Sums and Grounding

NOËL B. SAENZ
University of Illinois at Urbana-Champaign
nbsaenz@illinois.edu
Australasian Journal of Philosophy 96/1 (2018): 102-117.

Abstract. As I will use the term, an object is a mereological sum of some things just in case those things compose it simply in virtue of existing. In the first half of this paper, I argue that there are no sums. The key premise for this conclusion relies on a constraint on what, in certain cases, it takes for something to ground, or metaphysically explain, something else. In the second half, I argue that in light of my argument against sums, Universalism, which is perhaps the most widely accepted answer to the Special Composition Question, is false.

1 Introduction

Philosophers often claim that *mereological sums* are 'automatic' or constitute an 'ontological free lunch'. So, or so the thought goes, once you have got some xs, you have got these xs composing a sum. So when it comes to explaining why it is that the xs compose a sum, that the xs exist will suffice. So if y is a sum of the xs, then the xs compose y simply in virtue of existing. That is, if y is a sum of the xs, then that the xs compose y is grounded in their existing.

Now this view of sums is, we may say, a philosophical view of sums and does not follow from how some define 'sum'. For example, a standard definition of 'sum' has it that y is a sum of the xs if and only if the xs are parts of y and every part of y overlaps one of the xs [van Inwagen 2006: 619]. So understood, all wholes are sums. But this is not how I am understanding 'sum'. Nor is it how others do. Consider Fine (2010, 576), who says of the operation of summation that 'It is indeed distinguished by the fact that it is blind to all aspects of the whole other than the parts from which it was formed'. In saying this of summation, Fine has it that all that matters when it comes to composing sums are their parts. This is their distinguishing trait. So for Fine, sums are a special kind of whole. Indeed, Fine

explicitly rejects that to be a sum just is to be a mereological whole when he says that to deny that there is a nontrivial kind *sum* is "highly counterintuitive, and, if I am right, ... rests on a misconstrual of the relationship between *sum* and *sum of*" (589).

Johnston (2006, 688-89) says something similar when he says

> A sum, unlike a set of sets, or almost every other kind of item, *has no articulated structure* ... Here is a plausible principle of unity for mereological sums, one which explains their utter lack of structure: *All a sum requires of its parts is that they all exist*. That is why the sum of my molecules is no better and no worse a sum than the sum of the Eiffel Tower and my left foot ... The sum is thus a sort of null whole, the limiting case of a whole, a whole *with the least demanding principle of unity, namely just that its elements exist*. (italics mine)

So for Johnston, a sum is not a mere mereological whole (in fact, in spite of accepting all manner and sorts of wholes, Johnston (692-696) goes on to deny that there are sums). It is rather the kind of whole where the only unity required of the parts that will result in their composing this kind of whole is that they exist. This, of course, gets awfully close to (and I am tempted to think just is) my above understanding of 'sum'.

Consider also Baker (2007) who explicitly distinguishes sums from what she calls 'ordinary objects' (182-3), the latter including chairs, tables, hammers, and organisms (182-3), and says, on page 192, that

> Sums come into existence automatically when their parts come into existence: there is a sum whose parts are your left eyebrow and Tony Blair's favorite shirt, simply *in virtue of* the existence of your left eyebrow and Tony Blair's favorite shirt. In this way, sums are ontological free-riders. (italics mine)

For Baker, a sum of the xs is not simply a whole with the xs as parts, where every part of this whole overlaps one of the xs. This does not say enough about what, for Baker, sums are. Rather, and as she explicitly states, a sum is a whole that has its parts simply in virtue of the existence of those parts. And it is this view of sums that I both described above and will be working with in this paper.[1]

[1] Others who work (or at least get close to working) with this view of sums are Barnett (2004, 89), Burge (1977, 98-104), Sanford (2003, 1-2), Simons (1987, 324-25) and van Cleve (2008, 326).

In what follows, I argue that, in the just specified sense, there are no sums and so no things whose parts compose them simply in virtue of existing. I do this by first introducing and arguing for a principle governing grounding (§2). I then show that this principle has it that there are no sums (§3). Next, I defend my argument against sums from objections (§4) and argue that if there are no sums, then Universalism, which is perhaps the most widely accepted answer to the Special Composition Question, must go (§5).

2 Sensitivity

The in-virtue-of relation is a metaphysical explanatory relation. It is what many are calling 'grounding'. So if the *x*s compose a sum in virtue of existing, then their existence grounds their composing this sum.

Consider now the following counterfactual constraint on this relation:

> **Sensitivity.** If the *x*s are G in virtue of being F, then if the *x*s were to exist but not be G, then they would not be F.[2]

Given the explanatory nature of in-virtue-of, Sensitivity is on good footing. After all, what kind of explanation of the *x*s being G would we have if what does the explaining exists in those worlds closest to us where the *x*s exist but are not G?[3] There are modal constraints between facts explained and facts explaining and Sensitivity, at least on the face of it, is a plausible capturing of one of them.

Here are some examples which provide confirming evidence in favor of Sensitivity. Suppose that I am in pain in virtue of being in physical state *S*. Putting this in the antecedent of Sensitivity yields

> If I were to exist but not be in pain, then I would not be in S.

