Strong Composition as Identity and Simplicity

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Abstract

The General Composition Question asks "what are the necessary and jointly sufficient conditions any xs and any y must satisfy in order for it to be true that those xs compose that y?" Although this question has received little attention, there is an interesting and theoretically fruitful answer. Namely, Strong Composition as Identity (SCAI): Necessarily, for any *xs* and any *y*, those *xs* compose *y* iff those xs are identical to y. SCAI is theoretically fruitful because if it is true, then there is an answers to one of the most difficult and intractable questions of mereology (The Simple Question). In this paper, I introduce the Identity Account of Simplicity and argue that if SCAI is true then this Identity Account of Simplicity is as well. I consider an objection to The Identity Account of Simplicity. Ultimately, I find this objection unsuccessful.

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0. Introduction

One question that has received little attention is:

The General Composition Question (GCQ): What are the necessary and jointly sufficient conditions any xs and any y must satisfy in order for it to be true that those xs compose that y?[1]

Answers to this question will entail and be entailed by instances of the following schema:

Necessarily, for any *xs* and any *y*, those *xs* compose *y* iff ______________.

Proper answers to this question are supposed to be informative. That is, at the very least, proper answers should be finitely long and involve no mereological vocabulary.[2]

Perhaps the GCQ has received little attention partly because philosophers believe that it is rather hopeless to pursue answers to this question under the constraints given.[3] Or perhaps many

[1] This question was first introduced by van Inwagen (1990). In a short section of *Material Beings*, van Inwagen clearly distinguished the General Composition Question from the much more widely discussed Special Composition Question. My formulation of the General Composition Question is slightly different from van Inwagen's and conforms to the formulation of the Simple Question found below.

[2] It might be easy to answer this question if we were allowed to employ mereological vocabulary. We could just say that necessarily, for any *xs* and any *y*, those *xs* compose *y* iff each of those *xs* is a part of *y* and everything that is a part of *y* shares a part with one of those *xs*. Similarly, we may be able to give an infinitely long answer if we are able to list any possible *xs* and any possible *y* and say which *xs* compose which *y* in any given possible world. However, even though these answers may be easy or straightforward, they are not proper.

[3] Hawley (2006) claims that headway can be made on the GCQ if we give up on the constraints given. Moreover, she argues that answers to other mereological questions, such as the Special Composition Question, are not held

believe, as it seems van Inwagen does, that any putative answer to the GCQ will be subject to an open question style argument.[4] In any case, for whatever reason, philosophers have tended to avoid discussing the GCQ.

One exception to this trend involves those papers written on the much maligned view of Strong Composition as Identity. Strong Composition as Identity seems to be an answer to the GCQ which may be formulated as follows:[5]

Strong Composition as Identity (SCAI): Necessarily, for any *xs* and any *y*, those *xs* compose *y* iff those xs are identical to y.

When combined with the fact that there is at least one composite object, SCAI entails the rather radical thesis that identity is a non-distributive, many-one relation. Some may take this to be a sufficient reason for rejecting the view.[6] However, SCAI turns out to be a fruitful theory. If SCAI is true, then there is an answers to one of the most difficult and intractable questions of mereology; given SCAI there is an answers to the Simple Question.

In section 1, I introduce some of the vocabulary that I'll be using throughout this paper. In section 2, I formulate the Simple Question and introduce an answer (The Identity Account of Simplicity)

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to such high standards. Whether or not Hawley is correct, I am going to proceed to discuss the GCQ under the assumption that a proper answer must meet the constraints given above.

[4] See, in particular, van Inwagen (1990, 51). It is unclear to me why van Inwagen thinks that open question style arguments are problematic for answers to the General Composition Question but not to answers to the Special Composition Question.

[5] Strong Composition as Identity seems to have been accepted by Baxter (1988). Both Lewis (1991) and Sider (2007) toyed with the thesis before backing off in favor of a weaker, analogical principle. Van Inwagen (1995), Yi (1999), and Sider (2007) have all argued against SCAI.

[6] Strong Composition as Identity is rejected by van Inwagen (1995) on just this ground.

which seems to involve a many-one identity relation. I then argue that that answer to the Simple Question logically follows from SCAI. Finally, in Section 3, I consider an objection to The Identity Account of Simplicity. Ultimately, I find this objection unsuccessful. I conclude that it may be a theoretic benefit of SCAI that it settles a seemingly intractable dispute in mereology.

