UNIVERSALISM AND EXTENSIONALISM: A REPLY TO VARZI

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In a recent article in this journal, Achille Varzi (2009) argues that mereological universalism (U) entails mereological extensionalism (E):

(U)   Any non-empty collection of things has a fusion, i.e., something that has all those things as parts and has no part that is disjoint from each of them.

(E)   No two things have exactly the same proper parts (unless they are atomic, i.e., have no proper parts at all).

The thesis that U entails E (call it 'T') has important implications. For example, as is well known, T plays a crucial role in Peter van Inwagen's (1990) argument *against* universalism. Simply put, and adapted a bit for the present context, that argument runs as follows:

> Suppose that universalism is true. Now, consider the particles—the Xs—that compose Socrates (or his body, if materialism is false) at *t*—a time when Socrates is a child. Note that the Xs compose *Socrates*, not a mere temporal part of or stand-in for Socrates. Suppose further that, ten years later, at t_1, the Xs still exist but different particles compose Socrates. By universalism, the Xs have a sum at t_1 (call it 'S'); but, by our second supposition, S ≠ Socrates.   But "[i]f universalism is true, then the Xs cannot ever compose two objects…either simultaneously or successively." (1990: 75)   Therefore universalism is false.

The quoted premise, obviously, is just a restatement of Varzi's conclusion, T.[1]

Van Inwagen's argument will have no purchase on anyone who believes that objects 'change their parts over time' by having temporal parts at different times that are themselves composed of different parts. Likewise, familiar material objects like human bodies will raise no problems for T if we assume that such things don't *really* undergo mereological change. But universalists (like me) who believe that ordinary material composites like human bodies genuinely change their parts over time can resist van Inwagen's argument only by resisting T. I have argued elsewhere (1998) that van Inwagen's defense of T fails if one believes (as a universalist very well might) that for some Xs, what the Xs compose depends on how the Xs are arranged. Matthew McGrath (1998) offered an alternative defense of T; but, as I argued in Rea 1999, that defense also fails if we suppose that what some Xs compose

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[1] It is, at any rate, on the assumption that necessarily, if the Xs compose two objects successively, then there is an *x* and *y* such that x ≠ y but x and y *have* exactly the same proper parts. One might resist this assumption, however—perhaps for presentist reasons, objecting to the tenseless quantifier. And one might also insist that the verbs in U and E are properly construed as tensed. For such a person, van Inwagen's conclusion will be stronger than Varzi's; for Varzi's (on this new construal) will imply only that, given universalism, no two objects can *simultaneously* be composed of the same proper parts. For the remainder of the paper I will ignore this complication and proceed under the assumption that tenseless language is unproblematic.

depends on how they are arranged. Varzi's defense, however, does not fail in this way. Absent a rebuttal, then, my brand of universalism is in trouble.

In what follows, I show that Varzi's arguments for T rely on a tendentious assumption about parthood. Specifically, it relies on the following assumption, where '<' is the parthood relation and '<<' is the relation of proper parthood:

SD1*: $x < y \equiv x << y \vee x = y$

(I say that SD1* is an *assumption* rather than a *definition* because I am not sure whether Varzi thinks that SD1* is true by definition. At any rate, it makes no difference to his arguments if SD1* is taken to be true by definition; all that matters is its truth.) The assumption is tendentious because it is presupposed by standard *extensional* mereologies, known to be hostile to non-extensional mereologies, and not at all obviously included in our intuitive, pre-theoretical notion of parthood. A successful argument for T along the lines that Varzi has given would have to show that the universalist is *committed* to SD1*, which she would be if, for example, it could be shown to follow from axioms or definitions that are partly constitutive of the meaning of the English word 'part'. But Varzi has done nothing like this. Thus, so I shall argue, it is open to the universalist to say that SD1* isn't true of the parthood relation (even if it *is* true of whatever relation Varzi means by 'part'), and that Varzi's arguments, therefore, do not show that U entails E.

1. Let's begin with some assumptions and terminology. Every part of a thing is either a proper part or an improper part of that thing. For purposes here, I'll assume that the proper part relation obeys the following axioms of what Peter Simons calls 'minimal extensional mereology' (1987: 31):

SA1: $x << y \supset \neg y >> x$ (*x* is a proper part of *y* only if *y* is not a proper part of *x*)
SA2: $x << y \wedge y << z \supset x << z$ (proper parthood is transitive)

According to Simons, SA1 and SA2 are "partly constitutive of the meaning of 'part'". (1987: 11) Varzi concurs, at least about SA2 (he does not comment on SA1).

According to Varzi (2009: 599), the following principle is also partly constitutive of the meaning of the word 'part':

Supplementation: Whenever a thing has a proper part, it has at least another part that is disjoint from the first.

