Chapter 3

Four Arguments Against CI
and Responses

1. Introduction

There are five general kinds of arguments commonly leveled against Composition as Identity: (i) those that appeal to the Principle of the Indiscernibility of Identicals, (ii) those that appeal to the Principle of Ontological Parsimony, (iii) those that appeal to the Principle of the Substitutivity of Co-referential terms, (iv) those that appeal to technicalities involving Plural Logic—in particular, the details of predicates such as *is one of,* and (v) those that are concerned with modality. In this chapter I will address the first four of these argument (i)-(iv), leaving the fifth kind of objection—the Modal Objections—for Chapter 4. I will show how CI can respond to the first four worries using the account of Plural Counting I introduced in the previous chapter, and a plural logic and language, complete with plural quantifiers, terms, and predicates, which I will discuss in section 3 of the present chapter.

2. Four Common Arguments against CI

2.1 *Argument 1: The Indiscernibility of Identicals*

Perhaps one of the most intuitive and straightforward argument against Composition as Identity (CI) involves an appeal to the Indiscernibility of Identicals.

> **The Indiscernibility of Identicals**: for any object, *x*, and any object, *y*, if *x* = *y*, then *x* and *y* have all of the same properties.

One might be tempted to argue against CI using the Indiscernibility of Identicals as follows: The non-identity of parts and wholes is easy to show, for the parts have an obvious property that the whole does not have—namely, *being many in number*. Conversely, the whole has a property that the parts do not have—namely, *being one in number*. And so, given the Indiscernibility of Identicals, the parts must not be identical to the whole. Hence, CI is false. Lewis echoes this exact worry when he claims,

> "What's true of the many is not exactly what's true of the one. After all they are many while it is one. The number of the many is six, as it might be, whereas the number of the fusion is one."[1]

McKay (2006) summarizes this kind of objection slightly differently as follows:

> "The mereological sum of Alice, Bill, and Carla = the mereological sum of the molecules of Alice, Bill and Carla. Alice, Bill, and Carla are three in number, but their molecules are not three in number. So…Alice, Bill, and Carla, cannot be identical to their mereological sum."[2]

McKay here supposes that we have three objects, Alice, Bill, and Carla. Each of these three objects is made up of lots and lots of molecules. According to the principles of mereology, however, the mereological sum of Alice, Bill, and Carla is identical to the mereological sum of the molecules of Alice, Bill, and Carla. (Notice that this follows from the principles of mereology even if you do not accept CI.) Let us call this Claim 1:

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[1] Lewis 1991:87

[2] McKay 2006: 38.

> **Claim 1**: The mereological sum of Alice, Bill, and Carla is identical to the mereological sum of the molecules of Alice, Bill, and Carla.

According to CI, however, any mereological sum is identical to the parts that compose the sum. And so the following two claims follow from Claim 1, if CI is true:

> **Claim 2**: The mereological sum of Alice, Bill, and Carla is identical to Alice, Bill, and Carla
>
> **Claim 3**: The mereological sum of the molecules of Alice, Bill and Carla is identical to the molecules of Alice, Bill and Carla.

By the transitivity of identity, and the truth of Claims 1, 2, and 3, we get Claim 4:

> **Claim 4**: Alice, Bill, and Carla are identical to the molecules of Alice, Bill, and Carla.

But Claim 4 cannot be true because of the Indiscernibility of Identicals: Alice, Bill, and Carla have a property that the molecules of Alice, Bill, and Carla do not have—namely, *being three in number*. And so Claim 4 must be false. Hence, CI is false.

In short, this kind of argument against CI holds fixed our intuitions about identity and shows the apparently absurd position that CI yields. It seems that in claiming that mereological sums are identical to their parts, we would have to say that something can be both one and many, thus violating the Indiscernibility of Identicals. Since the Indiscernibility of Identicals is a principle that we do not wish to give up, then any theory which forces us to do so should be rejected. In much of the literature on composition, this is seen as a decisive argument against CI—

so much so, that further argumentation against CI is not even considered, or seen as necessary.

2.2 *Argument 2: Ontological Extravagance*

Related to the objection concerning CI and the Indiscernibility of Identicals, is another objection that appeals to the Principle of Ontological Parsimony (POP).

> **The Principle of Ontological Parsimony:** Of two competing metaphysical theories, *a* and *b*, if *a* posits fewer items in our ontology than *b*, then, all things being equal, we should prefer *a* over *b*. More strongly: *a* is more likely to be true than *b*.

This is Occam's Razor applied to ontology, which shows our prejudice for simpler systems. Moreover, it is not just that we *prefer* desert landscapes to unruly jungles; it isn't mere aesthetic preference. Rather, we think that the more austere theories, all else being equal, have a better shot at being true than the more complicated ones. Simplicity, in other words, is truth-conducive.[3]

So how does POP apply to issues of mereology and CI? Recall that one of the main motivations for finding CI tempting in the first place is an appeal to the POP: we should accept CI, one might argue, because we can then adopt all of theoretical advantages of allowing mereological sums into our ontology without accruing any ontological costs. We get mereological sums for free! Put another way, if we do not accept CI, and yet we still want mereological sums in our ontology (because they do some important theoretical work, say), then our theory

[3] See Chapter 1, section 5.

will be less plausible *overall* since it will be in tension with POP. Mereological sums without CI, in other words, *are* extremely ontologically costly.

Since POP is one of the primary motivating factors *in favor* of CI, it would undercut these very considerations if it is shown that CI ultimately violates this principle once the view is laid out in detail. The second kind of argument against CI concludes that this is exactly what a commitment to CI would bring—further ontological commitments that would directly violate the Principle of Ontological Parsimony.

One example of just such an argument run as follows[4]: Assuming CI is true, suppose that we have only two things in the universe, my mug, Mug, and my cat, Nacho.[5] A proponent of CI claims that we also have the mereological sum of Mug and Nacho—namely, Muggo. What's more, the CI theorist claims, is that Muggo is no further ontological commitment, since Muggo is simply identical to Mug and Nacho. Once we have Mug and Nacho, in other words, we get Muggo for free. Yet Mug has the property *being a mug*, and it does not have the property *being a cat*. Conversely, Nacho has the property *being a cat*, but he does not have the property *being a mug*. Assuming that no mug is a cat and no cat a mug, then what are we to say of the mereological fusion of the mug and the cat, Muggo? Muggo has neither the property *being a mug* (i.e., Muggo is not a mug), nor does it have the property *being a cat* (i.e., Muggo is not a cat). By accepting CI, it seems we are now committed to a new, strange kind of thing—

[4] Adapted from an argument in Yi 1997 141-2.

[5] For ease of explanation, assume what's unlikely: that my mug and my cat are mereological simples (i.e., they have no proper parts).

Muggo—that is neither a mug nor a cat. So, contrary to the CI theorist's claim, a commitment to Muggo *is* a commitment to something beyond a commitment to just a mug and a cat. Thus, CI *does* violate the POP, contrary to what the view has advertised. The extent to which POP is a guiding theoretical principle, then, is the extent to which we should find CI implausible.