This seems correct. If my being in pain is grounded in my being in S, then in the closest worlds where I exist but am not in pain, I also am not in S (after all, if I were in S, then I would presumably be in pain).

[2] Though this condition on in-virtue-of shares the same name with a condition that Nozick (1981) famously puts on knowledge, nothing in the literature on the latter has had any bearing, even by analogy, with respect to my thoughts on the former.

[3] In talking in terms of closeness of worlds, I do not mean to commit myself to a Lewis-Stalnaker analysis of counterfactuals (Lewis 1973; Stalnaker 1968). I do mean to admit that thinking about counterfactuals in terms of closeness of worlds can be, and almost always is, very useful. Because of this, I will continue to engage in such talk.

Or suppose that an action is good in virtue of being commanded by God. Putting this in the antecedent of Sensitivity yields

> If the action were to exist but not be good, then the action would not be commanded by God.

Again, this seems correct. Surely if an action's being good is grounded in its being commanded by God, then a change across those appropriately close worlds in the action's being good would result in a change across those very same worlds in the action's being commanded by God. If it did not, then it is no longer clear how the action's being commanded by God explains its being good.

Or suppose that the *x*s compose a table in virtue of being arranged table-wise. Putting this in the antecedent of Sensitivity yields

> If the *x*s were to exist but not compose a table, then the *x*s would not be arranged table-wise.

This too seems right. Think about it across time. If the *x*s compose a table in virtue of being arranged table-wise and I were to, in the near future, make it that the *x*s do not compose a table, then I will have made it that they are no longer arranged table-wise. But the reasoning behind this just is the reasoning behind thinking that in those closest worlds where the *x*s exist but do not compose a table, they are also not arranged table-wise.

I have both described and motivated a reasonable modal constraint on grounding. Now I will show that without it, we are not able to yield a certain kind of desired counterfactual. So consider first the largely accepted

> **Necessitation.** If the *x*s are G in virtue of being F, then necessarily if the *x*s are F, they are G.[4]

But Necessitation is too weak. Assuming that counterpossibles can be non-vacuously true (more on this in §3) and that some facts which obtain of necessity obtain in virtue of other facts, we need a modal principle that tells us what would happen if such facts were not to obtain. But Necessitation can do no such thing. Necessitation gives us a strict conditional and so yields counterfactuals that are informative only

[4]Necessitation is accepted by most. See, *inter alia*, Audi (2012, 697), Bennett (2011, 32), Dasgupta (2014, 4), deRosset (2013, 15), Rosen (2010, 118), Saenz (2015, 2196), and Trogdon (2013). For some who reject it, see Dancy (2004), Leuenberger (2014), Skiles (2015), and Zangwill (2008).

when the facts flanking in-virtue-of contingently obtain. But we need counterfactuals that are informative when the facts flanking in-virtue-of necessarily obtain. So we need a principle that delivers a subjunctive conditional that is able to take us to impossibilities.

Perhaps the following will do,

> **Counterfactual.** If the *x*s are G in virtue of being F, then if it were not the case that the *x*s are G, it would not be the case that they are F.

Given that the negation takes wide scope, Counterfactual is weaker than Sensitivity in that it does not require that the world we go to is a world where the *x*s exist.[5] But like Necessitation, it too is too weak. Showing this requires focusing on facts involving things being *essentially* some way.[6] Assume that persons are essentially rational. Assume also that persons are rational in virtue of being human. So we have

> 1. Amy is rational in virtue of being human.

From this, the following seems true:

> 2. If Amy were to exist but not be rational, then Amy would not be human.

Unfortunately, Counterfactual does not give us 2. Given that Amy is essentially rational, the closest worlds where it is not the case that Amy is rational are worlds where she does not exist. These worlds are possible (assuming, of course, that Amy contingently exists). They are not worlds where she exists but is not rational, which are impossible and hence much further away. Or so this is if we assume something very intuitive (Nolan 1997, 550), namely

> **Strangeness of Impossibility Condition.** Any possible world is more similar (nearer) to the actual world than any impossible world.

[5] If the negation took narrow scope, and so if the counterfactual began with

> if it were the case that the *x*s are not G, then ...,

then we would be going to a world where the *x*s are not G and so to a world where the *x*s exist. Counterfactual, it is easy to see, puts no such requirement on the *x*s.

[6] By 'essentially' I have in mind a purely modal notion. Things being essentially some way amounts to their being no possible world where those things exist and fail to be that way. It should be stressed that this notion of 'essentially' is not meant to compete with what is now a more common one according to which essence is not understood in modal terms at all (Fine, 1994).

Impossible worlds are very far. Actuality cannot, if you will, travel to them. But it can travel to possible ones. And given this condition, Counterfactual does not yield 2 from 1 since 2 takes us to impossible worlds whereas, given 1, Counterfactual takes us to possible worlds (worlds where Amy does not exist).[7] So Counterfactual does not give us all of the counterfactuals we want.

Here is another reason to think that Counterfactual is too weak. Assuming 1, Counterfactual gives us

> 3. If it were not the case that Amy is rational, then it would not be the case that Amy is human.

