In defence of the Simplicity Argument

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Eric Olson [2] correctly attributes to me an argument, which he dubs *the Simplicity Argument*, the conclusion of which is that I am a simple entity, altogether lacking parts (see my [1], pp. 39f). However, he also asserts that the argument is 'formally invalid' (p. 401): and this is what I want to dispute here, leaving aside for present purposes the question of whether its premises are true. (I shall, however, discuss an objection to one of the premises after the primary business of the paper has been concluded.)

I. Olson's Objection

Olson says that the Simplicity Argument has three main premises, as follows. (1) I am not identical with my body. (2) I am not identical with any part of my body. (3) No two things can have exactly the same proper parts at once. Olson calls premise (3) the *Weak Principle of Mereological Extensionality*. (As I shall explain later, this principle is in fact unacceptable as it stands and would need to be modified in a wholly satisfactory version of the Simplicity Argument, but for the time being this minor complication can safely be ignored.) In describing (1), (2) and (3) as being the 'main' premises of the Simplicity Argument, Olson is implicitly acknowledging that I do not claim that its conclusion is entailed by those premises alone. Other assumptions are also in play, as Olson recognises—one of these being that I do not have any parts which are *not* parts of my body.

Why, however, does Olson think that the Simplicity Argument is invalid? This is what he says:

> It does not follow from the Weak Principle, together with the claim that I am not my body, that I must either have no parts at all, be identical with a part of my body, or have a part that is not a part of my body. Imagine that both my body and I are made up entirely of atoms—the very same atoms. Suppose, however, that my *heart* is a part of my body but not a part of me (though of course the atoms that make it up are parts of me). In that case I should be neither identical with my body *nor identical with any part of my body* [emphasis added]. The Weak Principle allows this, for my body and I should not have exactly the same parts. Thus, it is consistent with the premises of the Simplicity Argument that I have as many parts as you like. ([2], p. 401)

But although the Weak Principle does indeed imply that, in the circumstances imagined by Olson, I am not identical with my body (because I and it have different parts), why does Olson think that it is also implied that I am not identical with any *part* of my body? He does not explain. Indeed, it seems pretty clear to me that in these circumstances I *would* be identical with a part of my body. For the atoms of which, on Olson's

supposition, I am entirely made up are evidently parts of my body, and consequently the *mereological sum* of those atoms is a part of my body. Hence, unless I have some part which is not a part of that sum, I have exactly the same parts as that sum of atoms and so, by the Weak Principle, I am identical with it and thus with a part of my body, contrary to premise (2) of the Simplicity Argument. But what other part might I have, which is not a part of that sum of atoms? If it is just some further part of my body, such as my brain, then we can simply add it to the sum of atoms to make another part of my body with which, by the Weak Principle, I would have to be identical. So, to avoid that consequence, I would have to have, in addition to the atoms as parts, some further part which was *not* a part of my body—and, as I pointed out in my original presentation of the argument, no such further part appears to be available.

So long as all of my supposed parts are also parts of my body, they have a mereological sum which is itself a part of my body, and one with exactly the same parts as I supposedly have. Hence, by the Weak Principle of Mereological Extensionality, I am identical with that part of my body, contrary to premise (2) of the Simplicity Argument. The only further assumptions that I am appealing to here are familiar principles of classical extensional mereology—in particular, the principles that any finite number of individuals has a unique mereological sum and that if each of a finite number of individuals is a part of a given individual, then the sum of those individuals is likewise a part of that individual (see Simons [3], p. 14, pp. 37ff). (As we shall see when I come to present a formal version of the Simplicity Argument at the end of the paper, there is in fact one other mereological principle that I am implicitly relying on—the Weak Supplementation Principle—though it, too, is a familiar enough one.) These principles of classical extensional mereology imply, for instance, that if each of the atoms making up my body is a part of my body (which is hardly contestable), then the sum of those atoms exists and is a part of my body. Similarly, they imply that for any finite number of cells each of which is a part of my body, the sum of those cells exists and is a part of my body.