2.3 *Argument 3: Failure of the Substitutivity of Co-Referential Terms*

A third kind of objection commonly raised against CI is related to the first, but is more concerned with grammaticality than it is with metaphysical issues. These arguments use the Law of Substitutivity of Co-referential Terms.

> **Law of Substitutivity of Co-referential Terms**: the following inference is valid (i.e., truth preserving), and because of that, grammaticality-preserving as well:
>
> F*x*
> *x* = *y*
> ————-
> F*y*

In other words, the Law of Substitutivity of Co-referential Terms guarantees that grammatical premises will yield grammatical conclusions.

One may use this principle to argue against CI as follows: Composition cannot be Identity. To see this, suppose that three people, Rod, Todd, and Maud, met for lunch. We can express this state of affairs by sentence (a):

(a) Rod, Todd, and Maud met for lunch.

Yet according to CI, Rod, Todd, and Maud compose a mereological sum, Ned, and hence, Rod, Todd, and Maud are *identical* to Ned. So let us assume for reductio that CI is correct, and that Rod, Todd, and Maud are identical to Ned. Yet given the Law of Substitution of Co-referentials, we should be able to substitute "Ned" for "Rod, Todd, and Maud" in (a). Yet when we do this, we get the ungrammatical—and, hence, unacceptable—(b):

(b) Ned met for lunch.

Hence, our assumption that CI is true, and that Rod, Todd, and Maud are identical to Ned must be rejected; so, CI is false. Both Yi (1997) and Sider (2007) have presented versions of the forgoing grammatical arguments against CI.[6]

Moreover, one might be tempted to make the further point that (b) is not only unacceptable because of the ungrammaticality *per se*, but that the ungrammaticality reflects a truism about the predicate or property *to meet*: namely, that one thing can't meet for lunch. Yet if CI is true, this will be the (unwelcome) result. If CI is true, then we will have to embrace the (apparently) odd metaphysical fact that one thing can meet for lunch.

Notice, however, that this further point is mistaken. Reflection reveals that, even though we do not think that one *person* can meet for lunch, one *thing* can, depending on what that thing is, and it can do more than just meet for lunch. The (one!) couple, for example, can meet for lunch; the (one!) team can meet for practice; the (one!) knitting club can meet for Mai Thais and gossip, etc. If CI is

[6] Although, admittedly, Sider does not think that such an objection is very effective against CI. See Sider 2007.

correct, mereological sums will be among those special, singular items in our ontology that *can* meet for lunch—and other things besides!—all by themselves. So if CI is correct, and Ned is the mereological sum of Rod, Todd, and Maud, then Ned *can* meet for lunch, if Rod, Todd and Maud do.

Yet if the ungrammatical result using the Law of Substitutivity of Co-referential Terms is supposed to be indicative of something metaphysical—i.e., if it is supposed to reveal whether or not one thing can instantiate a certain property (or satisfy a certain predicate)—then notice that this sort of objection will be a collapse into the first kind of argument—an argument using the Indiscernibility of Identicals. I will show how a CI theorist can respond to such objections below. If the worry *is* purely grammatical, however, then I hope to show how a defender of CI can respond to this sort of worry as well.

2.4 *Argument 4: CI and* **is one of**

The fourth and final type of objection launched against the CI that I will consider in this chapter is a bit more technical. It involves the charge that accepting CI undermines the benefits of having a plural logic. This would be an ironic consequence, if correct, since any successful defense of CI will rely heavily on the resources a plural language affords.[7] In particular, this objection claims that accepting CI will undercut an acceptable analysis of the predicate *is one of*. Such an analysis is essential if we intend to reap all of the theoretical advantages of having a plural logic and language in the first place—e.g., expressive power,

[7] Promissory note: this claim will be an important premise in the fourth argument against CI; I will simply assume it now, and support it later.

etc. Since there are many reasons, independent of issues of composition, to accept a plural logic and language, and since a predicate such as *is one of* seems to be integral to the success of these logics and languages, it is incumbent upon CI to show that it can accommodate these worries.

Let us accept (for now) the following analysis of the predicate *is one of* (modified from Sider (2007)), where t and $u_1,\ldots u_n$, are all singular terms.

is one of: t is one of $u_1,\ldots, u_n \leftrightarrow (t = u_1$ or,…, or $t = u_n)$[8]

is one of says that something, t, is one of something(s) else, $u_1,\ldots, u_n$, if and only if t is identical with any of $u_1, \ldots, u_n$. Notice that the list of u_is in the above formulation are strung together by commas, ‘,’. This is not intended to be the same terminology that I introduced in Chapter 2; it is rather intended to be a first pass at representing our ordinary sense of what we mean by the predicate *is one of*, [9] which presumably does not include a technical notion such as the hybrid identity predicate, $=_h$, that was introduced in the previous chapter. Intuitively, we often make a list of items, individuated by commas, and then claim that something, x, might be among or one of the listed items. We might also, in ordinary language, use a conjunction to represent such a list; we might say “Joe is one of Larry, Moe, *and* Curly.” Moreover, the bi-conditional in **is one of** is certainly intuitive in both directions: If I tell you that Joe is one of Larry, Moe, and Curly, then you expect that Joe is identical to either Larry, Moe, or Curly. And,

[8] This is modified from Sider’s principle **Lists**, and Yi’s principle (P). See Sider (2007:7) and Yi (1997:?).

[9] I will later argue that the CI theorist must ultimately claim that this first pass intuition is mistaken.

going the other way, if Joe is identical to either Larry, Moe or Curly, then we can say that Joe is one of Larry, Moe, and Curly.

Notice, however, that **is one of** isn't *completely* intuitive; the analysis leaves it open as to whether all of the $u_1,\ldots u_n$, are identical, for example. Or there may only be one u_i. So it may be the case that Joe is one of Larry, Moe, and Curly, but also true that Larry = Moe = Curly. And so on this analysis, despite the *prima facie* unintuitiveness of it, something *can* be one of itself. The defender of CI, as well as her opponents, embrace this seemingly unintuitive result of a more technical analysis of the predicate *is one of*.[10]

Yi's initial argument against CI, which appeals to a principle equivalent to **is one of**, runs as follows[11]: Suppose we have a cat, Tom, a mouse, Jerry, and the mereological fusion of Tom and Jerry, Genie. According to mereology, Tom and Jerry compose Genie. Given CI, however, it follows that (A):

(A) Tom and Jerry are identical to Genie.

But it is also the case that (B), since one thing is always one of itself:

(B) Genie is one of Genie.

Yet from (A) and (B), and given the Substitutivity of Identicals, we get (C):

(C) Genie is one of Tom and Jerry.

[10] And, as we shall see, this will play an important role in the following argument against CI.

[11] Yi gives this argument, then later tries to anticipate moves on the CI theorist's behalf, generating another argument that resembles the one with which I end this section.