But 3 has very little to do with Amy being rational in virtue of being human. Given that Amy is essentially rational, we have seen that the closest worlds where it is not the case that she is rational are worlds where she does not exist. So if it were not the case that Amy is rational, it would also not be the case that she is tall, creative, a great writer, or a political scientist. Indeed, she would not be anything! So counterfactuals like 3, which involve the denial of something being some way where that something is essentially that way, hold trivially on account of taking us to worlds where the thing we are talking about does not exist. But then what is doing the work in making 3 true is not that Amy's rationality obtains in virtue of her humanity, but that in the closest worlds where it is not the case that she is rational, she does not exist. It is not the failing of rationality which explains the failing of humanity. It is rather the failing of the existence of the thing that is being said to be rational. Given that Amy is essentially rational, whether or not 1 is true, 3 most certainly is. And all this tells against thinking that Counterfactual is enough of what we want. In having a counterfactual constraint on in-virtue-of, we want the truth of our counterfactual claims to result *because of*, and not merely *in spite of*, the operative in-virtue-of claim. Indeed, this just is the motivation in looking for such counterfactual constraints. So we need something stronger. We need something that can appropriately deal with facts involving things being essentially some way.

Let me say a bit more. Given that Amy is essentially rational, then the closest worlds where it is not the case that she is rational are worlds where she neither

[7] I am not, of course, saying that Counterfactual cannot take us to impossible worlds. It can. Just consider a fact which is both grounded and holds of necessity. However, we are not, in the present case, considering a fact which holds of necessity (even though we are considering ones involving an essential attribution). That Amy is rational does not hold of necessity since Amy does not exist of necessity. So even though there are no possible worlds where Amy exists and is not rational, there are plenty of possible worlds where it is not the case that she is rational.

exists nor is human. But that Amy is essentially rational should be neither here nor there when it comes to what counterfactuals result given 1. That is, the truth of the counterfactual that results from 1 should not depend on whether Amy is essentially rational. It should only depend on the *content* of the in-virtue-of claim. We want a principle that, whether or not things are essentially rational, gives us a counterfactual that depends only on Amy's being rational in virtue of being human. But Counterfactual is not such a principle. In it, that Amy is essentially rational interferes. This is bad and motivates the need to put a condition on Amy so as to block her being essentially rational from interfering. But what condition should be put?

Sticking with our example, it would be bad to put conditions such as Amy's being tall, creative, a great writer, or a political scientist. Not only are these conditions arbitrary, cooked-up, and not at all general, they fail to get at the source of the inadequacy of Counterfactual. And the source of this inadequacy is simply that, given 1, Counterfactual takes us to worlds where Amy does not exist. But then in order to overcome this, all we need is a guarantee of her existence. Stipulating that she exists in the antecedent of the counterfactual is neither arbitrary, cooked-up, nor lacking in generality (indeed, it both natural and perfectly general) and is all that we need in order to have the truth of the counterfactual result *on account of* the in-virtue-of claim. Sensitivity, of course, is this principle.[8]

So we have a powerful reason to accept Sensitivity. Unlike both Necessitation and Counterfactual, it yields 2 from 1 and provides us with, in cases involving things being essentially some way, counterfactual claims whose truths result on account of the operative in-virtue-of claims. Moreover, as witnessed earlier, it is both intuitive and well-confirmed. So we should embrace it.

Before turning back to sums, it is worth asking what happens if we reject the Strangeness of Impossibility Condition, something I appealed to above. And the answer is not much. For all the above needed is for there to be *some* grounded fact or other, that the *x*s are G, where the closest worlds where it is not the case that they are G are worlds where they do not exist. This is a weak, and so plausible, claim. And once this is granted, my reason for thinking that we need Sensitivity in

[8]It is worth highlighting why Counterfactual gives us counterfactuals whose truth depends on the operative in-virtue-of claim in cases involving things being contingently some way. Suppose that the *x*s are contingently G and are G in virtue of being F. Then in many cases, it is plausible to think that the closest worlds where it is not the case that the *x*s are G are worlds where the *x*s exist. And this, as we have seen, preserves the virtue of having the truth of the counterfactual result on account of, and not in spite of, the operative in-virtue-of claim.

addition to Counterfactual stands. Of course, someone could implausibly hold that for every grounded fact of the form 'the *x*s are G', the closest worlds where it is not the case that the *x*s are G are worlds where the *x*s exist. But this, in conjunction with Counterfactual, entails Sensitivity since it entails a counterfactual principle which takes us to a world where the *x*s exist but are not G.[9] So either Counterfactual is too weak or it is not. If it is, then we need Sensitivity. If it is not, then it entails Sensitivity. Either way, we get Sensitivity.

3 Against Sums

Now if we have Sensitivity, then sums are in trouble. If *y* is a sum of the *x*s, then the *x*s compose *y* in virtue of existing. Putting this in-virtue-of claim in the antecedent of Sensitivity yields

4. If the *x*s were to exist but not compose *y*, then the *x*s would not exist.

But if the *x*s were to exist but not compose *y*, then it is *trivial* that the *x*s would exist. The closest worlds where the *x*s exist but do not compose *y* are clearly not worlds where they do not exist. So 4 is false.

