Composition and Vagueness

TRENTON MERRICKS

"Restricted composition" says that there are some composite objects. And it says that some objects jointly compose nothing at all. The main threat to restricted composition is the influential and widely defended Vagueness Argument. We shall see that the Vagueness Argument fails. In seeing how this argument fails, we shall discover a new focus for the debate over composition's extent.

"Restricted composition" is a pair of commonsense claims. First, there are some composite objects, that is, objects with proper parts. Second, some objects jointly compose nothing. For example, a defender of restricted composition might say that my body is a composite object, having many atoms as parts. And she might deny that there is anything at all composed of my body and your nose and the planet Mercury.

Commonsense credentials notwithstanding, restricted composition is controversial. This paper examines the most influential argument against it. I shall first show that the argument is inadequately defended. I shall then argue that its first premise is false. This alone—given the influence of this argument—is important. And, if I am right about why its first premise is false, something even more important follows. What follows is a new way of understanding the question of whether composition is restricted and so a new focus for any future debates over composition's extent.

I. The Vagueness Argument and its Significance

David Lewis says that if composition is restricted, then it is sometimes vague whether composition occurs. (Section III examines why he says this.) Further, he claims that vague composition leads to vague existence. Here is his basic idea. Suppose it is vague whether a, b, and c compose something; suppose it is vague whether they have a "sum." But then, so it seems, it is vague whether that sum exists. Lewis adds that vague existence is impossible. He argues for this by claiming that all vagueness is rooted in language and that "the idioms of quantification," including 'exists' and its cognates, are not vague (Lewis, 1986, 212-213).

Lewis argues that restricted composition has an impossible result. Others defend essentially the same argument against restricted composition. Like Lewis, Theodore Sider says that if composition is restricted, then composition is sometimes vague. (Section IV examines why he says this.) And Sider's reasons for rejecting vague composition are much like Lewis's:

> Suppose for *reductio* that...it can be vague whether a given class has a fusion. In such a case, imagine counting all the concrete objects in the world. One would need to include all the objects in the class in question, but it would be indeterminate whether to include another entity: the fusion of the class [i.e., the object composed of all the members of the class]...That would mean that some *numerical sentence*—a sentence asserting that there are exactly *n* concrete objects, for some finite *n*—would be indeterminate. (Sider, 2001, 127)

As with Lewis, Sider thinks all vagueness is due to language. And Sider believes that the words in his "numerical sentences"—including, crucially, words like 'there are' and 'exist'—are not vague (2001, 127-8; 2003).

Despite differences in emphasis and formulation, it is fair to say that Sider and Lewis defend the same argument—the "Vagueness Argument"—against restricted composition:

(1) If composition is restricted, then composition is sometimes vague.

(2) If composition is sometimes vague, then it is sometimes vague whether something exists.

(3) If it is sometimes vague whether something exists, then 'exists' is vague.

(4) 'Exists' is not vague.

Therefore,

(5) It is false that composition is restricted.

Sider and Lewis are the most explicit defenders of the Vagueness Argument.[1] But others have defended something much like it, if not defending every single premise. Thus Mark Heller summarizes his objections to restricted composition by saying: "Since all reasonable candidates for natural constraints [on composition] depend upon vague concepts, there can be no such constraints" (1990, 51). And perhaps we find something like a proto-Vagueness Argument in Quine:

> More objects are wanted, certainly, than just bodies and substances. We need all sorts of parts or portions of substances. *For lack of a definable stopping place*, the natural course at this point is to admit as an object the material content of any portion of space-time, however irregular and discontinuous and heterogeneous. (1981, 10; emphasis added)

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[1] Lewis says that the words for "the partial identity of overlap" are not vague (1986, 212). To overlap is to be composed of some of the same parts as. Thus Lewis could argue that composition cannot be vague because 'composition' is not vague, sidestepping premises (2), (3), and (4). But the claim that 'composition' is not vague is more vulnerable than is the claim that 'exists' is not vague (cf. Sider, 2001, 126-30). Besides, Lewis cannot sidestep premise (1), the target of my criticisms of the Vagueness Argument.

Even Peter van Inwagen, a leading defender of restricted composition, agrees with much of the Vagueness Argument. First, van Inwagen agrees that at least some versions of restricted composition—including his—lead to vague composition (1990, 217-8 and 272); he thus has no objection to premise (1). Further, he accepts premise (2)'s claim that vague composition leads to vague existence (1990, 271ff). And finally, he endorses premise (4), saying that vague existence cannot be accounted for by the "linguistic theory of vagueness" (1990, 232). Van Inwagen and Lewis and Sider all agree that restricted composition leads to denying (3) and thus to non-linguistic vagueness. They part ways only on whether this is a *reductio* or instead a result.

The Vagueness Argument leads van Inwagen to metaphysical vagueness and vague existence. Moreover, the Vagueness Argument has been adapted by Sider (1997; 2001) to defend "the doctrine of temporal parts." My main concern in this paper is restricted composition. But it is worth noting that if I am right about how the Vagueness Argument fails, then both Sider's defense of temporal parts and van Inwagen's defense of metaphysical vagueness fail as well.