But (C), together with **is one of**, entails that either (D) or (E) are true:

(D) Genie is identical to Tom.

(E) Genie is identical to Jerry.

But even according to the defender of CI, (D) and (E) are both false. So, Yi concludes, (A) and CI must be false.

Let us not be mistaken; the above argument should not be confused with the following argument given by Hugh S. Chandler in his "Constitutivity and Identity" [12]:

> "How can one thing be the same as two, neither of which is the same as the first? A cardboard disc is made up of two halves. Obviously the disc is not the same as the first half and not the same as the second."

This argument from Chandler relies on a principle related to (but distinct from) **is one of**, which we can call the **Naïve Identity Principle**:

Naïve Identity Principle: If $x \neq_h y_1$, and …, and $x \neq_h y_n$, then $x \neq_h y_1, \ldots, y_n$.

Note that I have used the hybrid identity predicate, $=_h$, in the above formulation, which Chandler probably did not have in mind. But formulating the Principle in this way allows us to more easily articulate Chandler's assumption in the above quoted passage. Namely, that if something, *a*, is not identical to *b*, and is also not identical to *c*, then *a* is not identical to *b and c* (or: if $a \neq_h b$ and $a \neq_h c$, then $a \neq_h$

[12] Chandler, Hugh S., "Constitutivity and Identity," in Rea, 1997.

b,*c* in our hybrid identity terminology). According to the above argument from Chandler, CI must be false since it is clear that no whole (i.e., mereological sum) is identical to any of its parts, let alone all of them. And yet, according to **Naïve Identity Principle**, a whole must be identical to *all* of its parts, taken individually, if it is identical to them, taken collectively, at all.

However, as perhaps emerged from the discussion of Plural Counting (Ch. 2), and will emerge from my discussion of Plural Logic (below), a proponent of CI (as I am imagining her) does not think that any mereological sum is identical to any one of its (proper) parts. To wit, she thinks that the **Naïve Identity Principle** is false.

Recall, for instance, the quarter example that was discussed in Chapter 2. Imagine that you have two quarters in your pocket, which make up one fifty cent grouping. Now, let us existentially quantify over all of the things that are in your pocket, together with the non-identity claims of those objects. Then, according to Logic Book Counting, we will get a statement that looks something like the following (where ‘P*x*’ is read as ‘*x* is in your pocket’)”:

(1) $\exists x \exists y \exists z(\mathrm{P}x \;\&\; \mathrm{P}y \;\&\; \mathrm{P}z \;\&\; x \neq y \;\&\; x \neq z \;\&\; y \neq z)$

And (1), according to Logic Book Counting, will represent “there are three things in your pocket.” Recall, however, that (1) is *not* how the defender of CI will represent a statement such as “there are three things in your pocket” since she thinks that (1) is not the end of the story. In particular, (1) has left out an important identity claim that CI thinks hold—namely that the two quarters *are* *identical to* the one fifty-cent grouping. So, instead of (1), the defender of CI will endorse a statement such as (5), which uses her hybrid singular/plural identity predicate:

(5) $\exists x \exists y \exists z(\mathrm{P}x \,\&\, \mathrm{P}y \,\&\, \mathrm{P}z \,\&\, x \neq_{\mathrm{h}} y \,\&\, x \neq_{\mathrm{h}} z \,\&\, y \neq_{\mathrm{h}} z \,\&\, z =_{\mathrm{h}} x, y)$

Any view that interprets CI as only having recourse to (1) to represent the various things inside your pocket is underestimating the resources available to the CI theorist. In particular, she is ignoring the force of her primary claim, which is that one thing *can* be identical to many, without this implying the **Naïve Identity Principle**. The argument quoted from Chandler, is thus making a similar mistake—it is underestimating the moves available to the defender of CI. Chandler assumes that the only way that CI can be true—the only way that a whole could be identical to its parts—is by embracing the **Naïve Identity Principle**.

Yet, as we have seen, the defender of CI holds no such view. She does *not* think that a mereological sum is identical to any one of its parts; the whole is not identical to its parts individually. Rather, she thinks that a mereological sum is identical to its parts *taken together*, where the best way to interpret this is by having plural terms in our language that refer to more than one object at once, as is demonstrated in (5) above (and as will be shown in section 3 below).

However, Chandler's argument is not the one that Yi has put forward; I only mention Chandler's so that we are clear about what, exactly, Yi's challenge is. Yi's argument intuitively rests on the technicalities of **is one of**, and how we use it in ordinary language. Nonetheless, as I will demonstrate below, Yi's argument (carefully unpacked) actually reveals a much stronger point—namely that a commitment to **is one of** carries with it a commitment to the **Naïve Identity Principle**. That is, one cannot consistently be committed to one without being committed to the other. Thus, it seems that the CI theorist cannot consistently accept **is one of** and simultaneously reject the **Naïve Identity Principle**.[13]

Here is Yi's worry again, using a slightly different example, which is modified from Sider's example in his (2007). [14] Imagine that we have the top third of a circle, *t*, the middle third of a circle, *m*, and the bottom third of a circle, *b*. Also imagine that we have the entire circle, *Circle*. Now according to CI, (F) is true:

(F) $Circle =_h t, m, b$[15]

But is also the case that (G), since as explianed above, it follows from the definition of **is one of** that one thing is always one of itself[16]:

(G) *Circle* is one of *Circle*.

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[13] This argument echoes Sider's worry in [Sider:2007], but it seems present in Yi as well. That is, as far as I understand them, I think Yi and Sider are ultimately getting at the same point, which I hope I have articulated clearly below.

[14] I have changed the example somewhat, since I think his use of a human unfairly loads the argument against CI. For a human being, while composed of parts such as arms, legs, torsos, etc., is not *entirely* composed of such things. Intuitively, human beings are also composed of temporal and modal parts, and maybe some other things besides. (See Chapter 5 for elaboration.) For now, however, let us stick with objects such as circles, which are easier to imagine as not necessarily having temporal or modal parts—or at least, as not necessarily existing through time or modal space.

[15] Notice that we are using the CI way of expressing the identity relation between *Circle* and *t*, *m*, and *b*—we are using the hybrid identity predicate, $=_h$, which allows us to say that one thing is identical many, and we are using the plural term "*t*, *m*, *b*" to refer to *t*, *m*, and *b* collectively. We will see below how using the CI terminology in this way complicates matters slightly, but in a way that hopefully brings some clarity to the issues at hand.

[16] See bottom of page 8 and top of page 9.

Yet from (F) and (G), and given the Substitutivity of Identicals, we get (H):

(H) *Circle* is one of *t*, *m*, *b*.

But from (H), and the definition of **is one of**,

is one of: *t* is one of $u_1, \ldots, u_n \leftrightarrow (t = u_1$ or,…, or $t = u_n)$

it follows that either (I), (J), or (K) are true:

(I) *Circle = t*

(J) *Circle = m*

(K) *Circle =b*

But it is not the case—even according to CI—that any of (I)-(K) are true. Thus, it looks like we can only accept CI at the cost of giving up the (seemingly) intuitive principle, **is one of**. Yet since **is one of** is clearly true (so this argument goes), CI must be false.