Now, I do not want to commit myself here to absolutely every principle of classical extensional mereology. But I see no reason to challenge its implication that the sum of atoms making up my body exists and is a part of my body. Even if one questions (though I myself do not) whether any finite number of individuals whatever has a sum—perhaps on the grounds that things like the Eiffel Tower and my left big toe are too dissimilar and too unrelated to one another to have a sum—no such objection could be raised against the supposition that the atoms making up my body have a sum, because the atoms are very similar individuals which are closely related to one another, both spatiotemporally and causally. Of course, such a sum of atoms is not very much like such a body-part as a heart or a brain (a bodily organ), but that is no reason to deny that it is indeed a part of a body. And, certainly, I have never suggested that, for the purposes of the Simplicity Argument, the only parts of my body that need to be taken into account are those that are like the heart and the brain, together with the atoms of which such organic body-parts are composed. Perhaps Olson is making some such assumption as this, but I most assuredly am not. I conclude that the Simplicity Argument emerges unscathed from his charge that it is 'formally invalid'. In point of fact, I myself have never hitherto even attempted to present the argument in a formal guise, in which all of its premises are made fully explicit. This I shall do shortly, when I shall naturally include as premises the further mereological assumptions which I have identified in this paper and which seem to me to be relatively

uncontentious—much less contentious, certainly, than any of the three premises of the Simplicity Argument which Olson himself explicitly identifies. With those further assumptions in place, I think there can be no doubt that the Simplicity Argument is *valid*. The only remaining question is whether it is *sound*.

II. The Weak Principle of Mereological Extensionality

Before I conclude this paper with a formal presentation of the Simplicity Argument, I should like to address an interesting objection to premise (3), the Weak Principle of Mereological Extensionality, which has been raised by an anonymous referee for this journal. I should emphasise that, to the extent that this objection questions the *soundness* rather than the *validity* of the Simplicity Argument, it is tangential to the main concern of the paper. However, the objection is sufficiently important in itself to warrant some discussion here. After I have dealt with the objection, I shall explain why the Weak Principle of Mereological Extensionality, as formulated by Olson, does in fact require modification in any case, although only in a way which does not affect the validity of the Simplicity Argument.

The objection takes off from the observation that I assume that my body is not identical with the sum of the atoms composing it and that Olson makes the same assumption in arguing against me. My own primary reason for thinking that this assumption is correct is that I consider my body and the sum of the atoms composing it to have different persistence-conditions—for instance, my body could survive the destruction of some of those atoms, but the sum of those atoms could not. One way of articulating the intuitive distinction between the two entities in question is to say that my body is an *organic whole*, whereas the sum of the atoms composing it is not. Now, one reason why, on my view, my body and the sum of the atoms composing it do not provide a counterexample to the Weak Principle of Mereological Extensionality is that my body's various *organic parts*—such as its heart and its brain—are not parts of the sum of atoms composing my body. Each such organic part of my body is itself a (lesser) organic whole, which is likewise distinct from the sum of the atoms composing it. However, in view of the fact that my body, and thus any organic part of it, is composed of finitely many atoms, it seems that my body must have certain organic parts of *least size*, these being organic wholes which do not have any organic parts of their own. We could call such least organic wholes *organic molecules*. And, indeed, in the case of a human body, its least organic parts are perhaps precisely that, in the ordinary chemical sense of the expression—that is, they may be such things as individual DNA molecules. The problem is, however, that since an organic molecule has no organic parts of its own, it might appear to have exactly the same parts as the sum of the atoms composing it, in contravention of the Weak Principle of Mereological Extensionality.

My response to this apparent problem is to insist that organic wholes always have, in addition to any organic parts they may have, *structural* and/or *functional* parts, which something like a sum of atoms does not have. In the case of a human body, the neck and the elbows are examples of structural parts, while the nervous and digestive systems are examples of functional parts. These are quite unlike organic body-parts, for the latter are entities which can, in principle, exist independently of the bodies of which they are parts and even be transplanted from one body to another, as happens in a heart-transplant

operation. Structural and functional parts do not have this kind of independence. We may be misled about this by the fact that some of our terms for body-parts are ambiguous. Thus, the terms 'heart' and 'brain', although normally used to denote certain kinds of organic body-parts, can also be used to denote certain kinds of functional body-parts—'brain', for instance, being used to denote the central control unit of a body's central nervous system. Again, 'elbow' can sometimes be used to refer to an elbow *joint*, an organic body-part which can certainly be transplanted from one body to another, unlike the elbows which are structural parts of a human body. An elbow joint could, conceivably, be used to replace a defective knee joint, but this wouldn't mean that the body receiving the transplant had acquired a third elbow in the *structural* sense of 'elbow'. Now, even organic molecules (in my technical sense of the expression) must have structural and/or functional parts. This requirement can be illustrated by the actual case of DNA molecules, which in addition to the atoms composing them, have as structural parts the various valence bonds between those atoms. These bonds are clearly *parts* of a DNA molecule, and have to be represented as such in any adequate model or diagram of a DNA molecule. But they are not *composed* of the atoms (nor are they literally *composed* of the electrons within those atoms whose interrelationships are responsible for the existence of the bonds). Thus, a DNA molecule is not only an organic whole which is distinct from the sum of the atoms composing it, it is also something which has certain non-organic parts—the valence bonds—which are not parts of that sum of atoms. And that, in my view, is why it constitutes no counterexample to the Weak Principle of Mereological Extensionality.