Indeed, if 4 were true, then the closest worlds where the *x*s exist but do not compose a sum are logically impossible, having it that the *x*s both do and do not exist. But they are not. Surely the summist grants the *logical coherence* of denying that there are sums while accepting their parts, and so thinks that of those worlds where the parts of sums are but sums are not, the closest ones are logically coherent (logically incoherent worlds are much further away). But if 4 is true, they are not. If 4 is true, the closest worlds where we have things but no sums of things are worlds where incoherencies occur. We see then that, given a needed principle governing grounding, accepting sums commits us to something that is false because

[9] If every grounded fact of the form 'the *x*s are G' is such that the closest worlds where it is not the case that the *x*s are G are worlds where the *x*s exist, then we can move from

> **Counterfactual.** If the *x*s are G in virtue of being F, then if it were not the case that the *x*s are G, then it would not be the case that the *x*s are F

to

> If the *x*s are G in virtue of being F, then if it were the case that the *x*s are not G, then it would not be the case that the *x*s are F.

Given that the negation in the antecedent of the embedded counterfactual takes narrow scope and so takes us to a world where the *x*s exist, what we have here is simply Sensitivity (albeit worded a bit differently).

so radical. This is the price one has to pay if one wants composition on the cheap; composition that occurs simply because the things composing are. It is a price that should not be paid.

Upshot: since Sensitivity in conjunction with the existence of sums yields 4, either Sensitivity or sums must go. But, because doing so is quite costly (for reasons already given), Sensitivity should not. So sums should. Thus, no things are sums of things.[10]

Sums, as we have been understanding them, are wholes the existence of whose parts ground that these parts compose the whole. So we should distinguish sums from *mereological structures*, where y is a structure of the xs if and only if the xs compose y in virtue of being related in some way or other.[11] Now structures are, in principle, immune from the above argument against sums. In order to see why, assume, for simplicity's sake, that contact is the relation in virtue of which the xs compose y. Putting this in-virtue-of claim in the antecedent of Sensitivity yields

> 5. If the xs were to exist but not compose y, then the xs would not be in contact.

But 5 is unproblematic. That the the xs are not in contact is entirely consistent with the xs existing. Since there is nothing special about contact, the reasoning here generalizes to a great many relations. So structures are, in principle, immune to my objection against sums. And they are immune precisely because for them, *there is more to composing them than the existence of the parts that compose*. So what we need, in order to ground that the xs compose what they do, is some fact over and above the fact that the xs exist.

Jonathan Schaffer (2015) advocates a "bang for your buck" principle: get the largest collection of grounded things from the smallest collection of fundamental

[10]Given the similarities between sums and sets, one might think that if Sensitivity rids us of sums, then it rids us of sets. Certainly we should investigate whether this is so. But sets bring with them their own cluster of issues and on pain of significantly extending this paper, I will leave discussing what implications Sensitivity has on them for another time. My concern here is mereological and not set-theoretical.

An anonymous referee worries that Sensitivity will rid us of conjunctions. But if it does, then it would have to be true of conjunctions that their constituents compose them simply in virtue of existing. But this seems false. Conjunctions are structured entities. p&q is not the sum of p, q, and &. In order to get p&q, & itself, which is a constituent of p&q, has to operate on p, q. So what explains that p, q, and & compose p&q will involve how p, q, and & are related. But then Sensitivity will not tell against them.

[11]Examples of structures include such ordinary objects as chairs, tables, hammers, organisms, molecules, and atoms.

things. I think something like this principle is right, provided that the bang does not require more of us than we should accept. In the case of sums, where you get a rather nice bang (composition) for a rather small buck (mere existence of parts), it does.

4 Objections

Now for some objections, all of which seek to undermine my use of Sensitivity.

Objection. Your argument against sums appeals to counterpossibles. If the *x*s compose a sum, then necessarily if the *x*s exist, they compose a sum. So it is impossible for the *x*s to exist and fail to compose a sum if they in fact compose a sum. So for the summist, 4 is a counterpossible. But counterpossibles are either

> (*i*) very hard to assess (after all, we are being asked to consider what is going on in situations that cannot be),
>
> (*ii*) irrelevant with respect to how we should think the actual world is (why should our beliefs about how things actually are be informed by what cannot be?), or
>
> (*iii*) are vacuously true.

And since your argument against sums requires that 4, which is a counterpossible, is false, then it fails to establish that sums do not exist.

Response. There has been a steady movement against embracing this way of thinking about counterpossibles.[12] As the following false counterpossibles show, this movement is in the right:

> If it were necessary that there be donkeys, it would be impossible that there be cows (Dorr 2008, 37),
>
> If God were to exist but lack mathematical knowledge, then God would do well in calculus (Davidson 2015),[13]
>
> Assuming Nihilism, and hence that there are simples — if Universalism were the case, then every object would be gunky.

[12] For some recent papers, see Bernstein 2014, Bjerring 2013, and Brogaard and Salerno 2013.

