

Composition as Identity: Part 1

1. Introduction

Many of us think that ordinary objects—such as tables and chairs—exist. We also think that ordinary objects have parts: my chair has a seat and some legs as parts, for example. But once we are committed to the (seemingly innocuous) thesis that ordinary objects have parts, we then open ourselves up to a whole host of philosophical problems.

Suppose your chair is composed of only two parts: a seat and a (thick) leg.¹ And imagine that your chair is the only object in the world. Here is a seemingly simple question: how many objects are there? You might be inclined to say *one*—there's just one chair, after all. But I said that the chair was composed of a seat and a leg. So it seems we have to count the seat and the leg, too. So are there three things? But this doesn't seem right. If the chair is distinct from the seat and the leg, then we are committed to co-located objects. The chair is a material object that occupies region, R . The seat and the leg are material objects that occupy region, R .² This is case of complete spatial overlap: there is no place that the chair is that the seat and leg are not, and there is no place that the seat and the leg are that the chair is not. Since complete spatial co-location is unwelcome, then perhaps the seat and the leg are *not* distinct from the chair. So then there are just two things in our world—the seat and the leg. But then what happened to the chair? Our seemingly simple universe containing an ordinary object and its parts has revealed itself to be quite complicated indeed; we can't even say how many objects there are!

I claimed above that a chair (and its parts) is a case of complete spatial overlap. This point generalizes to all cases of material composition—i.e., to all ordinary objects and their parts. However, the problem of co-location of parts and wholes is often ignored. Co-location of *constituted* objects is discussed—e.g., a statue and the lump of clay that constitutes it—but not co-location of *composite* objects. This omission is metaphysically irresponsible. Most of us think that if there is a single material object M that completely occupies region R at t , then there cannot also be a single material object N completely occupying region R at t , where $M \neq N$. If this intuition is right, however, then what goes for one object goes for many: if there are some stars in an Orion-shaped region, O , at time t , then there cannot also be some spaceships exactly occupying O at t , where the stars \neq the spaceships. But if both of these intuitions are right, then it seems irrelevant whether the objects under discussion are one or many. It is not the number of objects that matter. Rather it is that material objects—no matter their number—seem to muscle each other out for space. No material object or objects can completely occupy the exact same region (at the same time) as any other object or objects. But if so, then the following is correct: if there are some stars exactly occupying an Orion-shaped region, O , at time t , then there cannot also be a single material object M exactly occupying O at t , where the stars $\neq M$. Thus, pending an argument to the contrary, many-one co-location is intuitively just as problematic as one-one co-location

The above two examples are just some of the philosophical worries concerning parts and wholes, and the relation between them, *composition*. Other worries include: whether and when some

¹ For simplicity, let us assume (implausibly) that these parts do not themselves have parts.

² The seat and the leg occupy R collectively, but not distributively—i.e., it is not the case that the seat occupies region R and the leg occupies region R . For more on the collective/distributive distinction, see below.

objects compose another (Van Inwagen's *Special Composition Question*³), whether composition can ever be vague, whether composition is ontologically innocent, whether composite objects gain and lose parts over time, whether composite objects *possibly* gain and lose parts, whether composite objects are causally redundant, etc.

Composition as Identity is the view that the composition relation is the identity relation.⁴ One benefit of this view is its straightforward treatment of many of the aforementioned problems. If composition is identity, there will be no co-location problem of parts and wholes. There may be a chair occupying region *R*, and there may be a seat and leg occupying region *R*. But this is no problem according to Composition as Identity (CI) because the parts (the seat and the leg) are identical to the whole (the chair). Co-location of parts and wholes is no more of a problem on this view than co-location is a problem for Superman and Clark Kent—the object(s) under discussion are identical, so there are no distinct objects to *co-locate*.

Some argue that composite objects generate rampant overdetermination.⁵ Suppose a baseball causes a window to break. If the baseball is composed of a right half and a left half, and composition is *not* identity, then intuitively *both* the baseball caused the window to break *and* the right half and the left half (collectively) caused the window to break. Our original worry about the chair and its parts and how many objects we had repeats itself at the level of causes (and effects). Of course, if composition *is* identity, this worry dissipates. Overdetermination of a baseball and its parts is no more of a problem than overdetermination is a problem for Superman and Clark Kent—the object(s) under discussion are identical, so there are no distinct objects to *overdetermine* anything.

However, while CI may provide an elegant solution to these problems, it seemingly does so at a heavy price. For example, many insist that adopting CI forces us to give up intuitively necessary principles of identity. If CI is true, then we must accept that many things are identical to one. But this is apparently a direct violation of Leibniz's Law (LL): $\Box \forall x \forall y (x = y \leftrightarrow \forall P (Px \leftrightarrow Py))$. The parts are many (and not one) while the whole is one (and not many). So either Leibniz's Law is false or CI is. Since Leibniz's Law cannot be false, CI must be.

Another example is the following. Many of us think that composite objects can lose (some) parts and survive. You have lost a skin cell or two since reading this, but you have survived despite the loss. But if CI is true, then any whole must have its parts necessarily. So CI entails *mereological essentialism*—the thesis that all composite objects have their parts necessarily. But then you couldn't have lost a skin cell or two and still survive. So the person reading this essay now is not the same person who was reading this essay 5 minutes ago. Since this is clearly absurd, CI must be false.⁶

While there may be some theoretical benefits to CI, most have found the arguments against it overwhelming. In what follows, I will briefly canvass three different varieties of Composition as Identity, and suggest why one of them should be preferred over the others. Then I will outline several versions of the most common objection against CI. In this essay, I will suggest how a CI

³ Van Inwagen (1990).