I will not take issue with either of these assumptions. Nor will I take issue with the following further principle which figures in one of the two arguments that Varzi offers for T:

Strong Supplementation: Whenever a thing is not part of another, the first has at least a part that is disjoint from the second.

Varzi himself does not take *Supplementation* as an undefended assumption. Rather, he argues that it is derivable from the conjunction of SA2 with the following obvious consequence of U:

> *Product*:   Any pair of overlapping things has a product, i.e. something whose parts are exactly the parts those things have in common.

Since I don't propose to reject *Product*, however, I omit the derivation.

We should also note that, within minimal extensional mereology, proper parthood is taken as primitive, and parthood ('<') is *defined* as follows (Simons 1987: 26):

(SD1) $x < y =_{df} x << y \vee x = y$

Obviously if every part of a thing is either a proper part or an improper part, it follows from SD1 that x is an improper part of y only if $x = y$. Varzi does not explicitly endorse SD1, so I shall not attribute it to him. However, in the next section, I will show that Varzi needs at least the biconditional that corresponds to SD1—namely, SD1*—in order for his arguments to establish the desired conclusion.

2. As I have already noted, Varzi offers two arguments for T. The first consists of an argument for the conclusion (already granted) that *Product*, a consequence of U, and *Transitivity* together entail *Strong Supplementation*, and that *Strong Supplementation*, in turn, entails E. In defense of the claim that *Strong Supplementation* entails E, Varzi cites Simons 1987: 29ff. Turning to the relevant portion of Simons's work, however, one finds that it is slightly misleading to suggest that Simons argues straightforwardly for the conclusion that *Strong Supplementation* entails E. Rather, what Simons does is to show that *given SD1** (among other things), *Strong Supplementation* entails a partially contraposed equivalent of the following principle:

(PPP) $\exists z(z<<x) \wedge \forall z(z<<x \supset z<<y) \supset x < y$

Immediately following the argument, Simons notes that *Strong Supplementation* rules out models in which distinct individuals share all of the same parts, and that (the contraposed equivalent of) PPP also does so. But, of course, Simons's claims there about what models are ruled out by *Strong Supplementation* apply only to the *extensional mereologies* that include, among other things, SD1*. Without SD1*, neither *Strong Supplementation* nor PPP implies E. Both imply that if x and y share all of the same parts in common, each is part of the other and neither is a proper part of the other. But SD1* is needed in order to infer from this conclusion the claim that $x = y$.

SD1* is also presupposed in Varzi's second argument, which purports to establish T without appeal to Strong Supplementation. I reproduce the argument in full:

For suppose that x and y are distinct non-atomic objects. There are two possibilities:

(a) One object, say x, is part of the other, y. Then obviously x and y don't have the same proper parts. For x must be a proper part of y, though it cannot be a proper part of itself (on pain of being non-self-identical).

(b) Neither x nor y is part of the other. Then let z be a fusion of x and y whose existence follows from (U). By definition of 'fusion', x must be part of z, in fact a proper part. (If x were identical to z, then y, which must also be part of z, would be part of x,

contrary to what we are assuming.) Thus, by [*Supplementation*], z has a part, z_1, that is disjoint from x. By definition of 'fusion', again, z_1 cannot be also disjoint from y, which is to say that it must have a part, z_2, in common with y. Now, either z_2 is a proper part of y or z_2 is y. In the first case, it is clear that z_2 cannot be part of x, let alone a proper part, since x is disjoint from z_1. In the second case, let z_3 be a proper part of y (which is not atomic). By [*Transitivity*], z_3 must be part of z_1, hence again it cannot be part of x, let alone a proper part. It follows that in both cases x does not have the same proper parts as y.

Since (a) and (b) are the only possibilities, this shows that the non-identity of x and y is reflected in their different mereological composition. (E) now follows by generalization. (2009: 600)

The thing to notice, however, is that this argument, too, presupposes SD1*. In (a), SD1* undergirds the move from the claim that x is part of y (but distinct from y) to the claim that 'x must be a proper part of y'. Without it, the possibility is left open that x is an improper part of y that is distinct from y. In (b), SD1* undergirds the claim that "either z_2 is a proper part of y or z_2 is y." Without SD1*, the possibility is left open that z_2 is an improper part of y that is distinct from y. In (b), SD1* also undergirds the claim that x must be a proper part of the fusion, z, of x and y. Absent SD1*, the possibility is left open that x is an improper part of that fusion.