This is a convenient point for me to explain why the Weak Principle of Mereological Extensionality, as formulated by Olson, does in fact require amendment, although only in a way which does not affect the validity of the Simplicity Argument. As formulated by Olson, the principle states that no two things can have exactly the same proper parts at once. However, this implies, unacceptably, that there cannot be more than one thing which altogether lacks proper parts—because, trivially, things which have no proper parts have exactly the same proper parts (cf. Simons [3], p. 28). Since I maintain that both you and I are simple things, altogether lacking proper parts, this would commit me to saying, absurdly, that you and I are identical. The right way to formulate the principle, clearly, is to say that no two things *which have proper parts* can have exactly the same proper parts at once. But if the Simplicity Argument is valid using Olson's version of the principle, then it is clearly also valid using this modified version of the principle, even though the modified version is weaker. This will be evident from the formal presentation of the Simplicity Argument provided below, where it is formulated as a reductio ad absurdum of the hypothesis that I have proper parts—for the modified version of the principle clearly applies to me under that hypothesis. In view of this fact, and in order not to deviate from the Simplicity Argument as stated by Olson, I shall continue to employ his version of the principle in what follows.

III. A Formal Version of the Simplicity Argument

To conclude the paper, I shall now present, as promised, a formal version of the Simplicity Argument in which all of its premises are made explicit. Let 'I' denote me and

'B' denote my body. And let '<' express the relation of proper parthood. Then the first three premises of the Simplicity Argument are as follows:

(1) $\neg(I = B)$

(2) $(\forall x)(x < B \rightarrow \neg(I = x))$

(3) $(\forall x) (\forall y) (x = y \leftrightarrow (\forall z)(z < x \leftrightarrow z < y))$

(1) and (2) state, respectively, that I am not identical with my body and that I am not identical with any proper part of my body. Note that I have made a minor amendment to Olson's version of premise (2), because if 'part' in his version is understood as meaning 'proper or improper part', premise (1) becomes redundant. (3), of course, is the Weak Principle of Mereological Extensionality, as stated by Olson—the principle that things which have exactly the same proper parts are identical. (At the appropriate point in the proof, however, I shall say how the modified version of the principle mentioned earlier can be used instead of Olson's version.)

The next premise we need is the proposition that I have no proper parts which are not proper parts of my body:

(4) $(\forall x)(x < I \rightarrow x < B)$

Note that we could, in fact, have appealed to a slightly weaker proposition instead of (4), namely, the proposition that I have no proper parts which are not proper or improper parts of my body, given a further principle that we shall be assuming anyway, namely, the Weak Supplementation Principle (see below). For the latter principle, together with the proposed replacement for (4), rules out the possibility that my body is a proper part of me (on the grounds that I should then have to have some further proper part, disjoint from my body, which (4)'s replacement precludes).

Finally, we need the premise that any finite number of proper parts of an object O has a unique mereological sum which is itself a part (either proper or improper) of O:

(5) $(\forall x_1)(\forall x_2)...(\forall x_n)((x_1 < O \ \& \ x_2 < O \ \& \ ... \ x_n < O) \rightarrow (\exists y) (y = [x_1 + x_2 + ... \ x_n] \ \& \ (y < O \lor y = O)))$

where ' $[x_1 + x_2 + ... \ x_n]$ ' denotes the mereological sum of x_1, x_2, ... and x_n.

Now suppose, for reductio, that a_1, a_2, ... and a_n are all the (finitely many) proper parts that I have:

(6) $a_1 < I \ \& \ a_2 < I \ \& \ ... \ a_n < I \ \& \ (\forall x)(x < I \rightarrow (x = a_1 \lor x = a_2 \lor ... x = a_n))$

We can assume that n here is greater than 1 by the Weak Supplementation Principle, that is, the principle that if an individual has a proper part, then it must have another proper part disjoint from that first part, and hence that no individual can have just one proper part (see Simons [3], p. 28). Our proof proceeds as follows.