I said above that Yi's argument reveals a stronger point about the relationship between **is one of** and the **Naïve Identity Principle**. Let me now explain this claim. Notice that (F) is an identity claim that follows directly from CI, given that *Circle* is composed of *t*, *m*, and *b*:

(F) Circle $=_h$ *t*, *m*, *b*

But as we saw, (F), together with some rather innocuous assumptions (i.e., the Subtitutivity of Identicals), and the definition of **is one of**, yields the conclusion that either (I), (J), or (K) are true. But this is just to endorse the conditional (L):

(L) If *Circle* $=_h$ *t*, *m*, *b*, then *Circle = t*, or *Circle = m*, or *Circle = b*.

Yet (L) is just the contrapositive formulation of the **Naïve Identity Principle**.

Naïve Identity Principle: If $x \neq_h y_1$, and …, and $x \neq_h y_n$, then $x \neq_h y_1, \ldots, y_n$.

Now, true: (L) is not entirely formulated using the hybrid identity statement; none of the objections in the literature (to date) against CI are. But a successful objection against CI would do well to use terminology that the CI theorist accepts. And there seems to be no reason in principle why (L), and the above line of reasoning from Yi, couldn't be accommodated or rephrased using the hybrid identity relation that the CI theorist endorses; I have shown previously how classical (singular) identity is just a special case of hybrid identity. In which case, then, the endorsement of a conditional such as (L) would be an endorsement of the **Naïve Identity Principle**, which is a principle that the CI theorist rejects.

So there *is* a genuine worry for CI here—one which hinges on CI's seeming inability to give an adequate account of the predicate *is one of*. In particular, Yi's argument (carefully unpacked) seems to show that a commitment to the heretofore proposed analysis of the predicate *is one of* carries with it a commitment to the **Naïve Identity Principle**. So, a CI theorist cannot accept **is one of** if she also wants to consistently reject the **Naïve Identity Principle**.

To summarize the dialectic thus far, the objection runs as follows:

(i) If one adopts a plural language, then one must have a correct analysis of the predicate *is one of*.

(ii) If one wants a correct analysis of *is one of*, then one should adopt **is one of** (as defined above).

(iii) If one adopts **is one of**, then one is also committed to the **Naïve Identity Principle**.

(iv) Assume CI is true.

(v) CI adopts a plural language.

(vi) So, by (i)-(v), CI is also committed to the **Naïve Identity Principle**.

(vii) But if the **Naïve Identity Principle** is true, then CI is false.

(viii) So (iv) must be rejected; CI is false.

A few quick words about the premises in the above argument: the support for (i) will be spelled out below, when we discuss the details of and motivation for having a plural language. It should be enough for our purposes here to point out that nearly all of the literature on plural language is agreed that there needs to be a primitive concept or relation such as *is one of* to maintain a plural language's expressive power, so we shall assume as much here. (ii) is an assumption that is implied by our initial acceptance of **is one of**. (As we shall see, this will (initially!) be the best place for a CI theorist to resist the argument.) (iii) is supported by our argument from (F) to (L) above, where (L) was the contrapositive of the **Naïve Identity Principle**. (v) is an assumption I am making throughout this entire thesis—namely, that a CI theorist cannot coherently defend her view without adopting a plural language, nor *should* she. I will support this claim in later sections of this chapter, but for now let us just flag it as a requirement of the CI view I am endorsing. (vi) follows from (i)-(v), given the assumption (iv). (vii) follows from Chandler's argument above—namely, that CI must be false because according to the **Naïve Identity Principle**, a whole must be identical to *all* of its parts, taken individually, if it is identical to them, taken collectively, at all, which it clearly is not. Thus, (viii) follows from the inconsistency that results when we assume CI is true.

Of course, as mentioned, the obvious move at this point is to reject (ii). By (i) and (v), it is true that a CI theorist needs *a* correct analysis of *is one of*, but perhaps she could easily reject that **is one of** is *the* correct analysis of *is one of*. After all, **is one of** is not formulated in terms of the hybrid identity relation (introduced in Chapter 2). In particular, a closer inspection of **is one of** reveals that it does not accommodate the view that one thing can be identical to many: the right-hand side of the bi-conditional suggests that identity is only distributive, and never collective, as the CI theorist endorses.

However, rejecting (ii) will not be as easy as it seems. For the CI theorist, if she is to reject (ii), is still required by (i) to provide an acceptable analysis of the predicate *is one of*. And this, we shall see, will prove to be quite difficult. For even if the CI theorist had an analysis of *is one of* that accommodated the idea that one thing can be identical to many, for instance, there would still (presumably) be a problem.

To see this, let us adopt **is one of ***, which allows for many-one identity:

is one of*: t is one of $u_1,\ldots, u_n \leftrightarrow (t =_h u_1$ or,…, or $t =_h u_n$, or $t =_h u_1, \ldots, u_n)$

Notice that **is one of *** uses the hybrid identity predicate, and allows that something, t, could be one of something(s) else, the u_is, just in case it is identical to all of the u_is (but not any one of them). We might think that this replacement analysis of the predicate *is one of* would be more amenable to the CI theorist, and may allow her to wriggle out of the above argument.

But even recourse to **is one of*** will not help. To see this imagine a cat, Tom, a mouse, Jerry, and the mereological sum of Tom and Jerry, Genie. Call Tom's left ear 'Lefty.' Call the mereological sum of the rest of Tom (i.e., Tom minus Lefty) and Jerry 'Leftover.' According to CI, (M):

(M) Lefty and Leftover = Genie = Tom and Jerry.

According to **is one of***, (N):

(N) Lefty is one of Lefty and Leftover.

Using the Substitutivity of Identicals, we get (O):

(O) Lefty is one of Tom and Jerry.

But according to **is one of*** Lefty is *not* one of Tom and Jerry. So even allowing that an analysis of *is one of* can somehow accommodate that one thing may be identical to many (collectively), as seems to be the case in **is one of ***, there still seems to be worry for CI.

In short, then, CI (as I will show) relies almost exclusively on our ability to use plural language and logic—complete with plural terms, plural predicates, plural counting, and especially a singular/plural identity predicate—to express and understand her view. One of the primitive concepts in such a language, however, is the predicate *is one of*. So if the adoption of CI results in a corruption of the primitive relation *is one of*, then CI will crumble at the core. Yi (and Lewis, Sider, et. al) do not think that CI can give an adequate analysis of *is one of*, and so CI is supposedly done for.

2.5 *Defensive Strategy*

In light of the above four kinds of objections, it may seem that there is no hope for Composition as Identity. I mean, come on! Not only is it already an unintuitive position to begin with, but the arguments against it are seemingly insurmountable. As much as some of us may *want* composition to be identity—as much as it may help with our ideas of ordinary objects, and the metaphysical puzzles that were introduced in the introduction of this thesis—it is a view that is best left alone, and rejected. However, I hope to show in the sections that follow that Composition as Identity (CI) is not only defensible against these common objections, but also that—after some reflection—CI is an intuitive view after all.