3. Varzi's arguments for T presuppose a claim about the parthood relation (and, by implication, about improper parthood) that is hostile to the non-extensionalist. As Simons notes, "'part' is *defined* in SD1 as 'proper part or identical'"; but, he says, there remains "the supplementary question whether this is the best definition of the intuitive concept of proper-or-improper part." (1987: 112) Non-extensionalists, of course, will say no; and so they will naturally offer something like the following reply to Varzi's arguments (buttressed with the arguments like those I have just given):

Reply: Varzi's arguments fail to establish T for the simple reason that he has not defended his assumption that parthood obeys SD1*. At best, then he has only succeeded in establishing the conclusion that U* entails E*:

(U*)   Any non-empty collection of things has a fusion$_{SD1}$, i.e., something that has all those things as parts$_{SD1}$ and has no part$_{SD1}$ that is disjoint from each of them.

(E*)   No two things have exactly the same proper parts$_{SD1}$ (unless they are atomic$_{SD1}$, i.e., have no proper parts$_{SD1}$ at all)

But it is an open question whether U* is universalism, and E* is extensionalism; for it is an open question whether fusions$_{SD1}$ are the same things as fusions, atoms$_{SD1}$ are the same things as atoms, and parts$_{SD1}$ are the same things as parts.[2]

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[2] A referee for this journal has suggested that, in effect, my reply to Varzi on behalf of the universalist is that he has mischaracterized universalism. But this is not correct. The formulation of universalism is fine, assuming 'part'

The universalist may then go on to offer a definition that (in her view) *does* capture the intuitive concept of parthood (which we may abbreviate as '≤'). To the extent that such new definitions are plausible, support will be lent to the claim that Universalism does *not* entail extensionalism.

Here is an example (but only an example—I do not myself endorse the following proposal). Simons (1987: 112) invites us to consider the following biconditional (taking '<<' still as primitive) as defining parthood:

SD15 $x \leq y \equiv [\exists z(z<<x) \supset \forall z(z<<x \supset z<<y)] \wedge [\neg\exists z(z<<x) \supset x << y \vee x = y]$

Informally, SD15 says: *x* is a part of y iff (i) if x has proper parts, then every proper part of x is a proper part of y and (ii) if x lacks proper parts, then either x is a proper part of y or x is identical to y. SD15 allows for non-identical objects to coincide. Moreover, rejecting SD1* in favor of SD15 undermines both of Varzi's arguments. To see why, suppose extensionalism is false and let A and B be distinct objects that share all of the same parts in common. A and B might be, for example, a bronze statue and the lump of bronze that constitutes it, or a tree and the lump of tissue that constitutes it, or any of a myriad other examples that populate the literature on material constitution. A and B satisfy the antecedent of PPP; thus, PPP implies that A is part of B (and vice versa)—precisely the result delivered by SD15. Thus, PPP poses no problem for the extensionalist. Likewise, *Strong Supplementation* is equivalent to the claim that if *x* and *y* share all of the same parts, then *x* is a part of *y*. Again, A and B satisfy the antecedent; and the consequent is precisely what SD15 delivers. Hence no problem from *Strong Supplementation*. So the first argument fails. Now for the second argument. As shown earlier, that argument relies on the validity of the following two inferences: (i) x is a part of y and x ≠ y; therefore, x is a proper part of y; and (ii) if z_2 is a part of y, then z_2 is a proper part of y or z_2 = y. Replacing SD1* with SD15, however, renders these inferences invalid; and our objects A and B provide a counterexample to both. Thus, the second argument fails as well.

One might object that SD15 faces its own share of problems. For example, consider again the parts—the Xs—that compose Socrates as a child. Those Xs are widely scattered now, but still exist (let us suppose). By Universalism, the, they have a sum—S. With Varzi's argument from U to E blocked, we need not conclude (absurdly) that S = Socrates. But SD15—*together with other assumptions (like eternalism)*—forces upon us the conclusion that S is a part of Socrates. Clearly this is no improvement.[3]

But this objection is not really pertinent to my argument. Non-extensionalists who reject one of the additional assumptions needed to get the conclusion that Scorates = S—presentists, for example—will be unmoved by this objection.[4] Others might simply reject SD15 in favor of a different non-extensionalist definition of 'part'. SD1* and SD15 are not, after all, the only possible options.

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means *part*; the problem is just that he has offered no defense of an important and controversial assumption about the parthood relation.
[3] Thanks to an anonymous referee for raising this problem.
[4] Elsewhere (Rea 2001), for example, I have expressed a preference for a temporally relativized version of universalism. This move also avoids the present problem.

Of course, nothing I have said here establishes the denial of T. For all I have said, Varzi might be right in thinking that parthood obeys SD1*. My point, rather, is just that he is not entitled to *assume* that it does in giving an argument from U to E. Which definition best captures the sense of 'part' in play in U and E will be a matter of (reasonable, substantive) controversy. Thus, in order to establish T (via something like the argument I have considered here) Varzi would have to address that controversy, and show that the Universalist as such is committed to SD1*. But this he has not done.[5]

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[5] In writing this paper, I have benefitted from comments by an anonymous referee for this journal and from correspondence with Achille Varzi. Thanks to both of them for their help.