⁴ I am concerned with *composition* as identity, not *constitution* as identity. One (apparent) difference between composition and constitution is that composition is the relation between one thing and many—e.g., (one) whole and (many) parts—whereas constitution is the relation between one thing and another—e.g., (one) statue and (one) lump of clay. While I do not have the space to discuss it here, the reader may decide for herself whether the distinction between *composition* and *constitution* collapses (or not), depending on which variety of CI one accepts.

⁵ See Merricks (2003), e.g.

⁶ This argument is given in Merricks (1999). I will explain below why I think this argument is a variation of the one before it.

theorist can respond to these charges by maintaining that some of the arguments are invalid. (In part 2, I suggest how a CI theorist can maintain that the remaining arguments, while valid, are unsound.) I do not intend to give a complete defense of CI here, but I hope my remarks will show that CI cannot be dismissed as easily as opponents have supposed.

2. Composition as Identity: 3 Varieties

There are at least three varieties of Composition as Identity: The Weak Composition Thesis (WCT), The Strong Composition Thesis (SCT), and the Stronger Composition Thesis (RCT).⁷

In *Parts of Classes*, David Lewis commits to the *Weak Composition Thesis*:

Weak Composition Thesis: the predicate ‘are’ used to indicate the composition relation is only *analogously* another form of the ‘is’ of identity.

Lewis claims that composition is not *strictly* identity but rather only *sort of* identity; that the ‘are’ of composition and the ‘is’ of identity are at best only analogous. Lewis explains this view of composition as follows:

“...mereological relations...are something special. They are unlike the same-mother relation or the average-of relation. Rather, they are *strikingly analogous* to ordinary identity, the one-one relation that each thing bears to itself and to nothing else. So striking is this analogy that it is appropriate to mark it by speaking of mereological relations—the many-one relation of composition, the one-one relations of part to whole and of overlap—as *kinds of* identity. Ordinary identity is the special, limiting case of *identity in the broadened sense*.” [1991: 84-5, emphasis mine.]

That composition is a kind of identity—“identity in the broadened sense”—is a thesis inspired by Joseph Butler’s distinction between identity “in the strict philosophical sense” and identity “in a loose and popular sense.”⁸ Identity in this broadened sense is presumably how we understand personal identity over time, qualitative similarity or type-hood, and (as Lewis suggests) the composition relation. This relation differs from strict identity in that it need not obey Leibniz’s Law. If composition is identity in this loose way, then (it is argued) it can reap the advantages that result from a stronger thesis such as the Strong Composition Thesis (e.g., a solution to the co-location problem), while avoiding objections such a view faces (e.g., objections involving Leibniz’s Law). Such promises may make us suspicious whether WCT can deliver all it claims.

SCT maintains that any whole is *literally* identical to all of its parts.

Strong Composition Thesis: the predicate ‘are’ used to indicate the composition relation is *literally* another form of the ‘is’ of identity.

⁷ WCT and SCT are dubbed and formulated by Yi (1999: 145-6). RCT is dubbed by Baxter (MS), who borrows it from a description in Lewis (1991: 84 fn12). Baxter points out that an important difference between SCT and RCT is that while SCT claims that parts are only *collectively* identical to the whole, RCT insists that the parts are (also) distributively—or individually—identical to the whole. This is possible because of his rejection of the Indiscernibility of Identicals. Baxter (MS: 1).

⁸ Butler (1839). See Chisholm (1976), Armstrong (1989), and Baxter (1988a) for discussion.

This does not mean that the whole is identical to *each* of its parts, *taken individually*. Rather, the whole is identical to its parts *taken together*. SCT further holds that the identity is (mostly) classically defined: it is transitive, reflexive, symmetric, unambiguous, intuitive, and obeys Leibniz’s Law. Just *how* this can be while simultaneously allowing that one thing can be identical to many is the root of many objections against CI (which I address in Part 2).

Contrast WCT and SCT with those who would like to claim (i) that composition is—not *is like* or *analogous* to—but literally *is* identity, yet (ii) identity is a different sort of relation than we may have initially supposed. In particular, this view claims that identity does not obey the *Indiscernibility of Identicals* (the left-right direction of Leibniz’s Law): $\Box \forall x \forall y (x = y \rightarrow \forall P (Px \leftrightarrow Py))$. This means that something can differ from itself. Endorsers of this view would be committed to the *Stronger Composition Thesis*:

Stronger Composition Thesis: the predicate ‘are’ used to indicate the composition relation is *literally* another form the ‘is’ of identity. In addition, identity does not obey the Indiscernibility of Identicals.

Donald Baxter claims that the Stronger Composition Thesis (RCT) is the only viable option for those that want to embrace Composition as Identity (CI).⁹ Moreover, he claims that puzzles about composition are *evidence* that our intuitions about identity are what are in need of revision, not our views about the relation between parts and wholes. Baxter maintains that cases of change over time, cases of fission and fusion, etc., all go to show that it is our concept of identity that is in need of revision, not our views of composition. Once we realize that composition is identity, *and* that the identity relation does not obey the Indiscernibility of Identicals, Baxter argues, then we can more easily see how the parts of an object are identical to the whole.