[13] Whether or not you believe in God, this counterfactual has an impossible antecedent. If you are an atheist, we have an impossibility since necessarily, God does not exist. If you are a theist, we have an impossibility since necessarily, God does not lack mathematical knowledge.

These counterpossibles are not hard to assess — they all appear false. Moreover, being false, they are not vacuously true. So (*i*) and (*iii*) are false.

How about (*ii*)? Well, if counterpossibles can be false or non-vacuously true, then that they are irrelevant becomes a hard sell. The reason, in the present context, is simple. Since there are counterfactual constraints on in-virtue-of, then we can use these constraints to evaluate whether particular in-virtue-of claims are true. Since some of these claims will involve facts that hold of necessity, then the counterfactual constraints will appeal to counterpossibles. Assuming then that counterpossibles can be false or non-vacuously true, it follows that counterpossibles become quite relevant with respect to how we should think the actual world is.

Objection. You are a cherry-picker, picking a principle that ensures that sums do not exist. But you could have just as easily picked a principle that ensures that you do not exist, namely

> **You-wise Sensitivity.** If the *x*s are G in virtue of being F, then if the *x*s were to be arranged you-wise but not be G, then they would not be F.

Assuming that the *x*s compose you in virtue of being arranged you-wise, this principle entails the false

> If the *x*s were to be arranged you-wise but not compose you, then the *x*s would not be arranged you-wise.

Surely something has gone wrong. It cannot be this easy to get rid of you. The culprit is plainly You-wise Sensitivity. Controversial as you may be, if the choice is between you and You-wise Sensitivity, you win out. But there is no principled difference between You-wise Sensitivity and Sensitivity. So if the former goes, so does the latter.

Response. But there are principled differences. The first: Sensitivity is general in nature. You-wise Sensitivity is not. In going to the closest worlds where the *x*s exist but are not G, Sensitivity puts as bare and general a requirement as one could ask for on the *x*s in asking that we eliminate, not the *x*s, but their being some way. This explains why I am able to use it in cases involving, among other things, that in virtue of which I am in pain, an action is good, someone is rational, and the *x*s compose a table. This is not so with You-wise Sensitivity. In going to the closest worlds where the *x*s fail to to be G, You-wise Sensitivity puts a non-bare, specific,

cooked-up requirement on the *x*s in asking, not merely that we eliminate their being some way, but that we add to them their being a certain way. So it does not have wide application. Unless we go in for category mistakes, I am not able to use it in cases involving that in virtue of which actions are good, numbers necessary, or propositions true — neither actions, numbers, nor propositions are the kinds of things that can be arranged me-wise. This difference is a principled difference and shows why one who appeals to You-wise Sensitivity in order to rid themselves of me, but not one who appeals to Sensitivity in order to rid themselves of sums, is a cherry-picker.

The second: We saw that when it comes to things being essentially some way, Counterfactual does not yield counterfactuals that result on account of the operative in-virtue-of claims. And we saw that this is so precisely because in such cases, it takes us to worlds where the *x*s do not exist. So in order to yield counterfactuals that result on account of the operative in-virtue-of claims, all we need is a guarantee that the *x*s exist. So we have reason to put an existence condition on a counterfactual principle governing in-virtue-of. We, of course, have no reason to put an arranged-me-wise condition. And since this is a principled difference, it shows why the present objection fails.

Objection. Sensitivity should be restrained such that 'F' and 'G' may only be substituted for predicates expressing genuine properties and not for 'exists'. There is a long tradition holding that existence is not a property and, given this, it is not at all ad hoc to hold that 'F' and 'G' in Sensitivity cannot be substituted by 'exists'. But then your use of Sensitivity against sums is inappropriate since it treats existence as a property.[14]

Response. If existence is not a property, then it is false that, where *y* is a sum, the *x*s compose *y* in virtue of existing. What should instead be said is that the *x*s compose *y* simply in virtue of the *x*s. But this is of no help in saving sums since we can re-state Sensitivity as follows:

> **Re-Sensitivity.** If the *x*s are G in virtue of ψ, then if the *x*s were to exist but not be G, then ψ would not be.

Re-Sensitivity is just like Sensitivity except that it leaves it open as to what it is that grounds that the *x*s are G. What is more, it is easy to see that the very arguments

[14]Thanks to an anonymous referee for raising this objection.

that favored Sensitivity favor Re-Sensitivity. So if Sensitivity is true, then so is Re-Sensitivity.

Now assuming that the xs compose y simply in virtue of the xs, then plugging this into the antecedent of Re-Sensitivity yields

> 6. If the xs were to exist but not compose y, then the xs would not be.

But 6 is false for the very same reasons 4 is. If the xs were to exist but not compose y, then it is *trivial* that the xs would be. The closest worlds where the xs exist but do not compose y are clearly worlds where they are and not worlds where they are not. So 6, like 4, is false. So having it that existence is not a property is of no help to sums.

Objection. There are counterexamples to Necessitation that double as counterexamples to Sensitivity. Here is one inspired by Dancy (2004, §3). Suppose that Dolores promised to feed your dog Wimpy last Sunday while you were away. So

> 7. Dolores was under an obligation to feed Wimpy in virtue of promising to feed Wimpy.

