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A subject of much recent philosophical discussion is the thesis that for any finite class of objects, the *xs,* there is necessarily an object composed of those *xs*. Composition is unrestricted. Some support for this view arises from concerns about whether composition can be a vague matter. Ted Sider offers an 'argument from vagueness' in defense of unrestricted mereological composition which relies heavily on the premise that composition cannot be vague. However, he endorses a particular view of vagueness which, I propose, commits him to abandoning certain premises of his argument. I will defend Sider's charge that composition cannot be vague. I will argue, though, that Sider should actually be committed to accepting sharp cutoffs with regard to composition, since the theory of vagueness Sider endorses itself requires sharp cutoffs. The purpose of this paper is to show that his views on vagueness and sharp cutoffs are at conflict with one another, and because of that, his argument for unrestricted composition fails.

1. The Argument from Vagueness

Sider's argument runs as follows[1]:

> P1: If not every class has a fusion, then there must be a pair of cases connected by a continuous series such that in one, composition occurs, but in the other, composition does not occur.
> P2: In no continuous series is there a sharp cut-off in whether composition occurs.
> P3: In any case of composition, either composition definitely occurs, or composition definitely does not occur.

The conclusion is that for every class there is indeed a fusion – an object composed of

the objects in that class. P1 should be uncontroversial, supposing that composition occurs sometimes but not always. There can be a case in which some *xs* compose an object and a separate case in which the same *xs* fail to compose an object. Imagine a series of cases connecting the two; adjacent cases of composition are only minutely different in any of the factors that might be relevant to whether composition occurs (spatial proximity, causal relatedness, extent of connectedness, and so forth). A continuous series of the sort mentioned in P1 is reasonable enough to imagine.

P2 is what I will spend this essay trying to rebut; though, for what it's worth, I believe it is indeed prima facie plausible. Take the continuous series discussed above: Sider proposes that it is implausible to say that given only such minute change between cases of composition it could be different as to whether composition occurs in one case but not in an adjacent one. This seems reasonable. A comparable example: imagine walking towards Mt. Everest; it is implausible to say that at a certain point you are definitely not on Everest, yet after moving .001 centimeters closer you are suddenly on Everest. Likewise it seems implausible to say that some object *a* having moved some arbitrary distance closer to some object *b* suddenly brings a third thing into existence. So P2 seems reasonable enough to accept.

P3 is the crucial premise in Sider's argument. Someone who denies that unrestricted composition is true might very well try to argue that it can be a vague matter as to whether composition occurs in a certain case. And if composition can be vague, Sider is wrong to think that restricted composition entails sharp cutoffs. If it is possible that composition can be vague, then it is also possible that existence can be vague. After all, it can be vague as to whether a composite object exists only if it can be vague as to whether its parts appropriately compose it. So P3 is the premise that appears to need the most defense in order for his argument to work.

2. Vagueness of Composition

It will be useful now to note that Sider endorses what is called 'the linguistic theory of vagueness'. This view is put forth most notably by David Lewis:

> "The only intelligible account of vagueness locates it in our thought and language. The reason it's vague where the outback begins is not that there's this thing, the outback, with imprecise borders; rather there are many things, with different borders, and nobody has been fool enough to try to enforce a choice of one of them as the official referent of the word 'outback'. Vagueness is semantic indecision." (1986; p.213)

A predicate is vague if it has more than one candidate meaning ('precisification'). Predicates are vague in the same way the name 'Harold' might be if there are three Harolds in a room together. The truth value of a sentence is made indeterminate if some

predicates in it are vague. Yet a sentence with any non-vague predicate – including a precise rewording of a vague predicate – would be determinately true or false. A sentence's being vague, according to this theory of vagueness is, then, just that it is true under some precisifications and false under others.