The Vagueness Argument has been enormously influential. Variations on it are just about the only arguments against restricted composition.[2] But aside from criticisms that focus on that argument's theory of vagueness—as in Hudson (2001, 99-105) and van Inwagen— virtually every sustained discussion of the argument and its central ideas is by its defenders

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[2] Objections to restricted composition based on the charge that any restriction would be "arbitrary" are typically variations on the Vagueness Argument. For that charge is typically limited to *non-vague* restrictions (see, e.g., Heller, 1990, 50-51 and van Cleve, 1986, 145). This limited charge is that every non-vague restriction is arbitrary. And so every non-arbitrary restriction is vague. Now we are back to the Vagueness Argument.

(but see Markosian, 1998, 237-8). I shall not criticize the theory of vagueness behind the

argument. But I shall argue that the Vagueness Argument fails.

II. Vague Composition and Vague Existence

Peter van Inwagen asserts the following about some simples that are briefly parts of a

person:

> There can be no right answer to the question 'When, exactly, did they begin to be parts of Alice?' And,
> therefore, there are moments such that there is no right answer to the question whether they were parts
> of Alice at those moments. If I am right about parthood and composition, there is no way round this.
> Being caught up in the life of an organism [which is van Inwagen's "restriction" on composition] is,
> like being tall, a matter of degree, and is in that sense a vague condition. (1990, 217)

For the sake of argument, let's suppose that restricted composition implies that "there are

moments such that there is no right answer to the question whether [certain atoms] were parts

of Alice at those moments."

Now consider the following case:

> At time t_1, atoms $a_1...a_n$ are parts of Alice. From $t_1...t_3$, all but one of these atoms
> remain determinately parts of Alice. But atom a_n gets farther and farther from the rest
> of Alice until, at t_3, a_n is not a part of Alice. (Alice still exists at t_3, for a_n was an
> inessential part of her.) At t_2, atom a_n is vaguely a part of Alice: it is no longer—as it
> was at t_1—determinately part of Alice; but it is not yet—as it will be at t_3—
> determinately not a part of Alice. Yet Alice herself determinately exists at t_2, as she
> did at t_1 and as she will at t_3.

We are supposing, for the sake of argument, that parthood can be vague. Given that supposition, a case relevantly like the above should be acceptable to every restricted compositionist—or at least to all who allow an object to lose a part. But the above is a case of vague composition without vague existence. At t_2, $a_1...a_{n-1}$ are determinately parts of Alice, but it is vague whether a_n is a part of Alice. And so it is vague whether $a_1...a_n$ compose Alice. Thus vague composition. But there is no vague existence. Each of the atoms determinately exists. And so does Alice.

Vague composition does not automatically trigger vague existence. As a result, premise (2)—if composition is sometimes vague, then it is sometimes vague whether something exists—is in need of repair. We can begin to repair (2) by supposing that objects related by at least two degrees of X are parts of the same composite. Suppose further that objects not related by any degree of X are not parts of the same composite. And suppose that if objects are related by one degree of X, it is vague whether they are parts of the same composite. Now consider a world of three simples, each related to the other two by one degree of X. We have here not only a case of vague composition, but also of vague existence. For—in this case—its being vague that those three simples have a sum implies that it is vague whether a composite object exists.

From now on, let's take premise (1) to say that if composition is restricted, then we sometimes get a case like the one just considered. That is, let's take premise (1) to say that if composition is restricted, then composition is sometimes vague *in such a way that the existence of some composite object is vague*. And we shall henceforth take (2) to say that *this sort* of vague composition yields vague existence.

These changes render (2) both trivial and beyond reproach. But they render (1) somewhat more controversial. For (1), as now understood, is no longer secured by the fairly commonsensical idea that, given restricted composition, something might have a "vague part." Even if Alice could have some atom as a part only vaguely, it might not be possible for there to be exactly three simples, interrelated by one degree of X.

I say that (1) is not intuitively obvious. And I shall argue that the extant defenses of (1) fail. So, I shall conclude, (1) is unmotivated. Then I shall argue that (1) is not merely defenseless, but just plain false.

III. The "Vague Desiderata" Defense of Premise (1)

The premise in question is:

(1) If composition is restricted, then composition is sometimes vague [in such a way that the existence of some composite object is vague].

Here is Lewis's defense of that premise:

> We are happy enough with mereological sums of things that contrast with their surroundings more than they do with one another; and that are adjacent, stick together, and act jointly. We are more reluctant to affirm the existence of mereological sums of things that are disparate and scattered and go their separate ways...
>
> But composition cannot be restricted in accordance with our intuitions...
>
> The trouble with restricted composition is as follows. It is a vague matter whether a given class satisfies our intuitive *desiderata* for composition. Each *desideratum* taken by itself is vague, and we get

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still more vagueness by trading them off against each other. To restrict composition in accordance with our intuitions would require a vague restriction. It's not on to say that somewhere we get just enough contrast with the surroundings, just enough cohesion, . . . to cross a threshold and permit composition to take place, though if the candidate class had been just a little worse it would have remained sumless. But if composition obeys a vague restriction, then it must sometimes be a vague matter whether composition takes place or not. (1986, 211-212)

For the sake of argument, grant that the relations intuitively relevant to composition—relations like cohesion, unity of action, proximity, and so on—are vague. This does not lead to premise (1). To get premise (1), these vague relations must be relevant to composition in a particular way. For example, we get no defense of (1) if they are fallible evidence of composition. Nor do we get a defense of (1) if composition goes along with these relations by and large, for the most part, and typically. For none of this guarantees that when these relations are vague, composition itself is vague. To guarantee that, and so to get a defense of (1), we must add that *if composition is restricted, then*:

> (A) Necessarily, objects compose something if and only if "intuitively relevant" relations hold among them.[3]

Presumably, restricted composition implies (A) only if the restricted compositionist must endorse (A). But why must the restricted compositionist endorse (A)?