Suppose now that, unbeknownst to her, Dolores had a ruptured appendix last Sunday so that in the closest worlds in which Dolores exists but was not under an obligation to feed Wimpy, this was because she was in the hospital having the appendix removed. Now assuming 7, Sensitivity yields that if Dolores existed but was not under an obligation to feed Wimpy, then she would not have made a promise to feed Wimpy. But this is plausibly false. So we have a counterexample to Sensitivity.[15]

Response. I find this and similar counterexamples unconvincing. Instead of showing Sensitivity false, I think such examples show that the relevant grounding claim is not a genuine instance of some fact fully grounding another.[16] To make my claim stronger, a grounding claim that is supposed to give us a full explanation of some fact but runs counter to Sensitivity has met its doom.

But suppose we have a genuine counterexample. Still, it is not obvious that this affects my use of Sensitivity against sums. If 7 is true but Sensitivity false

[15]Thanks to Tom Donaldson for this objection.

[16]See Bliss and Trogdon (2014, §5) for just this response in defending Necessitation against this kind of worry.

of it, then this is because of the absence of conditions that enable 7 to hold (call these conditions 'enabling conditions'). Here the enabling condition is Dolores' having the ability to feed Wimpy. Being in the hospital on account of an emergency, Dolores was not able to feed Wimpy in those closest worlds where she exists but lacks an obligation to feed Wimpy. So a condition that enabled her promise to explain her obligation was not met. Unfortunately for sums, there appear to be no conditions that the *x*s require in order for their existence to explain their composing a sum. Once they exist, they compose a sum. That's it. As such, granting that some instances of Sensitivity are false (which is not to grant that all are) appears to have little affect with respect to my use of it.

But suppose that some enabling condition is needed in the case of sums. Still, this does little to affect my case against sums. For it is easy to describe a sensitivity principle that would by-pass the present problem, namely

> **Enabling Sensitivity.** If the *x*s are G in virtue of being F, then if the *x*s were to exist, not be G, and the enabling conditions were all met, then the *x*s would not be F.

Given that *y* is a sum of the *x*s, Enabling Sensitivity yields

> If the *x*s were to exist, not compose *y*, and the enabling conditions (whatever those are) were all met, then the *x*s would not exist.

But this is false for the very same reason that 4 is. So Enabling Sensitivity cannot save sums.[17]

5 Against Universalism

The Special Composition Question (van Inwagen, 1990) asks: what conditions are both necessary and sufficient in order for the *x*s to compose something? Now one very popular answer, Universalism, says that any collection of objects composes a further object. So as an answer to the Special Composition Question, Universalism amounts to

> The *x*s compose something if and only if the *x*s exist.[18]

[17] Thanks to Michael Titelbaum for suggesting this response to the present objection.

[18] I am assuming, in order to conform to the standard definition of composition, that the *x*s are disjoint.

So Universalism says that composition always, automatically, occurs. Neither you nor I can do anything to bring it about that the *x*s compose something because they already do.[19]

I will now argue that if there are no sums, then Universalism is false. Notice first, however, that Universalism does not logically entail that sums exist. Since Universalism merely gives us a condition that is both necessary and sufficient for composition, it is consistent with the claim that whatever the *x*s compose, that they compose it is grounded in some fact other than that they exist. So, assuming that there are no sums, one cannot reject Universalism on the grounds that it logically entails that sums exist. Nevertheless, universalists ought to accept that there are sums. Here is why.

Universalism and sums constitute a nice fit. Consider a kind of object universalists accept: *trout-turkeys*, which are objects composed of an undetached front half of a trout and an undetached back half of a turkey. Notice that front halves of trouts and back halves of turkeys do not typically, if ever, stand in those relationships we are inclined to think are relevant to composition. That this is so explains why in wanting to see what Universalism is committed to, trout-turkeys are often pointed to. Front halves of trouts and back halves of turkeys are just two unrelated kinds of objects that, if Universalism is true, compose an object in the absence of any interesting relations they stand in or properties they bear. So the most natural thing to say here is that front halves of trouts and back halves of turkeys compose something simply in virtue of existing. So the most natural thing to say here is that they compose a sum. There is thus a very natural fit between Universalism and sums. And in light of this fit, I think that anyone who accepts Universalism *should* accept sums. But as I have been arguing, we should not accept sums. So we should not accept Universalism.

What can the universalist say in response? Take two simples, A and B, and assume that they are thousands of miles apart, moving at velocities relative to one another, and where neither has any obvious causal influence on the other. Someone who accepts Universalism but denies sums will have to say that A and B compose something in virtue of something other than their existence.[20] But what? A and

[19]The number of philosophers who accept Universalism are legion. Here are a few: Armstrong (1997, 120), Baker (2007, 191-193), Hudson (2001, §3.8), Lewis (1991, 79), Rea (1998, 348), Sider (2001, 120), Thomasson (2007, 184), Thomson (1983, 203 & 216-217), and van Cleve (2008, 321).