1. Plurals and Mereology

Before we begin, I'd like to lay out the plural and mereological vocabulary that I'll be employing throughout this paper. I'll be using a mixed second-order language of plurals and individuals. This language will include constants for both individuals and for plurals. Following convention, I will allow the plural constants to refer to individuals. In other words, we will treat individuals as degenerate pluralities.[7]

The language will also include individual variables, and plural variables along with a universal quantifier and an existential quantifier:

Individual Variables: x, y, z (with or without subscripts)

Plural variables: *xs*, *ys*, *zs* (with or without subscripts)

quantifiers: ∀, ∃

Plural variables can be satisfied by both pluralities and individuals. Hence, when an existential quantifier binds a plural variable it should be read as 'for some thing or things . . .' and when a universal quantifier binds a plural variable, it should be read as 'for any thing or things . . .'.

[7] This may make the individual constants logically redundant. However, it is sometimes more perspicuous to present ideas with the individual constants rather than the plural constants.

I'll use the following two primitive relational terms:

'is/are among'

And

'is/are identical to'

The relation 'is/are among' can be understood by considering some intuitive examples. The books in my office are among the books on Earth, my shoes are among the functional footwear, but they are not among the stylish footwear.[8] This relation is transitive and reflexive. As a consequence, my shoes are among my shoes and (since individuals are degenerate pluralities) my cat, Galileo, is among Galileo.

The relation 'is/are identical to' is also a transitive and reflexive relation and, I will assume, it obeys a strong version of Leibniz's Law:

Strong Leibniz's Law: Necessarily, (∀*xs*) (∀*ys*) (∀*F*) (*xs* are identical to *ys* only if (those *xs* are *F* iff those *ys* are *F*)).[9, 10]

The relation 'is/are identical to' can be understood by considering some intuitive examples. Hesperus is identical to Phosphorus; my cat, Galileo, is identical to Galileo, but he is not identical to an Italian astronomer born in the 16th century; my shoes are identical to my shoes but they are not identical to my shirts.[11]

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[8] If SCAI is true, then there will be some surprising examples of true statements involving 'is/are among'.

[9] Since the plural variables can be satisfied by individuals as well as pluralities, any statement of the form (∀*xs*)(ϕ*xs*) entails a statement for the form (∀*x*)(ϕ*x*). Hence, Strong Leibniz's Law entails the standard version of Laibniz's Law which employs only individual variables.

[10] Some people who endorse SCAI may choose to reject Strong Leibniz's Law in response to the argument that I consider in section 3 below. However, at least for the moment, I will assume that Strong Leibniz's Law is true.

[11] Of course, if SCAI is true, then there will also be some very surprising examples of true statements involving 'is/are identical to'.

Additionally, I'll be using the following relation term:

'is/are part(s) of'[12]

Following the standard practice of mereology, let's say that one thing stands in this relation to another if the first is a part of the second in the ordinary sense (e.g. my hand is a part of me) or the first thing is identical to the second. Let's also say that some things are parts of some other things if the first things are parts in the ordinary sense (e.g. the feet of the Supreme Court justices are parts of the Supreme Court justices) or the first things are identical to the second.[13] This relation is transitive and reflexive.

2. *Strong Composition as Identity and The Simple Question*

Every object is a part of itself. However, some objects have other parts as well. Those other parts are proper parts:

x is a proper part of *y* =df *x* is a part of *y* and *x* is not identical to *y*.

It may be that some objects have no proper parts. An object that has no proper parts is a simple:

x is a simple =df *x* has no proper parts

Now, we can introduce The Simple Question as follows:

The Simple Question (SQ): What are the necessary and jointly sufficient conditions any x must satisfy in order for it to be true that x is a simple?[14]

Answers to this question will entail instances of the following schema:

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[12] Given SCAI it may be that we need not take this relation as primitive. It may be that the following claim is true:

Necessarily, (∀x) (∀y) (x is a part of y iff (∃zs) (x is among those zs and those zs are identical to y))

If the above claim is true, then we may choose to eliminate the primitive 'is/are part(s) of' relation in favor of a relation defined in terms of 'is/are among' and 'is/are identical to'.

[13] Again, if SCAI is true, then there will be some surprising examples of true statements involving 'is/are part(s) of'.

[14] The Simple Question was first introduced in Markosian (1998).