In what follows, I will defend SCT as opposed to WCT or RCT. I do this for two reasons. First, SCT is the strictest version of CI in the following sense: if SCT can avoid the following objections, then WCT and RCT can as well. But the reverse does not hold. Where applicable, I will indicate when WCT or RCT can avoid objections that SCT cannot.¹⁰

A second reason to defend SCT is because so very few have done so, and this seems to me an unfortunate oversight in the literature.¹¹

3. Against Composition As Identity

⁹ Baxter (1988a), (1988b), (1999), (MS), and in personal correspondence.

¹⁰ It may have struck the reader that WCT, SCT, and RCT are misleadingly named. In particular, the so-called Stronger Composition Thesis (RCT) is not a stronger thesis than SCT as far as the composition relation is concerned. SCT is the only view that maintains that composition is truly (classical) identity—WCT claims that composition is only very similar to or like identity, and RCT claims that identity is a different relation than we may have originally thought (i.e., not classical identity). RCT’s ‘strength’ comes from the boldness of the claim that identity does not obey the Indiscernibility of Identicals, not from its position on composition *per se*. Nonetheless, I will maintain consistency with terminology already in use.

¹¹ A third reason—which I do not have the space here to discuss—is that, as Sider (MSb) has argued, SCT (but not WCT or RCT) can get out of a particular argument against CI, given in McDaniel (2008).

Composition as Identity (in any of its varieties) is not a popular view. In fact, opponents to CI so extensively out-number its proponents that it is curious why so much ink is spilled arguing against a view that is so rarely endorsed or defended.¹² Nonetheless, I will discuss one general type of argument against CI—those that appeal to the Indiscernibility of Identicals. I will defend CI against several versions of this objection when I am able. A full defense of CI would involve going through all of the objections against CI one by one, as well as providing positive arguments in its favor—a task which I do not have the space here to accomplish.

3.1 Indiscernibility of Identicals Arguments (IIAs)

Let us understand Composition as Identity and the Indiscernibility of Identicals as follows:

- | | |
|--------------------------------------|---|
| Composition is Identity (CI): | A composite object O is (collectively) identical to its parts $o_1, o_2, o_3, \dots, o_n$. ¹³ |
| Indiscernibility of Identicals (II): | For any object x and any object, y , if $x = y$, then for any property P , $Px \leftrightarrow Py$ |

Here is the general form of an Indiscernibility of Identical Argument (IIA) against CI:

TEMPLATE

- | | |
|--|--------------------|
| 1. If CI, then $o_1, o_2, o_3 \dots o_n = O$. | [Definition of CI] |
| 2. If $o_1, o_2, o_3 \dots o_n = O$, then for any property P, $o_1, o_2, o_3, \dots, o_n$ have P iff O has P. | [Ind. of Id.] |
| 3. For some property R, either ($o_1, o_2, o_3, \dots, o_n$ have R and O does not) or (O has R and $o_1, o_2, o_3, \dots, o_n$ do not). | [Premise] |
| 4. So, $o_1, o_2, o_3, \dots, o_n \neq O$. | [2, 3 MT] |
| 5. So, CI is false. | [4, 1 MT] |

There are several different kinds of IIAs in contemporary literature, each of which can be characterized by how premise 3 is filled out. I canvass four of them below.

Some IIAs rely on properties such as *being n in number*, or *being many*, or *being one*. The parts *are six in number* for example, while the whole *is one*. David Lewis presents just such an argument in Lewis (1991), as does McKay (2006: 38). The argument runs roughly as follows:

¹² Contemporary opponents include: Cameron (2007), (2010), (forthcoming); Lewis (1991); Markosian (1998a), (1998b); McDaniel (2007), (2008); McKay (2006); Merricks (1999), (2005); Sider (2007), (MSa), (MSb); van Inwagen (1990), (1999); Yi (1999). Note: Lewis and Sider (2007) argue against SCT, not WCT.

Contemporary proponents include: Armstrong (1997); Baxter (1988a), (1988b), (1999), (MS); Lewis (1991); Sider (2007). Note: Armstrong, Lewis, and Sider only defend WCT, not SCT. Baxter defends RCT, not SCT. No one to my knowledge defends SCT in print (present article excluded).

¹³ As advertised, I am defending SCT instead of WCT or RCT; this definition of CI assumes SCT. Fans of WCT or RCT should make adjustments accordingly.

MANY-ONE: If CI, then the parts are (strictly) identical to the whole. But if so, then by II, any property the parts have the whole must have as well. But the parts are many, while the whole is not. So, the parts are not identical to the whole. So, CI is false.

Here is another kind of IIA. Suppose we have my cat, Nacho, over here and my mug, Mug, over there. And consider the sum of Nacho and Mug: Muggo.¹⁴ Now place Nacho and Mug next to each other. Here is something that is true of the parts (Nacho and Mug): *they are beside one another*. But it is not true of the whole—Muggo—that it is beside one another. It is not even grammatical to say “Muggo is beside one another.”¹⁵ So we have the following argument against CI:

BESIDE: If CI, then the Nacho and Mug are (strictly) identical to Muggo. But if so, then by II, any property Nacho and Mug have, Muggo must have as well. But Nacho and Mug *are beside each other*, while Muggo is not. So, Nacho and Mug are not identical to Muggo. So, CI is false.