[20]Well, they could say that there is nothing in virtue of which A and B compose something because they could say that the *brutality of compositional facts* is true: for any *x*s, if there is an object composed

B do not stand in those relations we are inclined to think are relevant to composition. They are not in contact, fastened, do not constitute a life, and are not arranged K-wise for some common kind K. So in virtue of what do A and B compose something?

Here is a method for generating an answer. All one needs to do is point to some feature that A and B instantiate and say that A and B compose something in virtue of instantiating this feature. So

> A and B compose something in virtue of jointly occupying scattered region R.

Of course, there is nothing special here about their jointly occupying a region. I could have just as easily picked out the gravitational pull they have on each other, their distance apart, their combined mass, their combined weight, the number of parts they have, the kinds of sub-atomic particles they are, their distance from the sun, their age, certain of their causal roles, etc. Indeed, so as not to arbitrarily favor one of these over the others, the feature picked could be a conjunction or disjunction of them. But let us, for simplicity's sake, stick with their occupying a region. Later we will consider what happens when we add the rest.

Now what region A and B jointly occupy will vary across time and world. So in order to preserve that A and B compose something at these times and worlds (as they must if Universalism is true) in virtue of their jointly occupying some region, we need to have it that A and B's composing something is multiply realized across time and world. So at some time, A and B compose something in virtue of jointly occupying S (where S $\neq$ R). At another time (and perhaps world), A and B compose something in virtue of jointly occupying T (where T $\neq$ S and T $\neq$ R). At yet another time (and perhaps world), A and B compose something in virtue of jointly occupying U (where U $\neq$ T, U $\neq$ S, and U $\neq$ R). And so on such that for every possible region A and B jointly occupy, A and B compose something in virtue of occupying that region. This is enough to ensure that A and B compose something

of the *x*s, then it is a brute fact that there is an object composed of the *x*s (Markosian 1998, 215). So even though composition always occurs, there is nothing in virtue of which it occurs and so there are no sums (since if there were, then composition would occur, at least in some cases, in virtue of the existence of the *x*s). Unfortunately, making this move is dialectically odd. In line with Markosian's main reason to accept Brute Compositionalism (which is practically equated with the brutality of compositional facts (1998, 215)), the main virtue of the brutality of compositional facts is its consistency with common sense intuitions about what composes what. But anyone who accepts Universalism will have to forgo this main virtue of the brutality of compositional facts and so will lack the main reason to accept that composition is brute.

in virtue of their jointly occupying a region at all those possible times and worlds where they exist.[21]

But there is a problem. This explanation for why A and B compose something succumbs to Sensitivity, albeit in a manner somewhat different than the manner sums did. If A and B compose something in virtue of jointly occupying R, Sensitivity yields

> If A and B were to exist but not instantiate composing something, then A and B would have to have not jointly occupied R.

So far, so good. But we should not stop here. Given that A and B's composing something is such that for every possible region A and B jointly occupy, A and B compose something in virtue of occupying that region, then Sensitivity yields

> 8. If A and B were to exist but not compose something, then A and B would not jointly occupy R $\vee$ S $\vee$ T $\vee$ U $\vee$ ... (and so on for every possible region A and B jointly occupy).

So in the closest worlds where A and B exist but fail to compose something, it is not the case that for any possible region A and B jointly occupy, they occupy that region. But this is absurd! If A and B were to exist but fail to compose something, they would not, for any possible region they jointly occupy, cease to occupy that region. In order to see this more clearly, notice that the closest worlds where A and B exist but fail to compose something are worlds where either some restricted form of composition takes place or Nihilism is true. But it is false that in the closest worlds where some restricted form of composition takes place or Nihilism is true, two simples fail to occupy any of the possible regions they are able to occupy. So 8 is false. And if false, then it cannot be that for every possible region A and B jointly occupy, they compose something in virtue of occupying that region.

Above I said that when it comes to A and B composing something, there is nothing special here about the joint region that they occupy. It would be intolerably arbitrary to say that A and B's jointly occupying a region is somehow, against all other features they instantiate, privileged with respect to their composing something. Why favor their jointly occupying some region over the gravitational pull

[21] One could go disjunctive here by having it that A and B compose something in virtue of the disjunctive property of occupying R $\vee$ S $\vee$ T $\vee$ .... However, it is awfully natural to think that A and B jointly occupy R $\vee$ S $\vee$ T $\vee$ ... in virtue of some particular region they jointly occupy. But then given that in-virtue-of is transitive, someone who accepts this disjunctive account should accept the account given in the main text.

they have on each other? Or their distance apart? Or their combined mass? Or their combined weight? Or the kinds of sub-atomic particles they are? Etc. Therefore, so as not to arbitrarily favor any one of these over the others, what we should say is that A and B compose something in virtue of any of these features or conjunctions or disjunctions of them. Here then is the thought: for any feature or features that A and B jointly instantiate, A and B compose something in virtue of that feature or those features.