3. Plural Language

In recent philosophical literature, there has been quite a bit of work done on developing plural logics. [17] One of the reasons for this is the purported need for such logics if we hope to accurately express in symbolic logic all that we can express in the English language. For example, in classical logic, we have singular terms, singular predicates, singular quantifiers, etc. So a sentence such as (1) can be represented by (2) (where t = Ted, Lxy = x lifted y, c= the coffin):

[17] See for example: Boolos (1984), Link (1987), McKay (2006), Schien (1993), Sider (2007) Yi (200?), etc.

(1) Ted lifted the coffin.

(2) Ltc

However, notice that things get a bit more complicated when we have a sentence such as (3):

(3) Jason and Lucy lifted the coffin.

For (3) could mean either that Jason and Lucy lifted the coffin together, or that each of (the very strong) Jason and Lucy lifted the coffin individually. If we intend the latter, then we may symbolize the sentence such as (4) (where j =Jason, l = Lucy):

(4) Ljc & Llc

Yet if we intend the former, then it is not clear how we could treat the subject term 'Jason and Lucy' in a logic that only allows subject terms to be singular. Moreover, as some have argued[18], it is not only merely difficult to come up with a proper way to symbolize sentences such as (3) in a classical, singular logic, it is impossible to symbolize certain other sentences. The Kaplan-Geach sentence (5), for example, is inexpressible with a singular logic alone:

(5) Some critics admired only one another.[19]

It is argued that the only way we can fully express many of our expressions in English is by adopting some sort of plural logic—a logic that allows us to talk of

[18] Kaplan and Geach, e.g.

[19] See Boolos 1984; Rayo 2002.

plural subjects, predicates, etc. The sort of plural language I have in mind has (at least) the following features[20]:

(i) singular and plural variables, constants, and quantifiers.
(ii) plural predicates, distributive and non-distributive predicates.
(iii) a hybrid singular/plural identity predicate.
(iv) a predicate *is one of*.

3.1 *Singular and plural variables, constants, and quantifiers*

An example of a plural term would be the term “Jason and Lucy” in (3),

(3) Jason and Lucy lifted the coffin.

where Jason and Lucy lifted the coffin together. We want a language that will treat terms such as “Jason and Lucy” in (3) as a plural ‘unit’, such that we cannot infer from (3), (6):

(6) Jason lifted the coffin and Lucy lifted the coffin.

Assuming that the coffin is so heavy that neither Jason nor Lucy could lift it by themselves (but that they are strong enough to lift it together), (3) is true and (6) is false. So we want a language that will allow us to symbolize the situation as such. A classical singular language with only singular terms will not get the job done; one with plural constants, variables, and quantifiers will.

[20] I am assuming that our plural language is irreducible—that is, plural terms, quantifiers, etc., cannot be reduced to singular terms, quantifiers, etc. Also, this language will become more fully developed as we respond to the objections to CI.

So in addition to the usual singular variables, x, y, z, x_1, etc., our plural language will also have (irreducibly) plural variables, X, Y, Z, X_1, etc.; in addition to the usual singular constants, a, b, c, a_1, etc., we will also have (irreducibly) plural constants, A, B, C, A_1, etc. So, for example, if we want to represent a statement such as (7):

(7) There are some people surrounding a building.

we would use a sentence such as (8), where P = are people, B = is a building, and SXy = X are surrounding y:

(8) $\exists X \exists y(\mathrm{P}X \ \& \ \mathrm{B}y \ \& \ \mathrm{S}Xy)$

And to represent a statement such as (3),

(3) Jason and Lucy lifted the coffin.

where Jason and Lucy lifted the coffin *together*, we could use (9), where A = Jason and Lucy, c = coffin:

(9) LAc

3.2. *Plural predicates, distributive and non-distributive predicates*

Examples of plural predicates are predicates such as *surrounded the building*, *met for lunch*, *argued about philosophy*, etc., as was used in some of the sample sentences above. Let us reserve P, Q, R, S, P_1, etc., to represent plural predicates. Predicates such as these may be attached to plural terms, such that they can admit of collective—as opposed to a distributive—reading. Compare, for example, (10) with (11):

(10) Dan and Eddie met for lunch.

(11) Dan and Eddie sneezed.

The predicate *met for lunch* in (10) is collective in that it predicates a feature of both Dan and Eddie together. We wouldn't say that Dan met for lunch and Eddie met for lunch; meeting for lunch seems to be something that one person cannot do by himself.[21] Yet the point is that even if we can make sense of one thing meeting for lunch, there is an available reading where (10) is true even though it may not be true that Dan met for lunch and Eddie met for lunch. In fact, sentences such as "Dan met for lunch" and "Eddie met for lunch" may not even express propositions.[22] This, intuitively, is why *meeting for lunch* is typically read collectively. Contrast this with *sneezed* in (11). Sneezing is something that each individual does separately; *sneezed* typically modifies its subject terms distributively.

We can represent the distinction between collective and distributive predicates as we did above in (8) and (9):

(8) $\exists X \exists y(\mathrm{P}X \,\&\, \mathrm{B}y \,\&\, \mathrm{S}Xy)$

(9) LAc

[21] Although, as we saw above, what is true for people may not be true for (certain) mereological sums. See above, p. 6-7.

[22] Indeed, if you think that it is metaphysically impossible for one person to meet for lunch, and "Dan" and "Eddie" unambiguously refer to people, then you may not think that sentences such as "Dan met for lunch" and "Eddie met for lunch" even make any sense; such locutions may even be meaningless. However, let us leave this issue aside for now.

In (8), the predicate 'SXy' means '*X* surrounded *y*'; it takes a plural term or variable, *X*, in the agent position and a singular term or variable, *y*, in the patient position. This indicates that the surrounding relation is held between some things, collectively, and another thing, singularly. In (9), the predicate 'L*Xy*' means '*X* lifted *y*'. Like the predicate 'S*Xy*', 'L*Xy*' takes a plural term or variable, *X*, in the agent position and a singular term or variable, *y*, in the patient position. This indicates that the lifting relation is held between some things, Jason and Lucy, taken collectively, and another thing, the coffin, taken individually.

(8) and (9) both include collective predicates (or partially collective predicates), since they take (irreducibly) plural variables, terms, or constants as subjects. This need not always be the case, however, as we can see if we compare (again) (10) and (11):

(10) Dan and Eddie met for lunch.

(11) Dan and Eddie sneezed.