Finally, imagine that we have some Lego blocks, scattered and in no particular order, at t_1 . At t_2 we make a Lego house out of the Lego blocks, such that the Lego blocks compose the Lego house at t_2 . Let us also imagine—what seems plausible—that Lego blocks can survive being scattered (after all, they are scattered and survive at t_1), but that Lego houses cannot—that is, if a Lego house is scattered, it is no longer a Lego house.¹⁶ Now consider the following two arguments:

TEMPORAL: If CI, then the Lego blocks are (strictly) identical to the Lego house. But if so, then by II, any property the Lego blocks have the Lego house must have as well. But the Lego blocks *existed at time t_1* , while the Lego house did not. So, the Lego blocks are not identical to the Lego house. So, CI is false.

MODAL: If CI, then the Lego blocks are (strictly) identical to the Lego house. But if so, then by II, any property the Lego blocks have the Lego house must have as well. But the Lego blocks *could have survived being scattered*, while the Lego house could not. So, the Lego blocks are not identical to the Lego house. So, CI is false.

It is no surprise that many consider IIAs decisive against CI. The only rule of inference needed in each is modus tollens, which is classically valid. Each of the remaining premises is justified by definition, an accepted rule of identity, or by a seemingly obvious empirical claim.¹⁷ Faced with the above arguments, it would seem that CI is sunk. How could a CI theorist possibly respond?

The only options seem to be either (i) deny that the arguments are valid, which seemingly entails denying the validity of modus tollens or (ii) reject one of the premises, which entails either (a) denying the definition of CI, (b) denying the Indiscernibility of Identicals, or (c) denying seemingly

¹⁴ I intend the *sum* of Nacho and Mug to be something like their mereological sum, minus the jargon. I have excluded explicit talk of mereology and mereological sums in this essay since the arguments for and against CI can be discussed without them. Those familiar with the literature can apply my discussions to issues in mereology accordingly.

¹⁵ This grammatical point is the basis of yet another argument against CI which I do not have the space here to address. See van Inwagen (1994) and Sider (2007) for discussion.

¹⁶ Example modified from Thomson’s Tinkertoy case in Thomson (1983).

¹⁷ Or a seemingly obvious *a priori* claim (in MODAL), if you think that modal facts are non-empirical. (Thanks to an anonymous referee.)

acceptable and innocuous empirical claims. Since all of these consequences are unappealing, the only available move is presumably to reject CI.

Lewis (1991) rejects the above definition of CI. His endorsement of WCT (as opposed to SCT) commits him to the claim that composition is only analogous to identity. One important difference between composition and identity, according to Lewis, is that only identity—and not composition—obeys the Indiscernibility of Identicals.¹⁸ This gets Lewis out of all of the IIAs, since it is a way of denying the first premise of each of the arguments.^{19,20} But this is at the cost of blatant false advertising: if composition does not obey the Indiscernibility of Identicals, then despite what other redeeming features such a relation has, composition is simply *not* identity. Claiming that a relation is very similar to but not identity entails that such a relation is not identity. And if composition is not identity then it is a mystery how it reaps the theoretical benefits of CI. At the outset of this essay, I mentioned the co-location problem of parts and wholes. CI provides an elegant solution to this worry, I claimed, because if the parts are indeed identical to their wholes then there are no distinct objects to *co-locate*. But if it is admitted that the relation between parts and wholes is *not* identity—if parts are *distinct* from wholes—then no matter what other features composition has, the problem of co-location resurfaces. So while Lewis may be able to get out of the IIAs, he does so at the cost of weakening CI in such a way as to, absurdly, render composition *not* identity, which directly undermines some of the primary benefits of CI.

Baxter (1989), (1999), (2007) endorses RCT, which rejects the Indiscernibility of Identicals, which results in a rejection of premise 2 of each of the IIAs. This will work, but it is not a move I encourage a CI theorist to take. There is a far too tempting Moorean move to be made here: if CI requires giving up well-entrenched principles of identity, then surely it is CI that should be abandoned, not our well-entrenched principles of identity. Besides, if CI can be defended without rejecting the Indiscernibility of Identicals, it should be. And I think it can.

Let me propose here (briefly) a strategy on behalf of the CI theorist that will preserve classical logic, the Indiscernibility of Identicals, and Composition as Identity (strictly defined). The CI theorist can maintain that many of the IIAs above are invalid, without having to deny *modus tollens*. Here's how: the CI theorist can insist that many of the IIAs commit a formal fallacy of equivocation—an equivocation that is demonstrable once we adopt a robust plural language. Let me take the remainder of Part 1 to explain, and then (in Part 2) I will suggest how, in cases where a fallacy of equivocation is not being made, a CI theorist might deny the truth of some of the premises.

3.2 Plurals and Equivocation

To effectively endorse CI, one must be able to make *grammatical* sense of many-one identity prior to making theoretical sense of the view. The CI theorist can do this easily by making two

¹⁸ Lewis (1991: 87)

¹⁹ One might be tempted to read Lewis as accepting the definition of CI but rejecting the application of the Indiscernibility of Identicals (II)—in which case he would reject premise 2 (not premise 1) of the IIAs. But this is a mistake. Lewis accepts that *identity* obeys II; he rejects that *composition* does. So he would reject premise 1, not 2.

