times (Lewis, 1986, pp. 202–205). The spatial analogue is the problem of explaining how the same object can instantiate incompatible intrinsic properties at different places (*cf.* McDaniel, 2003; Hudson, 2005, p. 108). If all heterogeneous objects are mereologically heterogeneous, the spatial analogue of the problem is (it seems) easy to solve: an object can be both black and white by having some proper parts which are black and some which are white.[16] Since extended simples cannot be mereologically heterogeneous, this solution is not available to defenders of extended simples.

The problem with this argument is that, insofar as it is plausible that heterogeneous extended simples are possible if extended simples are, it is also plausible that non-mereologically heterogeneous composites are possible. Thus, if defenders of extended

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[15] One could, for instance, adopt the Brutal View of simples (McDaniel, 2007), which says that there is no non-circular and informative answer to the question which MaxCon seeks to answer: namely, 'What are the necessary and jointly sufficient conditions for an object's being simple?' (see Markosian, 1998). Alternatively, there seems to be no reason why one could not simply reject MaxCon without offering an alternative.

[16] Arguably, the problem is not really so easily solved, since this solution requires giving up on the idea that it is the object itself that instantiates *black* and *white* (*cf.* Botterell, 2004, on the temporal version of the problem.) In answer to the question, "How can the same object be both black and white?" this "solution" grants that it cannot.

simples run afoul of the problem of spatial intrinsics, everyone does. Qualitative heterogeneity is either a problem for none or a problem for all.

Before concluding, I want to make note of an interesting limitation of the response I gave to the argument from strangeness. The response assumes that extended composites are possible. This assumption, though very plausible, is incompatible with mereological nihilism.[17] Without the assumption, the intuition that one could cause an extended composite to instantiate non-mereologically heterogeneous properties does not support the conclusion that it is possible for there to be non-mereologically heterogeneous extended composites. It supports only the weaker conclusion that *if extended composites are possible,* then non-mereologically heterogeneous extended composites are possible. This conclusion is, of course, consistent with (MH).

Thus, without the assumption that extended composites are possible, the argument from strangeness supports the following claim, and does so without also undermining (MH):

(3) If extended objects (simple or composite) are possible, then non-mereologically heterogeneous objects are possible.

Together with (MH), which entails that non-mereologically heterogeneous objects are impossible, (3) entails that it is impossible for there to be any extended object, *simple or composite*. Therefore, the argument from strangeness supports a view on which, necessarily, the only objects that exist are point-sized.

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[17] Or at least, it is incompatible with the standard version of mereological nihilism which says not only that there are no composite objects but also that this is a necessary truth.

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