Sider's defense is as follows: If composition could be vague, there could be a sentence with only logical language containing only precise predicates that would be indeterminately true or false. And he says, surely logical sentences are always determinately true or false. So let us suppose it is indeterminate whether a purely numerical sentence saying "There are n concrete objects (for some finite number n)" is true or false. The sentence would look like this, for $n=2$: $\exists x \exists y \forall C((Cx\&Cy\&x\neq y)\forall z(Cz \rightarrow x=z \text{ v } y=z))$. It reads, "There are only two distinct concrete objects. And if any object is concrete, it is either one or the other". All the predicates are precise. It seems the only thing in this sentence that would contribute to vagueness would be the number of objects the sentence says there are. And if that number might be vague, the only possible location of semantic vagueness is in its quantification, – 'There are' – if indeed it is vague as to how many concrete objects there are. And if quantification is vague, then it must also be vague as to what is quantified – and as to what exists.

The numerical sentence in the previous paragraph is accurately reworded as, "Everything that is concrete is either this object a or this other object b." Sider's strategy is first to say that the universal quantifier, 'everything', in this sentence cannot possibly be vague: if it were, it would not truly be a universal quantifier. We could not say that there are multiple everythings in the same way there are multiple outbacks. If this were the case, the extension of some other precisification of 'everything' would contain a third object, c, not in the extension of our particular precisification. But then 'everything' would not really quantify everything. And it is incoherent to say that a universal quantifier fails to quantify universally. So there are cannot be multiple precisifications for universal quantification.

In the same way it becomes clear that vague existence is impossible. The proponent of vague existence will say it is possible for some sentence of the form "$\exists y(y$ is composed of a and $b)$" to be indeterminately true or false. But the real issue isn't whether it's determinately true whether y exists; the issue is specifying a precisification whose extension contains the existent object y. 'Existence' might have multiple candidate meanings. But it doesn't seem plausible that 'existence' can possibly have multiple meanings: after all, what would make 'existence' vague is if there were many ways of existing, each distinct from the others, much as 'outback' is vague because there are many outbacks, each with its own precise borders. To give a candidate meaning of 'existence' precise borders would require arbitrarily selecting a set of existent objects containing some objects but not others. Take a simple particle; α. Simple particles indisputably are objects, so it seems that there should be no doubt that α exists. Yet the proponent of vague existence would say it is possible that α does not exist if in saying

"∃α" we specify a sort of ∃ not containing α in its set of existent objects. So to accept that 'existence' might be vague would mean accepting a world in which simultaneously many and few objects exist, depending solely on what precisification of 'existence' we might have in mind. This is highly unreasonable. ∃ can't be the type of thing that requires precisifying. So there cannot be multiple precisifications for existence.

Neither universal nor existential quantification can be vague. So the vague compositionist will not be able to claim that 'composition' might be vague because 'exists' might be: There is no opportunity for vagueness of composition somehow to infect existence and make it vague as well. The only option the proponent of vague composition will be left with will be to say that if 'composition' can be vague it can be genuinely indeterminate whether or not "There is something composed of a and b" is true. If there are different sorts of composition but not different sorts of existence, the only escape the vague compositionist has is to say that, in cases of vague composition, it is possible for it to be genuinely indeterminate whether a composite object exists. I will now eliminate the possibility of vague composition by showing that such a recourse is highly problematic for the proponent of vague composition.

Let us assume that there are two precisifications for 'composition': composition-1 and composition-2. If some xs compose something then that thing exists, on any precisification of 'composition'. After all, what it means for some parts to compose something is that they stand in relation to each other such that they necessarily entail an extra existent object. So let us suppose that the sentence "a and b compose y" is vague: only some precisifications of 'composition' are true of y. a and b are composition-1 related: so there exists something other than just a and b. Yet a and b do not fall under the composition-2 relation: so a third thing does not exist. But this isn't right: If a and b compose a third object under any precisification of 'composition', that third object must exist. Saying that a and b fail to together compose some third object on a certain precisification of 'composition' doesn't take that composite object out of existence. Any composition relationship necessarily entails extra existents. The vague compositionist will have to say that in the case described above it is genuinely indeterminate whether a composite object exists. But it isn't indeterminate whether a composite object exists. So there cannot be multiple precisifications for composition.