²⁰ It should be noted that Lewis's position on composition is not his only defense against these arguments. Given his commitment to counterpart theory, for example, he could (and does) reject (a version of) MODAL. However, since I am only presently interested in how a theory of composition can avoid these problems, I will put aside discussion of other theoretical commitments that may or may not be of use in response to these arguments. (Thanks to an anonymous referee for raising this point).

commitments. First, she can adopt a plural language, complete with plural terms, variables, quantifiers and predicates. Second, she can introduce a singular/plural hybrid identity predicate.²¹

A CI theorist will adopt a language that includes irreducibly plural terms, which refer to objects collectively as opposed to only distributively. Suppose that o_1, \dots, o_n are the parts of a composite object O . Now take a sentence such as “the parts are identical to the whole.” There is a reading of this sentence that the CI theorist (as I have defined her) flat-out rejects. This is the reading where *each* of the parts is identical to the whole. We can represent this state of affairs as follows:

$$(1) o_1 = O \ \& \ o_2 = O \ \& \ \dots \ \& \ o_n = O.$$

In contrast, the CI theorist accepts the claim that the parts—the o_s —*taken together* or *taken collectively* are identical to the whole. We can represent this state of affairs as follows:

$$(2) o_{1,o_2, \dots, o_n} = O$$

The CI theorist can use ‘;’ as a way of concatenating singular terms, where, for example ‘ $x;y$ ’ means “ x and y , *taken together*.”

Adopting plural terms is not enough, however, since (2) is strictly-speaking ungrammatical. The traditional first-order identity predicate only accepts singular terms as argument places. So the CI theorist can symbolize a two-place hybrid identity predicate as ‘ $=_h$ ’, which takes either plural terms or singular terms as argument places:

$$\alpha =_h \beta, \text{ where } \alpha \text{ and } \beta \text{ can be either plural or singular terms.}$$

A CI theorist will intend for hybrid identity to *be* the classical identity relation, with only one exception. Hybrid identity is transitive, reflexive, symmetric, and it obeys Leibniz’s Law—the exception is that the hybrid identity relation allows us to claim that many things can be identical to a singular thing. The adoption of the hybrid identity predicate, $=_h$, will not force anyone to abandon the singular identity predicate, as used in traditional first-order logic. For singular identity statements are just a special case of hybrid identity statements, where α and β are replaced with singular terms.

Once we have accepted plural terms and a hybrid identity predicate, the CI theorist can effectively argue that many IIAs are invalid. I will begin by analyzing BESIDE and will return to the others in due course. The crucial premise in BESIDE is the claim “Nacho and Mug are beside one another but Muggo is not.” In particular, let us concentrate on the first conjunct of this premise:

$$(3) \text{ Nacho and Mug are beside one another.}$$

A bit of reflection reveals that (3) is best represented by (4), where ‘ n ’ stands for Nacho, ‘ m ’ stands for Mug, ‘ Bxy ’ is read as ‘ x is beside y ’:

$$(4) Bnm$$

²¹ I do not have the space here to elaborate on plural languages. For discussion see: Boloos (1984), Link (1987), McKay(2006), Sider(2007), Yi(2005), (2006), et. al.

This is because *being beside each other* is a two-place, distributive relation—*being beside* applies to Nacho and Mug individually (and symmetrically: if Nacho is beside Mug then Mug is beside Nacho). Still, it is not the case that Nacho and Mug *taken together* are beside...what? *Being beside* is undeniably a two-place relation. The “one another” in (3) is an ellipsis that indicates *which* two things instantiate a two-place (symmetric) relation. Contrast this, for example, with (5), where region R is the region of space that is occupied by Nacho and Mug taken together:

(5) Nacho and Mug are exactly occupying region R.

(5) is best represented by (6), where the abbreviations are as before, and where ‘r’ stands for region R, ‘O(x,y)ξ’ is read ‘(x,y) are exactly occupying ξ,’ where ‘x,y’ is an irreducibly plural term read ‘x and y together.’

(6) O(n,m)r

In this case, ‘O(x,y)ξ’ is representing a two-place relation that holds between some things (collectively) and another thing (singularly).²²

The *being beside one another* relation is best represented by “Bxy,” where this is a symmetrical relation (and so it entails “Byx”). It is true that Mug and Nacho are beside one another, but this just amounts to “Mug is beside Nacho” and “Nacho is beside Mug.” But then *being beside something* is a feature that they *each* have; it is a distributive (two-place) relation. A successful argument against CI needs to show that the whole has a feature that the parts (collectively) do not have, or that the parts (collectively) have some feature that the whole does not have. (3) is not an example of this, since it involves a distributive relation. Let me elaborate on the distinction between collective and distributive predicates briefly, and then I’ll return to the invalidity of BESIDE.

Many of us are familiar with the fallacy of composition (and division). Such fallacies are traditionally characterized as:

COMPOSITION: The parts are F; so the whole is F.

DIVISION: The whole is F; so the parts are F.

Seeming proof that COMPOSITION is a fallacy: Take the molecules, *M*, which are part of my body, *B*. *M* are invisible. By COMPOSITION, *B* is also invisible. But this is false. Since COMPOSITION takes us from a true premise to false conclusions, it is not valid. Seeming proof that DIVISION is a fallacy: My body, *B*, is visible. By DIVISION, the molecules, *M*, are visible. But this is false. Since DIVISION takes us from true premises to false conclusions, it is not valid.