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[3] Suppose that which intuitively relevant relations yield composition depends on the natural kind of the resulting composite. (Cf. van Inwagen's (1990, 61-71) discussion of the "series-style" answer to the special composition question.) Then (A) is true because a disjunction of intuitively relevant relations is necessary and sufficient for composition.

She would be forced to endorse (A) if it were obviously true. But it is not. After all, everyone who rejects restricted composition thereby rejects (A). For suppose composition is not restricted. Then there are only two possibilities. Either composition is unrestricted or, instead, composition never occurs. If composition is unrestricted—if objects compose something if and only if those objects exist—then "intuitively relevant" relations are not necessary for composition and so (A) is false. If, instead, composition never occurs—if there are only simple, non-composite objects—then "intuitively relevant" relations are not sufficient for composition and so, again, (A) is false.[4]

Every possible foe of restricted composition denies (A). Every possible foe insists that composition does not go hand in hand with "intuitively relevant" relations. Nevertheless, if they endorse Lewis's defense of premise (1), they must hold that restricted composition implies (A). Unlike its rivals, restricted composition does seem to be consistent with (A). But—to repeat a question asked above—why must the restricted compositionist endorse (A)?

Consider the following answer. The "intuitively relevant" relations hold among some objects but not others. On this basis, restricted compositionists conclude that some objects compose something and others do not. In drawing this conclusion, they presuppose (A). Strictly speaking, restricted composition is consistent with the denial of (A). But without (A)—this reply concludes—restricted composition is completely unmotivated. Thus Lewis:

> No restriction on composition can be vague. But unless it is vague, it cannot fit the intuitive *desiderata*.
> So no restriction on composition can serve the intuitions that motivate it. So restriction would be
> gratuitous. Composition is unrestricted... (1986, 213).

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[4] Lewis and Sider use the Vagueness Argument to defend unrestricted composition. For a sympathetic discussion of the thesis that composition never occurs, see Rosen and Dorr, 2002

I shall undermine this answer by motivating restricted composition, but without relying on (A). I believe that I exist and have many parts. But I do not believe this on the grounds that certain "intuitively relevant" relations hold among those parts and that just such relations yield composition—and even happen to yield me. Rather, I reason as follows: I exist; I am a human organism; human organisms are not simples; so I am composite. This gets us the first part of restricted composition, the claim that there are some composite objects.

I say that nothing is composed of all and only the atoms that compose you save a single atom of your left arm. But I do not argue for this by claiming, first, that those atoms are not interrelated by some intuitively relevant relation, and, second, that only that relation yields composition. Rather, I begin by supposing for *reductio* that there is such an object, an object comprising all your atoms save a single atom in your left arm. (That object is not identical with you; you have a part, the aforementioned atom, that it lacks.) I then ask whether that object is a conscious person. If it is, we have two persons in your chair: you and that object. If it is not, whether something is a conscious person can turn on whether it has an extra atom in its arm. Either result is awkward. So I reject what was assumed for *reductio*. I say that your atoms, minus those of your left arm, compose nothing. Thus the second part of restricted composition: Some objects jointly compose nothing at all.

The foregoing defense of restricted composition is controversial. But it is not meant to persuade all comers. Rather, it is intended only to illustrate that restricted composition can be defended without relying on (A) or anything like it. Indeed, an (A)-less defense is the rule rather than the exception. Restricted compositionists are almost uniformly motivated by claims about what composite objects there are (e.g., cats, people) and what alleged things

there are not (e.g., the sum of all noses and ice sculptures, something composed of all your atoms save one in your left arm). Restricted composition can be, and typically is, motivated without relying on anything like (A). Lewis's target—the restricted compositionist motivated by (A)—is something of a straw man.

Some might object that even if restricted composition is not motivated by (A), restricted composition nevertheless implies (A). Here is how this objection goes. Consider a list of all the composites a particular restricted compositionist accepts. Consider also a list of those she rejects. (If I am right about what typically motivates restricted compositionists, there must be such lists; of course, these lists need not be exhaustive.) Consideration of such lists, according to this objection, reveals the informative necessary and sufficient conditions for composition presupposed by such an ontology. Moreover, this objection continues, those conditions will be intuitively relevant. And so it goes with the lists that would be offered by any restricted compositionist. Thus—this line of reasoning concludes—restricted composition always leads to (A). And now the "vague desiderata" defense of (1) can proceed.

A similar argument can be run for premise (1) directly, bypassing (A). Consider a list of composites a restricted compositionist accepts. Consider a list of those she rejects. Consideration of such lists, according to this more direct argument, reveals implicitly presupposed informative necessary and sufficient conditions for composition. Those conditions will be vague. It will sometimes be vague whether those conditions are met, and

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so vague whether composition occurs. (Frances Howard-Snyder (1997, 295) defends this argument.)

Both of these arguments assume that consideration of the relevant lists reveals implicitly presupposed informative necessary and sufficient conditions for composition. But any restricted compositionist who has ever tried to discover the necessary and sufficient conditions for composition will see how fanciful this assumption is. It is not for nothing that van Inwagen is about the only restricted compositionist who proposes a necessary and sufficient condition for composition.[5] It is simply false that an ontology of restricted composition automatically gives rise to such conditions. *A fortiori*, it is false that this sort of ontology gives rise to such conditions that are "intuitively relevant" à la (A) or to such conditions that are vague.