These will be represented as (12) and (13), respectively, where M = met for lunch, A = Dan and Eddie, S = sneezed, d = Dan, e = Eddie:

(12) MA

(13) Sd & Se

(13) does not include any collective predicates, which is appropriate given that 'sneezed' is typically a distributive predicate that applies to objects individually.[23]

[23]I say "typically"; on my view, the story gets a bit more complicated. For I will eventually claim that ordinary objects such as people just *are* mereological sums of lots and lots of different parts—e.g., bodily parts, molecular parts, temporal parts, modal parts, etc. Yet if this is true, then *sneeze* won't be *purely* distributive. That is, it won't be true that if a person sneezes, then all of

(12), however, does include the collective predicate ‘P’, which only takes (irreducibly) plural terms or variables as objects (in this case, ‘A’). Thus, we cannot conclude from (12) that Eddie met for lunch and Dan met for lunch; such an inference is blocked since (12) treats the term ‘Dan and Eddie’ as a plural *unit*, so to speak.[24]

Notice that in (12) we used the plural variable ‘A’, but that we could have also used the plural terminology introduced in Chapter 2. For example, we could have also represented (10) as (14), where d = Dan, e = Eddie:

(14) P(d,e)[25]

Having both ways of referring to more than one object at once will endow our plural language with greater expressive power. For example, if we only had the irreducibly plural terms A, B, C, A_1, etc., then a sentence such as (15) may be difficult to express:

(15) Dan and Eddie met for lunch, and Dan sneezed.

---

the parts that compose that person sneeze. *Sneeze* is not a predicate that applies to individual objects *all the way down*, in other words. So while *sneeze* is a distributive predicate in the above example, it is only partially distributive on my account, given my metaphysics of persons. But since we may separate my claims about language and composition, from my claims about what ordinary objects (such as people) are, I will leave this issue aside for now. See section 5 of this chapter, and Chapter 4 for elaboration.

[24] Notice this echoes the move made in our discussion of plural counting (in Chapter 2) and the fourth objection to CI involving the predicate *is one of* (this chapter, section 2).

[25] Let us reserve parentheses for concatenated plural terms. So, for example, ‘P*x*’ 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*)*z*’ would represent a two-place relation with the plural term ‘*x*,*y*’ in the first subject slot, and the singular term ‘*z*’ in the second, etc.

For the natural way to symbolize this if we *don't* have recourse to our concatenated terms such as 'd,e' etc., and have only the plural language introduced in this section, is (16):

(16) MA & Sd

Yet (16) leaves opaque information that seems transparent in the natural language sentence (15)—namely, that Dan is one of (or among, or part of) the plural things that met for lunch. If we adopt the terminology that was introduced in Chapter 2, however, then we could more accurately represent (15) by (17):

(17) P(d,e) & Sd

It is transparent in (17) that the constant 'd' in the second conjunct is related to the plural terms 'd,e' in the first conjunct. In this way, it will increase the expressive power of our plural language if we adopt both ways of referring to many objects at once.[26, 27]

3.3. *A hybrid singular/plural identity predicate*

In addition to plural predicates, however, we will also want a plural language that has an identity predicate that allows both singular and plural terms in its scope. Notice that it is not uncommon to allow the identity predicate to modify only singular terms or only plural terms, as in (18) and (19):

(18) Superman is (identical to) Clark Kent.

[26] Thanks to Keith Simmons for helpful input in the foregoing section.

[27] See below for further elaboration on this point.

(19) Locke, Berkely, and Hume are (identical to) the British Empiricists.

But it is quite another matter to allow the identity predicate to be flanked by a mixture of plural and singular terms as in (20) and (21):

(20) Rod, Todd, and Maud are identical to Ned.

(21) Ned is identical to Rod, Todd, and Maud.

Yet, as has been discussed in previous sections of this thesis, a singular/plural hybrid identity predicate is particularly important to the defender of CI since the primary radical claim of her view is that many things can be one. As discussed in Chapter 2, we can symbolize this two-place, singular/plural hybrid identity predicate as '$=_h$', which takes either plurals or singulars as argument places:

$\alpha =_h \beta$, where α and β can be either plural or singular terms.

Also, we noted that the adoption of the hybrid identity predicate, $=_h$, will not force us to abandon the singular identity predicate used in traditional first-order logic, since singular identity statements are just a special case of hybrid identity statements. We incorporate singular identity as follows:

$\alpha = \beta \equiv_{df} \alpha =_h \beta$, where α and β are singular terms

It should be pointed out that anyone who denies that there can be such a predicate as $=_h$ (see, for example, Van Inwagen (1994)) is dismissing outright important evidence in favor of CI. We often *do* talk and use sentences that seemingly utilize the singular/plural hybrid identity predicate. Take, for example, the following pairs of sentences (22a)-(24b), all of which are perfectly acceptable in ordinary language:

(22a) One dozen eggs is (identical to) twelve eggs.
(22b) Twelve eggs are (identical to) one dozen.
(23a) Fifty-two cards are (identical to) one deck.
(23b) One deck is (identical to) fifty-two cards.
(24a) The team is (identical to) Sleepy, Dopey, and Grumpy.
(24b) Sleepy, Dopey and Grumpy are (identical to) the team.[28]

All of (22a)-(24b), and (20) and (21) for that matter, can all be nicely captured symbolically using the singular/hybrid identity predicate, $=_h$. So what we will need, if an argument against CI concerning this hybrid identity predicate is going to be successful, are independent reasons—not just blind prejudice—for why (20)-(24b) do not make sense, and why the $=_h$ predicate is incoherent or impossible. This will not be easy, since I think (20)-(24b) *are* perfectly intelligible, as is the idea of an identity predicate that attaches to a mix of both plural and singular terms. It seems it is incumbent upon the person who thinks that such a singular/plural hybrid identity predicate doesn't make sense to show why it is, then, that sentences such as (20)-(24b) are (seemingly) perfectly acceptable.

3.4 *An analysis of* '*is one of'*

Finally, we will need a plural language that has an analysis of the predicate *is one of*, which allows us to express when we have one thing among many.[29] Let us stick (for now) with the **is one of** predicate which we used above (in discussing the fourth kind of argument against CI):

[28] Suppressing the "identical to" in each case makes the sentence more natural, but making the identity relation explicit, while a bit more awkward, seems to make the sentence no less true.

[29] McKay (2006) actually takes *among*—instead of *is one of*—as the predicate which will allow us to express when one thing is a member of many others. An adequate plural language needs to

is one of: t is one of $u_1,\ldots, u_n \leftrightarrow (t = u_1$ or,…, or $t = u_n)$[30]

Again, **is one of** says that something, t, is one of something(s) else, $u_1,\ldots, u_n$, if and only if t is identical with any of $u_1, \ldots, u_n$. Also, recall that the list of u_is in the above formulation are strung together by commas ',', where this is not intended to be the same terminology that I introduced in Chapter 2; it is rather intended to be a first pass at representing our ordinary sense of what we mean by the predicate *is one of*, which presumably does not include a technical notion such as '$=_h$'. Let us reserve the symbol '€' to represent **is one of**, where, like the singular/plural identity predicate, '€' can be flanked by either plural or singular terms.