Let us represent some of the relevant body-molecules statements as follows, where ‘b’ stands for my body, ‘O’ stands (collectively) for the molecules (that are part of my body), ‘V’ is the predicate *are visible*, ‘~V’ is the predicate *are invisible*²³, ‘M’ stands for the predicate *is a molecule*.

²² Let us reserve parentheses for concatenated plural terms. So, for example, ‘Px’ would represent a one-place predicate with the single term ‘x’ in the subject slot; ‘Pxy’ would represent a two-place relation with the singular term ‘x’ and ‘y’ in their respective slots; ‘P(x,y)’ would represent a one-place predicate with the plural term ‘x,y’ in the subject position; ‘P(x,y)ξ’ would represent a two-place relation with the plural term ‘x,y’ in the first subject slot, and the singular term ‘ξ’ in the second, etc.

²³ For now, I’m ignoring the fact that “*are visible*” and “*are invisible*” are grammatically plural—in contrast with the singular “*is visible*” and “*is invisible*.” I’m intending these predicates to be neutral between taking a plural or singular term in their subject slots. That certain predicates are plural and resist singular terms in their subject slot is connected

- (7) $b =_h O$
(8) $\forall b$
(9) $\exists n (O =_h x_1, \dots, x_n \ \& \ Mx_1 \ \& \ \sim Vx_1 \ \& \ Mx_2 \ \& \ \sim Vx_2 \ \& \dots \ \& \ Mx_n \ \& \ \sim Vx_n)$
(10) $\sim VO$
(11) VO

All of these should be relatively straightforward except for (9). (9) states that there is some number, n , of molecules that are parts of my body, and that each one of these is invisible. Plausibly, your body is composed of a finite number of molecules.

It is true that my body is visible, as we can express by (8). It is also true that the molecules *taken individually* are invisible, as we express by (9). But even granting that my body is identical to the molecules *taken together*, (7), we cannot infer from this and (9) that (10). In fact, (10) is false. (10) expresses the claim that the molecules *taken together* are invisible, which is patently false. The claim “the molecules are invisible” is only true when we read the predicate ‘are invisible’ *distributively*—i.e., when we claim that *each* of the molecules is invisible. And we express this state of affairs by a statement such as (9), not (10). In fact, from (7) and (8), and an application of the Substitutivity of Identicals²⁴, we get (11), which *is* true—the molecules taken together *are* visible!

Claims such as “the molecules are visible” have a distributive and a collective reading: on the collective reading it is true; on the distributive reading it is false. A plural language can distinguish these two readings quite nicely, thus allowing us to see when an inference from parts to wholes is valid, or when it is not.²⁵

Let us return to COMPOSITION and DIVISION. Both of these refer to “the parts” ambiguously—the term is equivocal between a collective and distributive reading.²⁶ However, we can now formally distinguish these readings as follows (where the ‘ o_i ’s stand for the parts and ‘ o ’ stands for O):

- (12) $F(o_1, o_2, \dots, o_n)$; so Fo .
(13) $Fo_1 \ \& \ F o_2 \ \& \ \dots \ \& \ Fo_n$; so Fo .
(14) Fo ; so $F(o_1, o_2, \dots, o_n)$
(15) Fo ; so $Fo_1 \ \& \ F o_2 \ \& \ \dots \ \& \ Fo_n$.

In (12) and (14), the plural term “ (o_1, o_2, \dots, o_n) ” refers to O ’s parts collectively and predicates of them that they are (collectively) F . In contrast, (13) and (15) contain terms that refer to O ’s parts individually and claims of each that *it* is F . These inferences—(13) and (15)—are clearly invalid: it may *happen* to be that if some object O is F , then each of O ’s parts is F (e.g., if the fence is white,

with objections against CI on grammatical grounds, which I do not have the space here to address. See Van Inwagen (1994) and Sider (2007) for discussion.

²⁴ Substitutivity of Identicals: Fa , $a = b$; so Fb .

²⁵ Notice that this is a benefit of the plural language being endorse here that stands apart from the CI thesis—i.e., one can reap the expressive power of this plural language without committing oneself to CI.

²⁶ Leonard and Goodman (1940) make the distinction between expansive and non-expansive (or counter-expansive) relations.

then each of the boards of the fence is white²⁷). But it clearly does not *follow* from the fact that O is F that each of O's parts is F. No one would even be tempted by this line of reasoning.

The best diagnosis of why we might have ever found COMPOSITION and DIVISION compelling is because we interpreted them each as instances (12) and (14), respectively. Yet purported counterexamples—such as the body/molecules case—are almost always instances of (13) or (15). I say ‘almost always’ to be cautious. Whether or not there are counterexamples to COMPOSITION or DIVISION that are also instances of (12) and (14) is exactly what someone who is arguing against CI needs to show. Any instance of (12) or (14) that takes us from true premises to a false conclusion would also serve as a basis for a successful IIA against CI. Showing that there is a property, F, that the whole has that the parts (collectively) do not, or that there is a property, F, that the parts (collectively) have that the whole does not, would be in effect to fill in particular details of an IIA. Since whether or not this is the case still has yet to be established, I will not claim that all instances of (12) and (14) are valid. At this point, it is enough if I establish this: a plural language is expressive enough to disambiguate plural and distributive readings, and this will allow us to formally diagnose many fallacious inferences about parts and wholes. Moreover, any argument against CI must be sensitive to this fact or else the objection will be undermined from the outset.