One might "object" that, if composition is restricted, then there *must be* informative necessary and sufficient conditions for composition. But this is no objection at all. For suppose there are such conditions. The question then is whether those conditions—whose identity is currently beyond our ken—are vague. Simply to assert that they are vague is simply to assert that premise (1) is true. But the topic of this section is a defense of premise (1). We are looking for a successful defense of the claim that those conditions—whatever they may turn out to be—are vague. None has yet been given. So far, premise (1) is without defense and the Vagueness Argument has yet to get off the ground.

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[5] And van Inwagen's proposal—being caught up in a life—fails to be "intuitively relevant," at least when taken as a necessary condition for composition. To the best of my knowledge, H. Scott Hestevold (1980-81) is the only other restricted compositionist who offers an informative necessary and sufficient condition for composition. But Hestevold's condition is not vague and it does not imply anything like (A).

IV. The Continuous Series Defense of Premise (1)

Sider offers this defense of Premise (1):

If not every class has a fusion [i.e., if composition is restricted], then we can consider two possible cases, one in which composition occurs and another in which it does not, which are connected by a "continuous series of cases" selected from different possible worlds, each extremely similar to the last. Since composition can never be vague, there must be a sharp cut-off in this series where composition abruptly stops occurring. But that is implausible. So composition always occurs. (2001, 122)

According to Sider, if composition is restricted, a composition continuum is possible. (Let a *composition continuum* be Sider's "continuous series of cases.") If composition is never vague, then there must be a "sharp cut-off" in the composition continuum. But, Sider adds, such a sharp cut-off is implausible. Thus, Sider concludes, if composition is restricted, then it is implausible that composition is never vague.

Sider concludes, in other words, that if composition is restricted, then it is implausible to deny that composition is sometimes vague. And I shall assume that if Sider's conclusion were right, then the first premise of the Vagueness Argument would be true, the premise which says that if composition is restricted, then composition is sometimes vague.

But Sider is not right. As we shall see, there are problems with both of the central claims of his argument. The first of these claims is that, if composition is restricted, then a composition continuum is possible. The second is that a sharp cut-off in a composition continuum is implausible.

The hormone DHT—if there is enough of it—causes baldness.[6] Consider a series of men continuous with respect to their DHT level. The first man has the minimal amount biologically possible; the man next to him just a bit more; and so on until we reach the last man, who has as much DHT as is biologically possible. This is a continuous series involving a factor relevant to baldness.

DHT is merely causally relevant to baldness. So presumably it is possible for a determinately bald man to have *exactly* the same level of DHT as a determinately not bald man. Similarly, it is possible for a determinately bald man to have *almost* the same level of DHT as someone who is determinately not bald. As a result, there is nothing implausible about a DHT series in which some determinately not bald man is directly next to a determinately bald man.

The point here is not that a sharp cut-off in baldness must be present in a DHT-continuous series. We could construct a DHT-continuous series with such a cut-off and we could also construct a DHT-continuous series without such a cut-off. The point here is rather that there is nothing implausible about a DHT-continuous series with such a sharp cut-off.

Contrast a DHT series with a continuous series involving the number (thickness, distribution, etc.) of hairs, a continuous series involving the supervenience base for baldness. In this latter sort of series, it is implausible that one man could be determinately not bald, yet an adjacent man be determinately bald.

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[6] My knowledge of DHT and baldness is purely theoretical. I am determinately not bald. I am not even vaguely bald. Not that there's anything wrong with that. Some of my best friends are vaguely bald.

Here is the moral. A continuous series renders a sharp cut-off with respect to some feature implausible only if it is a series involving the supervenience base for that feature. Thus Sider's series must involve the supervenience base for composition. (More carefully, it must involve what would be the supervenience base for composition, were composition restricted.)

Sider's defense of (1), as we are now taking it, seems to have a decided advantage over the "vague desiderata" defense. For Sider's defense incurs no obligation to identify the relations that are necessary and sufficient for composition. (This is an advantage because most restricted compositionists are agnostic about the identity of those relations.) Sider can just stipulate that the relations in his series are those relations—whatever they happen to be— upon which, when holding to the right degree, composition supervenes.[7] He then needs to add only that they are subject to a continuous series.

But this addition is not trivial. For composition might not supervene on relations subject to a continuous series. First, composition might not supervene at all. This is worth

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[7] When Sider first presents his series, he does not say—as I am now saying—that it involves the supervenience base for composition. He says only that it is a series involving: "qualitative homogeneity, spatial proximity, unity of action, comprehensiveness of causal relations, etc." (2001, 123). But it is unclear how we are to fill in the 'etc.'. As a result, it is unclear what exactly Sider's series is supposed to be. Once we add that Sider's series involves the supervenience base for composition, this problem disappears. For then Sider needs to say only that the relations in the series are those upon which—when holding to the right degree—composition supervenes.

(Sider does say that composition supervenes on "causal and qualitative factors" (2001, 122). If he identified those factors with qualitative homogeneity, spatial proximity and other relations "intuitively relevant" to composition, he would risk presupposing that restricted composition implies (A). If he presupposed this, Sider's defense of (1) would no longer be an alternative to Lewis's.)