I have voiced the worries CI might face if she embraces **is one of**, as stated. However, let us leave this formulation for now; we will amend the analysis in my response to the fourth argument against CI, below. The fact remains that a plural language presumably needs an account of the predicate *is one of* (or an equivalent predicate that expresses an equivalent relation) in order for that language to yield the expressive power that it does. For example, it allows us to express the Kaplan-Geach sentence (5), which is inexpressible in a singular logic:

be able to express the relation that one thing has to many, when the one things is among (is one of, is a member of, is a part of, etc.) the many. That there is more than one way to express this relation will be important for the CI theorist in defending her view against objections—in particular, the fourth objection against CI which is concerned almost entirely with the *is one of* relation, and how a CI theorist can give an adequate account of it. See below, section 5 for elaboration and discussion of this point.

[30] Again, this is modified from Sider's principle, **Lists**, and Yi's principle (P). See Sider (2007) and Yi (1997).

(5) Some critics admired only one another.

We can adequately represent (5) by (5'), where C = is a critic, A*xy* = *x* admired *y*, € = is one of:

$$(5')\ \exists X\ (\forall y\ (y \in X \rightarrow Cy)\ \&\ \forall y \forall z (y \in X\ \&\ Ayz \rightarrow z \in X\ \&\ y \neq z))$$

(5') claims that there are some things, the *X*s, such that for anything, *y*, if it is one of the *X*s, then it is a critic, and for anything *y*, and anything else, *z*, if *y* is one of the *X*s and *y* admires *z*, then *z* is also one of the *X*s, and is distinct from *y*. In this way, an adequate analysis of the predicate *is one of* is necessary in order to express sentences such as (5); whether CI can provide such an analysis remains to be seen.

Notice that there are independent reasons—reasons apart from ontology—to have a plural logic and language. As is shown by the Kaplan-Geach sentence, (5), we can say more with a plural language than we can without one. Moreover, many who propose a plural logic and language insist that such a language carries with it no ontological burdens. So not only can we say more with a plural language than without one, but we can do so at no cost in ontology.[31]

The defender of CI will welcome these advantages of adopting a plural language, as well as have her own, metaphysically based reasons for wanting to adopt such a language.

[31] See Boolos 1984; Lewis 1991; Yi 2004.

Once we have a way of talking about plural objects—of quantifying over things plurally, with a plural quantifier, rather than being restricted only to a singular quantifier—then we will be able to better address some of the objections against CI that I've briefly summarized above. However, in addition to a plural language, we will also need plural counting, which I discussed in the previous chapter. Then, to refresh ourselves, I will briefly discuss Plural Counting below, in light of the plural language we've just introduced.

4. Review of Plural Counting

Recall that a Plural Counter is motivated by the desire to be able to coherently express a statement such as "four quarters are (identical to) one dollar" or "one fifty-cent grouping is identical to two quarters." When we count up all of the things in the world, for example, we want to be able to express that sometimes, many things can be identical to one (two boots are identical to one pair, fifty-two cards are identical to one deck, six beers are one six-pack, etc.). Yet in order to makes sense of such locutions—in order to symbolize them adequately—we needed (at least) two things: the two-place identity predicate, $=_h$, and a way of concatenating singular terms e.g., x, y, z, etc.—into plural terms, with the use of commas as such: "x,y,z". Thus we were able to generate sentences such as (2_h),

(2_h) $\exists x \exists y \exists z\ (z =_h x,y)$

which represented a sentence such as “there is something, z, that is identical to something(s), x, y, *collectively*.”

Now that we have introduced plural variables, ‘*X*’, ‘*Y*’, ‘*Z*’, etc., and plural constants, A, B, C, etc., we can see that the concatenated singular terms—e.g., ‘x,y,z’—are doing similar work as the plural variables and constants in our plural language, as was discussed briefly above. Each is a way of allowing us to quantify over and talk about objects collectively, rather than individually. This does not mean, however, that we will want to do away with one of these strategies over the other, for each will be important for the expressive power of our plural language.

Sometimes, when we are talking about some object*s*, plural, we will not know, nor will it matter, how many objects we are quantifying over. This may be for two reasons: (i) we may not know, nor will it matter, what kind of objects compose the objects that are relevant (to our discussion, or for a particular proposition’s truth, etc.), and (ii) as was discussed in chapter 2, counting will always be disjunctive, and so there is never a brute answer to how many *things* there are in front of us anyway. To see this, imagine that there are in front of us some metalheads moshing in a pit. So we would like to be able to symbolize (25):

(25) Some metalheads are moshing in a pit.

Yet because it is often difficult to tell how many metalheads there are when you see a bunch of them moshing in a pit, we will not be able to quantify over all of the metalheads individually (as we could with all of the quarters in your pocket), such as $\exists x\ \exists y\ \exists z, \ldots \exists n$, etc., and then form a concatenated plural term such as "$x,y,z,\ldots n$", because we don't *know* how many metalheads there are. Indeed, it may not be an epistemic problem: it may be that there is simply no fact of the matter how many metalheads there are.[32] (25), in other words, should be expressible even if we don't know, nor is there a fact of the matter, how many metalheads there are. But in such a case we have recourse to the plural variables 'X', 'Y', 'Z', etc., which allows us to talk of some thing*s* even though we may not know how many things there are. So (25) can be symbolized as (26), where H = are metalheads, P = is a pit, MXy = X are moshing in y):

(26) $\exists X \exists y\,(\mathrm{H}X\ \&\ \mathrm{P}y\ \&\ \mathrm{M}Xy)$

However, it may be the case that we *do* know how many objects we are dealing with, as was the case with the quarter example discussed in chapter 2. If you have two quarters in your pocket, which make up one fifty-cent grouping, then we will want to express this by using a hybrid identity claim, as well as the plural term 'x,y', as is demonstrated by sentence (27), where P = in your pocket[33]:

(27) $\exists x \exists y \exists z(\mathrm{P}x\ \&\ \mathrm{P}y\ \&\ \mathrm{P}z\ \&\ x \neq_h y\ \&\ x \neq_h z\ \&\ y \neq_h z\ \&\ z =_h x,y)$

[32] This is no doubt implausible for bulky items in our ontology such as metalheads. But the number of certain other items may be (metaphysically) indeterminate—for example, red things, or square things, etc. This is no doubt getting us into metaphysical puzzles such as vagueness and the Problem of the Many, etc. For now, however, it is enough for my purposes if we simply grant that there may be some cases when there is no fact of the matter how many of some things we are dealing with. (This is also a consequence that falls out of Plural Counting, if we take 'fact of the matter' to mean 'brute count'.)

[33] This was sentence (5) in Chapter 2.

So it will be beneficial to adopt both the brute plural terms, 'X', 'Y', 'Z', etc., as introduced in section 3 above, as well as the concatenated singular terms, 'x,y,z', etc., as introduced in chapter 2. Having both ways of referring to objects plurally will expand the expressive power of our language.