Necessarily, (∀*x*) (*x* is a simple iff ______________)

Just like with the GCQ, proper answers to this question should be finitely long and involve no mereological vocabulary. Although several answers to the SQ have been formulated, few have been endorsed.[15]

If SCAI is true, then there is a straightforward and proper answer to the simple question:

The Identity Account of Simplicity: Necessarily, (∀*x*) (x is a simple iff (∀*ys*) (if those *ys* are identical to *x*, then (∀*z*) (if *z* is among those *ys*, then *z* is identical to *x*)).[16]

We can easily prove that the Identity Account of Simplicity is true if SCAI is true. First, let's suppose that SCAI is true. Now, we'll start by proving the necessity of the left to right direction of the embedded biconditional. Arbitrarily choose a possible world and arbitrarily choose an object at that world. Call that object 'Betty'. Suppose, for conditional proof, that Betty is a simple. Suppose, for reductio, that it is not the case that (∀*ys*) (if those *ys* are identical to Betty, then (∀*z*) (if *z* is among those *ys*, then *z* is identical

[15] See Markosian (1998), Tognazzini (2006) and McDaniel (2007) for formulations of several answers to the SQ. Markosian (1998) and Hudson (2001) both endorse spatial occupancy accounts of simplicity according to which objects are simples iff they occupy regions of space that have certain features. McDaniel endorses a brutal account of simplicity according to which there is no finitely long and informative answer to the SQ.

[16] Another way to formalize the intuitive idea is as follows:

The Identity Account of Simplicity 2: Necessarily, (∀*x*) (x is a simple iff (∀*ys*) (if those *ys* are among *x*, then x is among those ys)).

I have chosen to focus on The Identity Account of Simplicity rather than The Identity Account of Simplicity 2 because the proof that SCAI logically entails The Identity Account of Simplicity is far more intuitive than the proof that SCAI logically entails the Identity Account of Simplicity 2. The proof of the latter requires the highly counterintuitive idea that a proper part of an object is among that object (e.g. my hand is among me). Although highly counterintuitive, this seems to follow from SCAI. I leave it to the reader to reconstruct the proof.

to Betty). So, ∃*ys* (those ys are identical to Betty and (∃*z*) (*z* is among those *ys* and *z* is not identical to *Betty*). Call those *ys* 'Betty Parts'. So, Betty Parts are identical to Betty and (∃*z*) (*z* is among Betty Parts and *z* is not identical to Betty). Call *z* 'Bamm-Bamm'. So, Bamm-Bamm is among Betty Parts and yet Bamm-Bamm is not identical to Betty. We've already seen, though, that Betty Parts are identical to Betty. But, given SCAI, if Betty Parts are identical to Betty, then Betty Parts compose Betty. But, if Betty Parts compose Betty, then (given the definition of composition) everything that is among Betty Parts is a part of Betty. So, Bamm-Bamm is a part of Betty. So, Betty has at least one part that is not identical to Betty. So, by the definition of a simple, Betty is not a simple. But, we assumed, for our conditional proof, that Betty is a simple. So, Betty both is and is not a simple. We must conclude that our reductio assumption is false. So, (∀*ys*) (if those *ys* are identical to Betty, then (∀*z*) (if *z* is among those *ys*, then *z* is identical to Betty). Finally, by conditional proof, we must conclude that if Betty is a simple, then (∀*ys*) (if those *ys* are identical to Betty, then (∀*z*) (if *z* is among those *ys*, then *z* is identical to Betty). But, Betty was an arbitrarily chosen object in an arbitrarily chosen possible world. So, we must conclude that necessarily, (∀*x*) (x is a simple only if (∀*ys*) (if those *ys* are identical to *x*, then (∀*z*) (if *z* is among those *ys*, then *z* is identical to *x*)).