So let us return to BESIDE. We can now see that it is no objection to claim that there is a property that the parts (distributively) have that the whole does not, such as *being beside each other*, to prove CI false. This is because certain relations that the parts bear to each other are still distributive, even though they may not seem that way (because the relation is multi-placed, for example). To be more explicit, the following claims are endorsed by CI, given the Mug and Nacho example, where n = Nacho, m = Mug, Bxy = x is beside y (and where ‘Bxy’ expresses a symmetric relation), and u = Muggo:

- (16) Bnm
- (17) u =_n n,m

Given that ‘Bxy’ is a two-place relation, we cannot simply swap ‘u’ in for ‘n’ and ‘m’ using something like the Substitutivity of Identicals. First, this is because the plural term ‘n,m’ in (17) is distinct from the singular terms ‘n’ and ‘m’ in (16). In (16) the terms ‘n’ and ‘m’ are referring to Nacho and Mug *individually*, and is saying that each of them has a certain relation to the other. In (17), the plural term ‘n,m’ is referring to Nacho and Mug *collectively*, and claiming that they, taken together, are identical to Muggo. So the Substitutivity of Identicals doesn’t apply here—Muggo is not identical to Nacho, nor is it identical to Mug; it’s identical to Nacho *and* Mug (collectively). Second, the predicate in (16) is *two*-placed; we cannot merely swap one plural term in for two singular terms. This objection is committing an error similar to that of the Fallacy of Composition and the Fallacy of Division—it is conflating the distinction between distributive and collective predication.

To be clear, the problem with BESIDE is that it is invalid because it is formally ambiguous: there is no distinction between Nacho and Mug referred to plurally and Nacho and Mug referred to individually (also, there is no use of hybrid identity, so the sentences are strictly-speaking ungrammatical). We can remedy this by formally recasting the argument as follows, using previous abbreviations:

BESIDE*

²⁷ But the molecules of the fence are not white. Nor are the inside parts of the boards, etc. Very rarely is a distributive predicate distributive all the way down.

1. If CI, then $n, m =_h u$.
2. If $(n, m) =_h u$, then for any property P , $P(m, n)$ iff Pu .
3. But Bnm , while $\sim Bu$.
4. So, $n, m \neq$ Muggo.
5. So, CI is false.

All of the above premises are true, but the argument itself is invalid. As explained above, it is irrelevant that Nacho and Mug *each* have a property that Muggo doesn't have. Even granting the truth of premise 3, 4 simply does not follow from this fact. Moreover, any other reading of this argument would either (i) be an implausible interpretation of CI (i.e., if CI was read as saying that each of the parts is identical to the whole²⁸) or (ii) would render premise 3 false (i.e., it is not the case that *being beside* is true of Nacho and Mug collectively). So, once we disambiguate BESIDE, we see that it is either invalid or unsound. Either way, it is ineffective against CI. And similarly for MANY-ONE, TEMPORAL and MODAL. Any interpretation of these arguments that equivocates between a collective and distributive application of some predicate F in an attempt to show that the parts have a feature that the whole does not (or that the whole has a feature that the parts do not), will be rejected outright as invalid.

However, recognition that there is an invalid reading of these arguments against CI only eliminates some of the attempts to show that CI is false. Unlike BESIDE, there are *valid* readings of MANY-ONE, TEMPORAL and MODAL, which leave the CI theorist the challenge of showing how they are nonetheless unsound. I address this topic in Part 2.

References

- Alston, W. and Bennett, J. (1984) Identity and Cardinality: Geach and Frege. *The Philosophical Review* 93(4): 553-67.
- Armstrong, D. (1997) *A World of States of Affairs*. Cambridge. Cambridge University Press.
- (1989) *Universals: An Opinionated Introduction*. Westview Press.
- Baxter, D. (1988a) Identity in the Loose and Popular Sense. *Mind* 97: 575–82.
- (1988b) Many-One Identity. *Philosophical Papers* 17: 193–216.
- (1989) Identity Through Time and the Discernibility of Identicals. *Analysis* 49 (3): 125-131.
- (1999) The Discernibility of Identicals. *Journal of Philosophical Research* 24: 37-55
- (MS) Identity, Discernibility, and Composition.
<http://www.philosophy.uconn.edu/departments/baxter/Id%20Dis%20Comp%20draft.pdf>
- Black, M. (1952) The Identity of Indiscernibles. *Mind*, Vol. LXI, No. 242.

²⁸ And even if one maintained this, as Baxter does by endorsing RCT, he does so by rejecting the Indiscernibility of Identicals, in which case the argument would be unsound.