Likewise it is impossible for the vague compositionist to argue that the sentence "a and b compose y" might be determinately true if it is supertrue, i.e. is true on all precisifications of 'composition'[2]. Here is an argument to support this. Let's suppose that composition occurs according to composition-1 whenever the appropriate parts are no more than 23 microns apart at the most distal point of separation; and composition occurs according to composition-2 whenever the appropriate parts are no more than 25 microns apart. Suppose "a hammer head and handle together compose a hammer" is true under all precisifications for 'composition' (there are only two), composition-1 and composition-2. Let's say the hammer head and handle are exactly 23 microns apart at

the most distal point: the sentence is supertrue. Suppose we now move the head and the handle 1 micron apart; they are now 24 microns apart. The sentence is no longer supertrue. Yet a hammer still exists, because the appropriate parts together fall under the composition-2 relation: they are no more than 25 microns apart at the most distal point. But they are not composition-1 related. There must in fact have been two distinct hammers. Yet the proponent of vague composition will have to say that it is now genuinely indeterminate whether a hammer exists. But it isn't indeterminate whether a hammer exists. And so there cannot be multiple precisifications for composition.

One objection to the above arguments so obvious that I must address it here is the suggestion that vagueness might be a genuine worldly phenomenon. Sider simply assumes that the theory of linguistic vagueness is true. But here is my take on the possibility of ontic vagueness: I argue above that after having eliminated vague existence, the vague compositionist will have to admit that in certain cases it can be genuinely indeterminate whether a composite object exists. This seems tantamount to what ontic vagueness has to offer. After all, the proponent of ontic vagueness wants to agree that existence and composition each only have one precisification. He would only argue that it can be genuinely vague as to whether some two things compose a third thing. Yet ontically vague composition would require that some objects have vague boundaries, or that there are at one location a multiplicity of co-located objects, only some of which have vague boundaries. But then vagueness would still be semantic indecision. To the still unconvinced proponent of ontic vagueness I reply: to say that there is an area where the existence of a composite object is vague would require two sharp cutoffs on either end of that area of vagueness, instead of just one cutoff between composition and non-composition[3]. So, linguistic vagueness is a better option because it necessitates fewer cutoffs.

3. Vagueness and Cutoffs

I argue that Sider makes a misstep in his application of vagueness to composition. For linguistic vagueness itself requires a sharp cutoff at some point. The many precisifications of a vague predicate are indeed each true in their own light. Yet we can't have things that are very obviously not examples of a vague predicate be precisifications of it: Chewbacca cannot possibly be a precisification of 'bald'. For example, I am from the suburbs of Chicago, though I can and do tell others that I am from Chicago. My precisification for 'Chicago' is something like, "No more than an hour's drive from Lake Shore Drive." Yet it would be saliently untrue for a man in Los Angeles to say he is in Chicago, even if he tries to press the case that he is in a precisification of 'Chicago' that is "No more than a year's drive from Lake Shore Drive." A precisification like that is definitely too broad.

I propose a Sorites series for being in Chicago. Here is why: If you are in Los Angeles and claim to be in Chicago, your statement will undeniably be false. Yet if you are on

the roof of the Chicago Tribune building and claim to be in Chicago, you will undeniably be speaking truthfully. We can imagine as our Sorites series as a man travelling from Los Angeles to Chicago. As he moves closer and closer to Chicago, it's not the case that his claiming to be in Chicago somehow becomes less and less false – Boulder, CO is just as obviously not Chicago as Los Angeles is. Rather, there must be a sharp cutoff after which point he can begin to say "I'm in Chicago" without it being so perspicuously false. There must be a first precisification of 'Chicago' he eventually finds himself in. There are indeed many Chicagoes. But there cannot be precisifications of a vague predicate which are very clearly not instances of it. So the sort of Sorites series for being in Chicago is really just a Sorites series for where the first precisification of a vague predicate is. And so there must be sharp cutoffs with regard to the incidence of precisifications of vague predicates – as to where vagueness begins to occur.

I'm unsure as to whether Sider would think this is just as counterintuitive as a sharp cutoff with regard to composition. I certainly do – to say that as you're driving into Chicago there suddenly comes a point where you can actually be honest about your location seems completely counterintuitive. The same goes for baldness and plucking hairs from someone's head, or anything else with vague predication. But it is a smaller bullet to bite in accepting this than to accept that even the wildest things might be precisifications of vague predicates.