This picture approaches the *doctrine of plenitude* and is something a number of universalists appear happy to accept.[22] It can also be put in many ways. Johnston (2006) puts it in terms of a principle of unity: for any item that has parts, there is a principle that "unifies those parts into the whole that is the complex item" (652). And describing this doctrine in terms of principles of unity amounts to saying that any relation or property of some things is a principle that unifies those things into a whole that has them as parts. The picture I described above comes close to this. It says that any relation or property of some things is such that those things bearing those relations or properties is that in virtue of which they compose a whole. Call this *Grounding Plenitude*. Some might think that it allows one to be both a universalist and a denier of sums. But it does not. And even if it did, Sensitivity tells against it.

It does not because if any old property or relation A and B bear is that in virtue of which they compose something, then so should their existing. So given Grounding Plenitude, that A and B exist should explain why they compose something. But then Grounding Plenitude is committed to sums. So Grounding Plenitude is not a view the universalist can accept while denying that there are sums.

But push this worry to the side. For Grounding Plenitude is also subject to Sensitivity's shaving ability. Grounding Plenitude is not a contingent doctrine and so has it that necessarily, A and B compose something in virtue of any of their relations or properties. But from this, Sensitivity yields

[22] I say it approaches this doctrine since it does not quite get us there (thanks to Dan Koram for pointing this out). For this doctrine entails that there is massive mereological coincidence. But the view I describe is consistent with A and B composing one and only one object since it is consistent with thinking that the fact that A and B compose something is massively overdetermined. Be that as it may, the view I describe fits awfully nice with thinking that A and B compose a great many objects, and so fits well with the doctrine of plenitude.

Among others, those who advocate this doctrine (or something close) are Bennett (2004, 354-359), Eklund (2008, 391-92), Hawley (2001, 6-7), Hawthorne (2006, vii-viii), Inman (2014), Johnston (2006, 696-698), Sosa (1999, 142-143), and Thomasson (2007, 183-185). For a nice overview of arguments in favor of this doctrine, see Korman (2015, 17-19).

9. If A and B were to exist but not compose something, then A and B would not instantiate any of their possible relations or properties.

So if A and B were to exist but not compose a whole, then they would not, for any possible way they are, be that way. So supposing that A and B are electrons, if A and B were to exist but not compose a whole, then A and B would not be electrons, have negative charge, be simple, have the joint mass of $2 \times (9.109 \times 10^{-31}$ kg), be named 'A' and 'B', be the subjects of this sentence, etc. But this is incredible! If A and B were to exist but not compose a whole, they would certainly be some possible way and not no possible way.

Since doing so neither avoids sums nor respects Sensitivity, Universalism should not join itself with Grounding Plenitude if it wants to avoid sums. And since I am not aware of any non-arbitrary way of holding on to Universalism while denying that sums exist, I conclude that if Universalism is true with respect to composition, then sums exist. But sums do not exist. So Universalism is false.

6 Closing

Sums do not exist. And because of this, Universalism is false. These are the central conclusions of this paper. And they are conclusions that belong to first-order metaphysics. Let me therefore close on two matters metametaphysical.

First, some think that just about all has been said and done when it comes to the metaphysics of material objects. Here is Bennett (2009)

> My claim, then, is not that work on the metaphysics of material objects is pointless, but rather that *we have more or less done it already*. In these particular debates, I suspect that we are rapidly coming towards the end of inquiry. There is not a whole lot more to be said. (73)

I hope the argument given in this paper shows us that this is not so. For reflecting on matters and principles concerning grounding has shown us that a good deal more can still be said when it comes to the metaphysics of material objects. So progress has been made. And I think (or at least hope) more can be. So those interested in matters mereological should continue to engage in what Bennett calls *localized fighting*. For we have engaged in such fighting, and it has gotten us somewhere.

Second, some think that the deep questions of metaphysics are not existence questions but *grounding* questions (Schaffer 2009, 356-62). Though I deny that all such questions are grounding questions, I think something is right in thinking that existence questions should not take pride of place. Something about this metametaphysics is correct. But, and this should be clear, that does not mean that we should be complete permissivists about what exists. Concerning his permissivism, Schaffer says

> I certainly do not mean to suggest that every candidate entity should count as an existent ... For instance, if a candidate entity is described in such a way as to entail grounding information (e.g., "a Platonic number," understood as a transcendent substance), or so as to engender contradictions (e.g., "a non-self-identical creature"), one need not remain permissive. (359)

The tack taken in this paper falls under the first. Sums are entities that entail grounding information. So we need not, and I have argued should not, be permissivists when it comes to them.[23]

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[23] I would like to thank Karen Bennett, Esa Diaz-Leon, Tom Donaldson, Kathrin Koslicki, Michaela McSweeney, Guy Rohrbaugh, Michael Titelbaum, Jennifer Wang, and the audiences at the 2015 Pacific APA and the 2015 Bellingham Summer Philosophy Conference. A very special thanks to Dan Korman, whose many, both written and verbal, comments significantly improved this paper. Mention here should go to my now three-year-old daughter, Jeannette Autumn Saenz. It was during those late nights holding her shortly after she came into this world when I first came up with the central ideas in this paper. And finally, as I forever will, I would like to thank my wife, Amy Greenip, for her always present love, support, and encouragement.

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