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considering, since, plausibly, parthood is not analyzed in terms of other relations; thus its supervening on other relations would be a synthetic necessity. Second, even if composition supervenes, it might not supervene on relations that come in degrees. (Or it might not supervene on relations for which a change in degree corresponds with a change in composition). Third, even if composition supervenes on relations that come in degrees, a continuum might be impossible because of how those relations play off one another. Perhaps, for example, increasing the degree of one such relation must result, at some point, in a decrease in the degree of another so that the cases cannot be "lined up" to construct a continuous series.

In light of the three scenarios just considered, it is neither obvious nor trivial that a composition continuum is possible. Since his defense of premise (1) relies on it, Sider must defend the continuum's possibility. But he does not defend it.[8] And, more importantly, it is hard to see how he *could* defend it. For virtually all restricted compositionists are agnostic about the identity of those relations. As a result, they are agnostic about whether those relations render Sider's series possible. Sider's defense of (1) ends up stumbling over the same block—his opponent's agnosticism—as did the "intuitive desiderata" defense.

The first case is a man with a full head of hair. In each subsequent case the man has one hair fewer. By the last case, he is completely hairless. Adjacent cases differ only trivially

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[8] Sider's only comment relevant to this whole issue is that it is "extremely implausible" that composition does not supervene on other factors (2001, 122).

with respect to baldness. Sider would say that our coarse-grained rules for using 'bald' are not sensitive to such trivial differences. So, he would say, neither 'bald' nor 'not bald' determinately describes the man somewhere in the middle of the series. Thus, Sider would conclude, the man is vaguely bald somewhere in the middle of the series.[9]

All this is fairly straightforward. But a complication lurks. For Sider insists that 'exists' is not vague. (Recall premise (4) of the Vagueness Argument.) Yet 'exists', like 'bald', is the product of coarse-grained linguistic practices. Sider must explain why 'bald' is vague but 'exists' is not.

Sider does explain. His explanation begins with the idea that there are competing ways 'bald' could be made more precise, none of which is objectively more significant than any of the others. If instead one of these ways were the "most eligible" precisification—if one of these ways "carved nature at the joints"—then 'bald' would not be vague. For nature would step in and make the word 'bald' absolutely precise. Indeed, this is what Sider thinks actually happens with 'exists'. The reason 'exists' is not vague, according to Sider, is that there are not competing but equally good ways to make it precise; there is exactly one best way: the joint. (See, e.g., Sider, 2001, 128-130)[10]

Adjacent cases in the baldness series differ from one another only trivially, never

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[9] Recall that Lewis and Sider endorse a theory of vagueness according to which, for example, someone's being vaguely bald is understood in terms of the vagueness of 'bald'. This approach to vagueness is the source of premise (3): If it is sometimes vague whether something exists, then 'exists' is vague.

[10] Sider's account of joints in nature is controversial. But there is no point in considering objections to it. For recall that my aim is to criticize the Vagueness Argument without objecting to its defenders' theories of vagueness, theories which purport to tell us not only why terms like 'bald' are vague but also why 'exists' is not.

differing with respect to a joint in nature. Contrast this with a composition continuum. At the far left of the continuum is a case of scattered atoms $a_1...a_n$, composing nothing. At the far right is a case of those same atoms arranged to compose an object O. The case at the left includes only $a_1...a_n$; the case at the right includes not only $a_1...a_n$, but also O. Somewhere along the line, in the move from left to right, O is introduced. The addition of O is not trivial since, as Sider insists, a difference in what exists marks a joint. And the first case in which O exists is the first case in which composition occurs.

Sider would agree with all of this. He would endorse the above reasons for saying that restricted composition leads to a first case, in the composition continuum, in which composition occurs. Indeed, that restricted composition implies just this sort of sharp cut-off is essential to his continuous series defense of premise (1).

Also essential to that defense is:

(TS) It is implausible that there is a sharp cut-off in the composition continuum.

Sider believes that existence marks a joint in nature. And so he has at hand the resources to make sense of sharp cut-offs in existence, the resources to explain why a sharp cut-off in existence is far more plausible than a sharp cut-off in baldness. But, as should be clear, the cut-off in the composition continuum *just is* a cut-off in existence. For the cut-off is the first case in which we have composition of the sort that brings a composite object into existence. So it is odd that Sider—of all people—endorses (TS).

But set this *ad hominem* objection to (TS) aside. For the important point here is not that (TS) is an odd premise for someone like Sider. The point is not even that those who share Sider's views about existence marking a joint in nature can easily resist (TS), can easily

explain why a sharp cut-off in the composition continuum is plausible even if seemingly analogous sharp cut-offs in most other continua—such as those involving baldness or tallness or wealth—are not. The point is that (TS) is false. Or so I shall argue in the next section. That argument will complete my discussion of Sider's continuous series defense of premise (1). And that argument refutes not only (TS), but also premise (1) itself.

V. Vagueness and Composition

Recall the Vagueness Argument's first premise:

(1) If composition is restricted, then composition is sometimes vague [in such a way that the existence of some composite object is vague].

In attacking (1), I shall assume that composition is restricted. This begs no questions. For what is at issue in this section is not whether composition is restricted. What is at issue is, instead, what restricted composition implies. In particular, we want to know whether restricted composition implies that composition is sometimes vague. To answer this question, we assume—for the sake of argument—that composition is restricted. We then see what follows.