Here is where P2 of Sider's argument becomes problematic. He supports in P3 that composition is always a determinate matter; both 'existence' and 'composition' each only have one precisification. I argue that Sider should be committed to saying instead that in every continuous series there is a sharp cutoff with regard to composition. Here is why: There is only one precisification for 'composition'; so that must be where the sharp cutoff with regard to composition occurs. The only retreat is to admit that composition might in some cases be genuinely vague – but then existence might be vague; and Sider rejects both these claims. He rejects sharp cutoffs with regard to composition because they seem highly counterintuitive. I agree that sharp cutoffs are counterintuitive. But the fact that composition is non-vague necessitates that there is a first point where composition occurs – that the first and only precisification must have precise boundaries. And since composition is non-vague, anything past that sharp cutoff must also be a case in which composition occurs. Sider cannot reject sharp cutoffs without sacrificing P3 of his argument. And so his argument from vagueness fails.

4. Some Objections Considered

The first objection to my argument I can imagine is that it makes no progress in dealing with Sorites series, much like I argued previously that ontic vagueness sacrifices one sharp cutoff for two. I fail to see how this might be the case for sharp cutoffs in linguistic vagueness. The operative principle of linguistic vagueness is that there are

multiple referents for a vague predicate. The person who raises this objection might claim that there are two sharp cutoffs much as in my objection to ontic vagueness; some cases are very obviously precisifications of a vague predicate and some others are very obviously not. I reply: Not quite – there might be separate cutoffs between individual precisifications, but for the vague predicate itself there can only possibly be one sharp cutoff. Everything past the initial precisification of 'bald' must also be a precisification of 'bald'.

A second objection might be raised that the conclusion of my argument turns the sharp cutoff between composition and non-composition into an epistemic problem. The objection says we might say "*a* and *b* compose *y*" and still be entirely wrong as to whether that actually is the case. I agree. Yet I reply: this might also be the case for predicates such as 'bald'. I might say "David is bald" in reference to the apparently few number of hairs he has on his head and still be missing the initial precisification for 'bald', perhaps even by so small a margin as twenty or thirty hairs. The problem addressed by linguistic vagueness isn't necessarily which of our vague sentences are true but to determine which things in the world are examples of vague predicates we use. I don't intend to address in arguing that there are sharp cutoffs with regard to composition whether we can know where that cutoff occurs, I only argue that such a cutoff has to exist.

The third and final objection I consider here is the suggestion that since composition is a relation between some parts, and not a real predicate, it might be vague. In every case of composition there is only one possible composite object, but 'composition' might still have precisifications in this sense: "John and Linda are in a relationship" might be vague as to whether they are dating, engaged, or married, but it is non-vague whether they are actually in a relationship. Composition, but not existence, might be vague. I counter thus: much as any precisification of composition entails extra existent objects, if a composite object exists it must be determinate whether its parts compose it. Composition entails that an extra object exists; and the existence of a composite object entails that a composition relation has non-vaguely been fulfilled. It can't be possible for composition to be vague and existence not to be. What it means for a composite object to exist at all is that its parts stand in the appropriate relation to each other.

References

Lewis, D. (1986): *On the Plurality of Worlds,* Oxford: Basil Blackwell.

Sider, T. (2001): *Four-Dimensionalism: An Ontology of Persistence and Time,* Oxford: Clarendon Press.

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[1] Sider 2001, p.123-5

[2] One solution to assigning a definite truth-value to sentences with vague predicates is a technique known as supervaluationism: a sentence meeting all precisifications of a vague predicate is 'supertrue'; a sentence that fails to meet any precisifications is 'superfalse'. But without being either one of these supervalues, vagueness occurs.

[3] I am quite aware that my stance here has been both offered and countered by many before me, the latter often through appeal to higher-order vagueness. Such concerns are extraneous to the purpose of this paper; I have nothing to add at this time to the already extensive debate on ontic vagueness.