From (6) we can immediately infer

(7) $a_1 < I \ \& \ a_2 < I \ \& \ ... \ a_n < I$

and from (4) and (7) we can infer

(8) $a_1 < B$ & $a_2 < B$ & ... $a_n < B$

From (8) and (5), setting $O = B$ in (5), we can infer

(9) $(\exists y)(y = [a_1 + a_2 + ... a_n]$ & $(y < B \vee y = B))$

Instantiating for 'y' in (9), we get

(10) $r = [a_1 + a_2 + ... a_n]$ & $(r < B \vee r = B)$

From (10) we can immediately infer

(11) $r = [a_1 + a_2 + ... a_n]$

However, we can also prove

(12) $\neg (r = a_1)$ & $\neg (r = a_2)$ & ... $\neg (r = a_n)$

The proof of (12) is as follows. Suppose, for reductio, that for some i between 1 and n inclusive, $r = a_i$. By (7), $a_i < I$. By the Weak Supplementation Principle, $(\exists x)(x < I$ & $\neg (x = a_i)$ & $\neg (x < a_i))$. Instantiating for 'x' here, we get: $s < I$ & $\neg (s = a_i)$ & $\neg (s < a_i)$. But, given that $s < I$, we have, by (6): $s = a_1 \vee s = a_2 \vee ... s = a_n$. So let $s = a_j$, for some j between 1 and n inclusive. Then we have, from above: $\neg (a_j = a_i)$ & $\neg (a_j < a_i)$. Hence, on the hypothesis that $r = a_i$, we have: $\neg (a_j < r)$ & $\neg (a_j = r)$. However, contradicting this, we have from (11), by the definition of 'sum': $a_j < r \vee a_j = r$. This completes the reductio in proof of (12), and we can now proceed with the main proof.

From (11) and (12), by the definition of 'sum', we can infer

(13) $a_1 < r$ & $a_2 < r$ & ... $a_n < r$

And from (6) we can immediately infer

(14) $(\forall x)(x < I \rightarrow (x = a_1 \vee x = a_2 \vee ... x = a_n))$

From (13) and (14) we can infer

(15) $(\forall x)(x < I \rightarrow x < r)$

From (7) and (5), setting $O = I$ in (5), we can infer

(16) $(\exists y)(y = [a_1 + a_2 + ... a_n]$ & $(y < I \vee y = I))$

Instantiating for 'y' in (16), we get

(17) $t = [a_1 + a_2 + \ldots a_n]$ & $(t < I \lor t = I)$

From (17) we can immediately infer

(18) $t = [a_1 + a_2 + \ldots a_n]$

From (11) and (18) we can infer

(19) $r = t$

From (17) and (19) we can infer

(20) $r < I \lor r = I$

From (20), by the transitivity of proper parthood, we can infer

(21) $(\forall x)(x < r \rightarrow x < I)$

From (15) and (21) we can infer

(22) $(\forall x)(x < I \leftrightarrow x < r)$

From (3) and (22) we can infer

(23) $I = r$

This is the point in the proof at which it would be possible to use the modified version of the Weak Principle of Mereological Extensionality instead of Olson's version, (3). From the modified version we can infer: $((\exists y)(y < I) \ \& \ (\exists y)(y < r)) \rightarrow ((\forall x)(x < I \leftrightarrow x < r) \rightarrow I = r)$. The antecedent of this conditional can be inferred from (7) and (13), allowing us to detach the consequent. From the consequent and (22) we can then infer (23). Then both versions of the proof can continue as follows. From (10) we can immediately infer

(24) $r < B \lor r = B$

Suppose, taking the first disjunct of (24)

(25) $r < B$

From (2) we can infer

(26) $r < B \rightarrow \neg (I = r)$

And from (25) and (26) we can infer

(27) $\neg (I = r)$

This contradicts (23). Suppose instead, taking the second disjunct of (24)

(28) $r = B$

From (1) and (28) we can infer

(29) $\neg\,(I = r)$

This again contradicts (23). QED

Hence, on the supposition that premises (1) to (5) are true, we have proved (6) to be false (given also the truth of the Weak Supplementation Principle, the transitivity of proper parthood, and the definition of 'sum'). Consequently, we have proved, given these premises (and the further assumptions just mentioned), that I do not have finitely many proper parts and hence—on the plausible assumption that I do not have infinitely many proper parts—that I have no proper parts at all: that is, that I am an altogether *simple* entity.[1]

REFERENCES

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3.   Peter Simons, *Parts: A Study in Ontology* (Oxford: Clarendon Press, 1987).