- Boolos, G. (1984) To Be Is to Be the Value of a Variable (or to Be Some Values of Some Variables). *Journal of Philosophy* 81: 430–49. Reprinted in Boolos 1998: 54–72.
- Butler, J. (1839) *The Whole Works of Joseph Butler*. Dissertation I: Of Personal Identity. 263-70.
- Cameron, R. (2007) The Contingency of Composition. *Philosophical Studies*. 136 (1).
- (2010) Quantification, Naturalness and Ontology. In Allan Hazlett (ed.) *New Waves in Metaphysics*. Basingstoke, Palgrave Macmillan. Forthcoming.
- (forthcoming) Composition as Identity Doesn't Settle the Special Composition Question. *Philosophy and Phenomenological Research*.
- Carrara M. and Sacchi E. (2007) Cardinality and Identity. *Journal of Philosophical Logic* 36(5): 539-56.
- Chisholm, R. (1973) Parts as Essential to Their Wholes. *Review of Metaphysics* 26: 581–603.
- (1975) Mereological Essentialism: Further Considerations. *Review of Metaphysics* 28: 477-84.
- (1976) *Person and Object*. Open Court publishing Company.
- Feldman, F. (1973) Sortal Predicates. *Nous* 7(3): 268-82.
- Geach, P. T. (1967-8) Identity. *Review of Metaphysics*. 21: 3-12. Reprinted in Geach (1972).
- (1972) *Logic Matters*. Berkeley: University of California Press.
- (1980) *Reference and Generality*. Ithaca, NY: Cornell University Press.
- Gibbard, A. (1975) Contingent Identity. *Journal of Philosophical Logic* 4: 187-221.
- Leonard, H. S. and Goodman, N. (1940) The Calculus of Individuals and its Uses. *The Journal of Symbolic Logic*. 5(2): 45-55.
- Lewis, D. (1986). *On the Plurality of Worlds*. Oxford: Basil Blackwell.
- (1991). *Parts of Classes*. Oxford: Basil Blackwell.
- Markosian, N. (1998a) Brutal Composition. *Philosophical Studies* 92: 211–49.
- (1998b) Simples. *Australasian Journal of Philosophy* 76: 213–26.
- McDaniel, K. (2004) Modal Realism with Overlap. *Australasian Journal of Philosophy*. 82:1 137-152.
- (2007) Brutal Simples. *Oxford Studies in Metaphysics*. 3: 233-66.
- (2008). Against Composition as Identity. *Analysis* 68(2): 128-33.

- McKay, T. (2006) *Plural Predication*. Oxford. Clarendon Press.
- Merricks, T. (1999) Composition as Identity, Mereological Essentialism, and Counterpart Theory. *Australasian Journal of Philosophy* 77 (1999): 192-195.
- (2000) No Statues. *Australasian Journal of Philosophy* 78 (2000): 47-52.
- (2003) *Objects and Persons*. Oxford: Clarendon Press. Oxford University Press.
- (2005) Composition and Vagueness. *Mind* 114 (2005): 615-637.
- Noonan, H. W. (1978) Sortal Concepts and Identity. *Mind* 87 (346): 267-269.
- Paul, L. A. (2002) Logical Parts. *Nous* 36:4.
- (2006) Coincidence as Overlap . *Nous*. 40 (4): 623-659.
- Priest, G. (1979) The Logic of Paradox. *Journal of Philosophical Logic* 8: 219-241.
- Quine, W. (1982) *Methods of Logic*, Fourth Edition. Harvard University Press.
- Rayo, A. (2002). Word and Objects. *Noûs* 36: 436–64.
- Rayo, A. and Gabriel Uzquiano (1999). Toward a Theory of Second-Order Consequence. *Notre Dame Journal of Formal Logic* 40: 315–25.
- Rea, M. (ed.) (1997). *Material Constitution*. Lanham, Maryland: Rowman & Little_eld.
- Schaffer, J. (2007) Monism. *The Stanford Encyclopedia of Philosophy*.
<http://plato.stanford.edu/entries/monism/index.html>
- Schaffer, J. (2010) Monism: Priority of the Whole. *Philosophical Review* 19: 31-76.
- Sider, T. (1993). Van Inwagen and the Possibility of Gunk. *Analysis* 53: 285–89.
- (2001). *Four-Dimensionalism*. Oxford: Clarendon.
- (2007). Parthood. *Philosophical Review*. 116: 51-91.
- (MSa). Against Parthood. <http://tedsider.org/papers/nihilism.pdf>
- (MSb). Composition as Identity and Emergent Properties.
http://tedsider.org/papers/mcX_reply.pdf
- Simons, P. (1987). *Parts: A Study in Ontology*. Oxford: Clarendon.
- Thomson, J. J. (1983) Parthood and Identity Across Time. *Journal of Philosophy* 80: 201-20.

- Unger, P. (1979) I Do Not Exist. In *Perception and Identity: Essays Presented to A. J. Ayer with His Replies to Them*, G. F. MacDonald (ed.). London. The Macmillian Press.
- Van Inwagen, P. (1990) *Material Beings*. Cornell University Press.
- (1994). Composition as Identity. *Philosophical Perspectives* 8: 207–20. Reprinted in van Inwagen 2001: 95–110.
- (2001). *Ontology, Identity and Modality*. Cambridge: Cambridge University Press.
- Varzi, A. C. (2006) Parts and Wholes. *The Journal of Philosophy*. 103 (12).
- Weatherson, B. (MS) Stages, Worms, Slices and Lumps. <http://brian.weatherson.org/swsl.pdf>.
- Wiggins, D. (1968) On Being at the Same Place at the Same Time. *The Philosophical Review*.
Reprinted in Rea 1997.
- Yi, Beyong-uk (1999). Is Mereology Ontologically Innocent? *Philosophical Studies* 93: 141–60.