Now we can prove the necessity of the right to left direction of the embedded biconditional. Arbitrarily choose a possible world and arbitrarily choose an object at that world. Call that object 'Wilma'. Suppose, for conditional proof, that (∀*ys*) (if those *ys* are identical to Wilma, then (∀*z*) (if *z* is among those *ys*, then *z* is identical to Wilma)). Finally, suppose for reductio that Wilma is not a simple. If Wilma is not a simple, then there is a part of Wilma that is not identical to Wilma. Call that part 'Pebbles'. Given our definition of composition, Pebbles and Wilma compose Wilma. By SCAI, Pebbles and Wilma are identical to Wilma. But, we have already assumed that (∀*ys*) (if those *ys* are identical to Wilma, then (∀*z*) (if *z* is among those *ys*, then *z* is identical to Wilma)). So, if Pebbles and Wilma are identical to Wilma, then (∀*z*) (if *z* is among Pebbles and Wilma, then *z* is identical to Wilma)). But Pebbles is among Pebbles and Wilma. So, Pebbles must be identical to Wilma. But, we have already shown that Pebbles is not identical to Wilma. Our reductio assumption, then, must be false. Hence, Wilma is a simple. But now we must conclude, by conditional proof, that (∀*ys*) (if those *ys* are identical to Wilma, then (∀*z*) (if *z* is among those *ys*, then *z* is identical to Wilma)) only if Wilma is a simple. However, since Wilma was an arbitrarily chosen object in an arbitrarily chosen possible world, we must conclude that necessarily, (∀*x*) ((∀*ys*) (if those *ys* are identical to *x*, then (∀*z*) (if *z* is among those *ys*, then *z* is identical to *x*))) only if x is a simple).

We have proven both the necessity of the right to left direction of the embedded biconditional and the necessity of the left to right direction. But, these two conclusions logically entail The Identity Account of Simplicity. Since these proofs invoked SCAI and no other substantive theses, we may conclude that if SCAI is true, then The Identity Account of Simplicity is true as well.

3. *An Objection to the Identity Account of Simplicity*

An answer to the SQ is proper only if it involves no mereological vocabulary. Presumably, a term is a bit of mereological vocabulary if it expresses a mereological property or relation. So, if the Identity Account of Simplicity employs vocabulary that expresses a mereological property or relation, then it is not a proper answer to the SQ. The Identity Account of Simplicity does employ the relational term 'is/are identical to'. However, some might think that given SCAI, the term 'is/are identical to' expresses the same relation as 'composes' (after all, the terms are necessarily co-extensive). Since what is expressed by the latter is clearly a mereological relation, so then, must be what is expressed by the former. Hence, the Identity Account of Simplicity is not a proper answer to the SQ.

This is a formidable objection. However, I believe there are two plausible responses to this objection. First, one might want to reject the claim that 'is/are identical to' expresses the same relation as 'composes'. It may be that there are two distinct relations and that one of them obtains in virtue of the other obtaining. Second, one might want to reject the claim that a term is a bit of mereological vocabulary if it expresses a mereological property or relation. Perhaps a term is a bit of mereological vocabulary if it is appropriately defined with paradigm mereological terms. For example, perhaps 'composes' may be appropriately defined with 'is a part of' (which is a paradigm mereological term). Although 'is/are identical to' expresses the same thing as 'composes', it may be that it is not appropriately defined using paradigm mereological terms.

I prefer the first of these options over the second. But, I will not argue for my particular view here. Instead, I will argue that the objection above *must* be mistaken because the implications of the argument are too broad. If the objection above is sound, then there is no true and proper answer to the SQ.[17]

Suppose that there is a true and proper answer to the SQ given by the following sentence:

True and Proper Answer to the SQ: Necessarily, for any x, x is a simple iff x is F

It follows that necessarily, the property of being a simple applies to an object iff the property of being an F applies to that object. If one property is identical to another given that they (of necessity) apply to the same things, then the property of being a simple is identical to the property of being F. Since the property of being a simple is clearly a mereological property, so too must the property of being an F. But, the property of being an F is what is expressed by 'is F'. So, if a term is a bit of mereological

[17] Or to the General Composition Question or to the long standing Special Composition Question.

vocabulary if it expresses a mereological property, it must be that 'is F' is a bit of mereological vocabulary. So, contrary to our assumption, the True and Proper Answer to the SQ is not really proper.[18]

So, it seems that if the objection above is sound, then there are no true and proper answers to the SQ and we can discover that there is no such answer just by realizing that a course grained view of properties and relations is correct and by realizing that something is a bit of mereological vocabulary because of its content. But, it seems that there may be a true and proper answer to the SQ. At the very least, it seems that we should not be able to discover that there is no such answer in the way indicated above.

4. Conclusion

Although Strong Composition as Identity has been criticized by quite a few philosophers, it does seem to have at least one theoretical benefit. If it is true, then there is an answers to one of the most difficult and intractable questions of mereology; given SCAI there is an answers to the Simple Question. If there are enough theoretic benefits, then perhaps those benefits outweigh the problems typically associated with SCAI. The benefits may ultimately provide a strong case in favor of SCAI.

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[18] It is obvious that a similar problem will plague answers to the General Composition Question and the Special Composition Question.

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