So assume that composition is restricted. Moreover, pretend the following story is true. Necessarily, simples are silent but composite objects emit a loud whistling noise. (That's right, they whistle.) Their whistling, according to this story, is not reduced to the collective activity of their parts. For example, it is not reduced to the spatial interrelations among the composite's parts, as it would be if the wind's blowing through the composite

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caused the whistling. Instead, whistling is a necessary result of composition itself. The whistling of composites, according to this story, is in some sense "emergent." And, finally, let us add that it cannot possibly be vague whether the whistling occurs.

Pretend that the "whistling composites" story is true. And suppose composition continua are possible. Consider a continuum that has, at one end, only simples; at the other, only those simples and the single object they compose. Moving along the continuum, it is obvious when the simples first compose an object. The sharp cut-off jumps right out. (Just listen.) And so, if the whistling composites story were true, then (TS)—which says that a sharp cut-off is implausible—would be false. Indeed, and more importantly, it should be clear that if that story were true, then composition would never be vague. And so, if that story were true, (1) would be false.

There are other "stories" which, if true, would undermine premise (1) and thereby undermine the Vagueness Argument. For example, the Vagueness Argument would fail if composites glowed (and glowing could not be vague) and simples did not. Similarly, the argument would fail if composites spun and simples were motionless. More generally, the Vagueness Argument fails if any story relevantly like the story of the whistling composites is true. In light of this, and for reasons that should become apparent below, I want to exchange (1) for the following:

> (1*) If composition is restricted *and every story relevantly like the story of the whistling composites is false*, then composition is sometimes vague [in such a way that the existence of some composite object is vague].

If we replace (1) with (1*), the argument ceases to be valid. To restore validity, we must add a premise:

(1.5) Every story relevantly like the story of the whistling composites is false.

There is nothing untoward in our recasting the Vagueness Argument with premises (1*) and (1.5) in place of premise (1). If the defender of the Vagueness Argument refuses to stand by (1*) and (1.5), she ought likewise refuse to stand by (1). For (1) is true if and only if both (1*) and (1.5) are true.[11]

What is it for a story to be "relevantly like" that of the whistling composites? According to the story of the whistling composites, composite objects are "something more than" their parts. For a composite's whistling, given that story, is not reduced to the collective activity or features of its parts. (Contrast this with, for example, a composite object's having a certain weight; that is presumably reduced to the collective weight of its parts.) Moreover, according to that story, whether whistling occurs is never vague. With this in mind, we can see what it would take for (1.5) to be false. First, all composites would have some feature or other that is not reduced to the collective work or features of their parts. Second, that feature would never be vague.

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[11] (1) is true if and only if both (1*) and (1.5) are true. The key to this equivalence is that, if (1.5) is false, then composition is not vague even if restricted. So if (1.5) is false, then so is premise (1). And obviously, if (1*) is false but (1.5) true, (1) is false as well. So (1) is true *only if* both (1*) and (1.5) are true. Moreover, (1) is true *if* both (1*) and (1.5) are true. This is an instance of the formula that p implies q *if* both r is true and (p & r) implies q.

Composition as identity is the logically revisionary claim that a single composite is *literally identical* with the many things that compose it (cf. Armstrong, 1997, 12; Baxter, 1988; Lewis, 1991, 80; Searle, 1992, 113). Thus composition as identity says that a composite is, in the strongest sense possible, nothing more than its parts.

Suppose that it is uncontroversial that some arbitrary objects—e.g., the xs—exist. But suppose that whether they compose something is a matter of controversy. Add that composition as identity is true. Then the object allegedly composed of the xs is identical with the xs. Given composition as identity, that object is identical with objects that uncontroversially exist. Endorsing that object's existence is as ontologically venturesome as endorsing the existence of Tully, given the uncontroversial existence of Cicero. There is no point in denying it. The point is general. Given composition as identity, restricted composition is absolutely unmotivated.

Indeed, given composition as identity, restricted composition may well be unintelligible. Restricted composition says that some objects—e.g., the xs—have a sum, but others—e.g., the ys—do not. This is an ontological distinction: The xs exist and, moreover, something exists composed of them; the ys exist and nothing exists composed of them. But, arguably, this ontological distinction makes no sense given composition as identity. Given composition as identity, once we've endorsed the existence of the xs and the ys, we have thereby endorsed the existence of their sums, which sums are nothing additional ontologically, nothing more in terms of what exists. Along these same lines, to deny that the ys have a sum is—given composition as identity—to deny the existence of something that, were it to exist, would be (identical with) the ys. But it seems nonsensical to deny the

existence of something that would, if it existed, be (identical with) things whose existence one affirms.

Or look at this way. Suppose the *y*s compose nothing. Presumably, the *y*s *could* compose something. So suppose that whatever must happen for the *y*s to compose something happens. (Perhaps the *y*s come to be arranged just so.) This should all make sense to the restricted compositionist. But, given composition as identity, it does not make sense. For after the *y*s "come to compose" something, there is nothing other than whatever is identical with the ys. Yet before the *y*s came to compose something, there was whatever was identical with the *y*s. As a result, the *y*s going from composing nothing to composing something involves no change in what exists. But this is inconsistent with the claim that an object (namely, the sum of the *y*s) did not exist before the *y*s came to compose something, but did exist afterwards.

Given composition as identity, it is hard to make sense of the idea that the *y*s do not compose something, although they could. Given composition as identity, it is hard to make sense of the idea that the *y*s exist but there is no entity that is their sum. Composition as identity undermines the distinctions that define restricted composition. So I conclude that composition as identity rules out restricted composition. Thus if composition is restricted, composition as identity is false.[12]

Of course, not everyone who thinks a composite is "nothing more than" its parts endorses the logically revisionary thesis of composition as identity. But restricted composition fares no better with respect to the claim that everything about a composite is

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[12] And there are other reasons to reject composition as identity. See Merricks, 2001, 20-28; and Sider, forthcoming.

reduced to its parts (and their features and interrelations, etc.) than it did with respect to composition as identity. For starters, restricted composition is clearly unmotivated given this sort of reductionism. Suppose that everything about a composite is reduced to its parts. Suppose, for example, that the alleged sum of your head and the Statue of Liberty is nothing more than said head and Lady Liberty. And suppose that you agree that your head and that statue exist. Then there is no reason to deny their sum. That sum is nothing more than objects you already accept. The point is general. If a composite is reduced to its parts (and their features and interrelations, etc.), then restricted composition is unmotivated.

It is not only unmotivated, it is virtually unintelligible. The distinction that defines restricted composition is the distinction between objects that have a sum and objects that do not. But that distinction is suspect, given the reduction of sums to their parts. It is suspect to say that there is something composed of the xs—which is nothing more than the xs—while denying that there is something composed of the ys—though the ys exist, and if they composed something it would be nothing more than the ys. Indeed, if everything about a composite is reduced to the objects that compose it, whenever you have those objects, you thereby seem to have something they compose—that "something" is nothing more than the original objects.

Or look at it this way. Suppose the ys fail to compose something. Suppose the ys then come to be interrelated in a new way, way R. Suppose that a restricted compositionist who knows that the ys have come to be R-interrelated asks whether the ys have thereby come to compose something. Given restricted composition, this is a perfectly sensible question. But it is not a perfectly sensible question if there is nothing more to the sum of the ys than the ys and their being R-interrelated. For *ex hypothesi*, the restricted compositionist already knows that

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the *y*s exist and are R-interrelated. Therefore, given the reductionism under discussion here, there is nothing left for the restricted compositionist to ask about.

So I conclude that if everything about a composite is reduced to its parts (and their features and interrelations, etc.), restricted composition is false. If composition is restricted, then *something* about each composite object is not reduced to its parts. If composition is restricted, each composite object has some irreducible property or other. Of course, composites do not all have the irreducible property of *being a whistler*. Again, the whistling composites story is false and obviously so. So—if composition is restricted—in what way are composites more than their parts?

Nothing defended in this paper depends on a particular answer to this question. But let me briefly sketch what I think is the right answer, just to illustrate that not every answer is as untenable as "whistling."   To cause an effect non-redundantly is to cause an effect that nothing else causes. In particular, a composite object causes an effect E non-redundantly only if E is not caused by that object's parts working in concert. Thus a composite object's exercising non-redundant causal power—an object's causing something non-redundantly—cannot be reduced to what its parts cause working in concert. In this way, an object's exercising non-redundant causal power is irreducible to its parts (and their features and interrelations, etc.). I think that each and every composite object has non-redundant causal powers. So I think that composites have irreducible features.

This can be partially motivated as follows.[13] Consider all the atoms of your body save atom a_n, an atom in your left arm. Those atoms fail to compose something with mental properties, since if they did, we would have two thinkers—you and it—where there is but one,

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[13] A full defense of this position can be found in my *Objects and Persons*; see also Merricks, 2003.

you. Suppose you then lose a_n, shrinking by a single atom, though none of your other atoms change with respect to what they cause. Still, those atoms go from composing no thinker to composing you. You cause things in virtue of your mental properties. But this cannot be reduced to what your constituent atoms cause, since they cause exactly what they were causing back when they failed to compose a thing with mental properties. Thus your mental properties give you irreducible and non-redundant causal powers.

Non-redundant causal powers are merely an example of an irreducible feature. Such powers are not essential to my case for (1)'s falsity. What is essential is the claim that if composition is restricted, then *something* about each composite object is not reduced to its parts (and their features and interrelations, etc.). That claim has two important results. The first, developed in the remainder of this section, is the demise of the Vagueness Argument. The second, developed in the final section, is a new way to look at debates over composition.

The claim that each composite has an irreducible feature does not, all by itself, show that (1.5) is false. The falsity of (1.5) requires that irreducible feature never to be vague. In arguing that it never is vague, I shall rely on the Vagueness Argument's assumptions about vagueness. (I shall not rely on these assumptions in the final section of the paper, which goes beyond the Vagueness Argument.) One could resist my argument by rejecting those assumptions. But that would undermine the Vagueness Argument. And, in this section, undermining the Vagueness Argument is all that matters.

Defenders of the Vagueness Argument have given no reason to think that the irreducible feature of composite objects can be vague. After all, they have (at least so far) nothing at all to say about this feature. On the other hand, the Vagueness Argument's prohibition against vague existence is itself a reason to think that the feature cannot be vague. For suppose that, necessarily, a composite exists just in case an irreducible feature is exemplified. Then its being vague whether such a feature is exemplified implies that it is vague whether a composite exists. But vague existence is out. So I conclude that the irreducible feature cannot be vague.[14]

Here is a second argument. A gerrymandered property—like the property of *being-four-feet-tall-or-having-negative-charge-or-being-both-Plato-and-Greek*—is "built up out of" other properties in funny ways. Irreducible properties are not built up out of other properties at all. So irreducible properties are as far from gerrymandered as they could possibly be. Thus it is plausible that each irreducible property is natural.

Some resist the idea that some properties are natural, others not. But defenders of the Vagueness Argument accept this idea. Moreover, they add that natural properties are not vague. (Recall that Sider explicitly argues that *existence* is not vague because 'exists' carves nature at the joints.) So, given the Vagueness Argument's assumptions about vagueness, we can add that not only is the irreducible property of each composite natural, it is not vague.

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[14] The prohibition on vague existence obviously guarantees that *existing* cannot be vague. So the Vagueness Argument fails if *existing* is analogous to *being a whistler*. That is, the argument fails if a composite, merely in virtue of existing, is something more than its parts. I am not sure what to say about this, so I would not want to rely on it in defending the conclusions of this paper. Happily, I do not need to, since I think composite objects have non-redundant causal powers, which clearly make them more than their parts.

We can now complete my discussion of Sider's defense of premise (1). Reconsider Sider's key assumption:

(TS) It is implausible that there is a sharp cut-off in the composition continuum.

Recall that, given the whistling composites story, it is *not implausible* that there is a sharp cut-off in the composition continuum. And so, given the whistling composites story, (TS) is false. Of course, the whistling composites story is not true. But, I have argued, if composition is restricted, some story or other relevantly like it is true. And so (TS) is false.

Restricted composition implies that each composite object has a feature that is not reducible to its parts (and their features and interrelations, etc.). Relying on the Vagueness Argument's assumptions about vagueness, we can show that this feature cannot be vague. This implies that (1.5) is false. Since (1.5) is false, so is (1). And the Vagueness Argument fails.

VI. A New Approach

If composition is restricted, then each composite object has some feature or other that is not reduced to its parts (and their features and interrelations, etc.). Perhaps this should not be surprising. After all, lest restricted composition seem arbitrary, there should be something special about the product of atoms that compose an object. That is, there should be something about that product that differs relevantly from the ersatz "product" of atoms that compose nothing at all. One natural idea is that the product of genuine composition is something more than its constituent atoms, whereas the ersatz "product" of atoms that compose nothing is, naturally, just those atoms.

This natural idea—defended in the previous section—shows that restricted composition is not arbitrary. Moreover, this idea casts new light on the debate over restricted composition. To begin to see how, note that unrestricted composition is most compelling when restricted composition really does seem arbitrary. So unrestricted composition is most attractive if every composite is reduced to its parts. Thus the following is plausible. If composition is unrestricted, then composite objects are nothing more than their parts.

In the last section, I claimed that if everything about a composite is reduced to the objects that compose it, then whenever you have those objects, you thereby have something they compose—that "something" is nothing more than the original objects. And so we might plausibly conclude that if composites are nothing more than their parts, then composition is unrestricted. Combine this with the conditional at the end of the preceding paragraph and we get that composition is unrestricted if and only if composites are nothing more than their parts.

But we can look at things another way. Suppose that every object is either a simple or composed of simples. And suppose that a composite is nothing more than its parts. This

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might suggest compositional nihilism, the claim that composition never occurs. After all, if composite objects are nothing more than their constituent simples, then all objects are—in some sense—nothing more than simples. Thus there are only simples. And so composition never occurs.

Moreover, suppose that only simples exist. Still, we might speak somewhat loosely and say "there are composite objects," as long as such "objects" are nothing more than their constituent simples. Thus if composition never occurs, composites are nothing more than their parts. Combined with the conclusion of the last paragraph, this implies that composition never occurs if and only if composites are nothing more than their parts.

Suppose that all of the above is right. Then composition never occurs if and only if composite objects are nothing more than their parts. And composition is unrestricted if and only if composite objects are nothing more than their parts. Of course, the sense in which compositional nihilism says that objects are "nothing more than" their parts must differ from the sense in which unrestricted composition says this.[15] But I do not want to focus on this or other differences between nihilism and unrestricted composition. Rather, I want to emphasize an important and overlooked similarity. That similarity is that compositional nihilism and unrestricted composition agree that composite objects are—in some sense or other—nothing more than their parts. Thus they are joined in opposition to restricted composition, which

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[15] If not, we could combine the two bi-conditionals and conclude that composition never occurs if and only if composition is unrestricted. (If only a proof of restricted composition were that easy!) This difference regarding the sense in which a composite is nothing more than its parts is just one of the differences between nihilism and unrestricted composition. Perhaps the most important difference—if not the most obvious—is that compositional nihilism, unlike unrestricted composition, implies that there are simples.

says that composites are more than their parts.

Some philosophers claim not to understand what all the fuss is about in debates over composition. They claim not to understand what is at issue between someone who thinks there is something composed of the Statue of Liberty and your head and someone who denies this. But perhaps at least some of these philosophers can see the point of asking whether each composite object has some feature or other not reduced to its parts. Once they see the point of this question, they can see part of what is at issue between, on the one side, restricted compositionists and, on the other, unrestricted compositionists and compositional nihilists.

Philosophers interested in the scope of composition should turn their attention away from questions of vagueness and toward the question of whether a composite is something more than its parts. The answer to this question will tell us whether composition is restricted. And if composition is restricted, we now have a useful tool for discovering when it occurs. For we can now ask: If composition were to occur, would the resulting object be more than its parts? If not, then there is no such object.[16]

Department of Philosophy   TRENTON MERRICKS

University of Virginia

Charlottesville, VA 22904

USA

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merricks@virginia.edu

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