Moreover, having both ways of referring to objects plurally will allow us to easily represent a sentence such as (28)

(28) Some metalheads and Jason are moshing in a pit.

by (29), where j = Jason, H = are metalheads, P = is a pit, $\mathrm{M}Xy$ = X are moshing in y:

(29) $\exists X \exists y\, (\mathrm{H}X \;\&\; \mathrm{P}y \;\&\; \mathrm{M}(X,\mathrm{j})y$

In (29) we have concatenated the plural variable, 'X', with the singular term, j, to yield the plural term '(X,j)'. This hybrid construction will allow us to express more in our plural language than we could with just the irreducibly plural variables and constants, X, Y, Z, A, B, etc.[34]

Also, let us not forget that we need the concatenated terms, 'x,y,z', etc., in order to yield a plural *count*. Recall that I suggested that we take our counts by taking a sentence such as (30),

(30) $\exists x \exists y \exists z(\mathrm{P}x \;\&\; \mathrm{P}y \;\&\; \mathrm{P}z \;\&\; x \neq_{\mathrm{h}} y \;\&\; x \neq_{\mathrm{h}} z \;\&\; y \neq_{\mathrm{h}} z \;\&\; z =_{\mathrm{h}} x,y)$

[34] Thanks to Keith Simmons for raising this point.

and we Logic Book count all of the variables on either side of the identity predicate. As I explained previously, we can imagine that all of the variables on the left-hand side of the symbol "$=_h$" are one domain, and that the variables on the right-hand side of the hybrid identity symbol are another domain. So then we Logic Book Count all of the variables on first one side, and then the other, using "V_L" and "V_R" for "is a left-hand variable" and "is a right-hand variable" respectively:

Left-hand-side Domain: $\exists x\ (V_Lx\ \&\ \forall x \forall y(V_Lx\ \&\ V_Ly \rightarrow x=y))$

Right-hand-side Domain: $\exists x \exists y\ (V_Rx\ \&\ V_Ry\ \&\ x \neq y)\ \&\ \forall x \forall y \forall z(V_Rx\ \&\ V_Ry\ \&\ V_Rz \rightarrow (z=y) \vee (z=x))$

In the first case we get a count of *one*, and on the other we get a count of *two*. (It is important to remember that, in this particular example, we never get a count of *three*, thus adhering to the Principle of Ontological Parsimony.) In this way, then, the Plural Counter is utilizing our method of Logic Book Counting, but only at the level of variables. She will then produce an (exclusive!) disjunctive count such as: "there are (at least) one or two things."

Notice, also, that a Plural Counter only counts singular, lower-case variables. This is because the uppercase plural variables may range over more than "one" thing. So, for example, while it may be the case that some thing*s* are identical to some other thing*s*, which we may express as '$X =_h x,y,z$', it will not be beneficial to count by variables such as '*X*' since we may not know how many individuals '*X*' ranges over. In this way, only singular variables are helpful when counting things up, so long as we remember that many singular thing*s* (plural) can be identical to one thing (singular).

In short, then, we now have *two* ways of referring to objects collectively—via the plural variables, '*X*', '*Y*', '*Z*', etc., and via the concatenated variables, e.g., '*x*,*y*,*z*', etc., which can also yield hybrid terms such as '*X*,*y*,*z*', etc. Moreover, we are still maintaining that our counts are always (exclusively) disjunctive, as is suggested by Plural Counting (chapter 2), where we count at the level of singular variables.

5. Responding to the Four Objections

I will now respond to each of the four objections laid out at the beginning of this chapter.

5.1 *Responding to Argument 1*

Recall that the arguments against Composition as Identity (CI) that appeal to the Principle of the Indiscernibility of Identicals usually go something like this: "The parts are many (and not one), while the whole is one (and not many). Therefore, the parts cannot be identical to the whole; Composition as Identity is false."

There are at least two ways a supporter of CI to resist this kind of objection. First, she could modus tollens the above line of reasoning, claiming that our intuitions about identity are what is in need of revision, not our commitment to composition as identity. This is the move that Donald Baxter favors (Baxter 1988, 2007 (ms)). I have already voiced my worries about making such a move.[35]

Clearly, this is not the line that I will be taking. For I think that we can maintain our ordinary intuitions about identity, and in particular maintain the Principle of the Indiscernibility of Identicals, yet still maintain CI. This is because I think that our methods of *counting* are more complicated than may have first been supposed. So while it's initially assumed that we can take a brute count of something and have, e.g., the parts be many, and the whole be one, what we have failed to realize is that counts are never taken *simpiciter*.

Our methods of counting, I maintain, are most accurately represented by Plural Counting, which shows that we almost always have a disjunctive answer to questions such as *how many?*. If so, then it is not true that, given the Indiscernibility of Identicals, the parts are many *and* not one, *and* the whole is one *and* not many. Rather, it is this: we have something(s) in front of us. This something(s) (whatever it(they) is(are)) is either many *or* one. Put in terms of Relative Counting, the parts are many *parts* and the whole is one *whole*; but there is not both the many parts *and* the one whole. Rather, there is either many parts, or one whole, or—and now we can just leave the sortals out of it—there are many things *or* one thing depending on what thing(s) you want to count up. Hence, there is no outright contradiction.

So my quick answer to worries such as the one proposed by Lewis and McKay et. al., is that Plural Counting will show us that these worries against CI

[35] Previously, in Ch. 1.

are misguided. First, it assumes a method of counting (Logic Book Counting) that the CI theorist only accepts at the level of variables. Second, once Plural Counting is adopted, the objection fails to go through. It is no objection to say to the CI theorist: “But wait! The parts are many and the whole is one, so the parts can’t be identical to the whole!” For the CI theorist will say: “Our counts of things are always (exclusively) disjunctive. So there are either many things in front of us or one, but there aren’t *both* many *and* one.” Thus, our CI defender will dodge the counting worries.

Yet perhaps one might push the objection as follows: Look. All of the arguments against CI that appeal to the Indiscernibility of Identicals have been carefully chosen. Just because Lewis, McKay, et. al., appeal to the *number* of parts (many) and the *number* of wholes (one) as the distinguishing difference-making feature between the parts and the whole, this need not be the only difference-making feature. Invoking plural counting will only address worries that concentrate on *counting* up the number of parts and wholes. Yet many other arguments can be crafted using the Indiscernibility of Identicals which do not rely on counting.

For example: Suppose we have your cat, Nacho, over here and your mug, Mug, over there. Now place them next to each other. Ok, so here’s something that is now true of the parts: *they are beside one another*. But it is not true that the mereological sum of Nacho and Mug, Muggo, is beside one another.[36] So

[36] We do say things such as “I am beside myself” but I think it is clear that this particular example wouldn’t be a case of Muggo being beside itself. So it is not the ungrammaticality of the locution that’s in question, but the metaphysical fact that seems to follow from Muggo’s parts being beside one another.

here is a property that the parts have that the whole does not—*being beside each other*—and so that parts are not identical to the whole; thus, CI is false.

My answer to this sort of worry using the Indiscernibility of Identicals will *not* rely on plural counting. But it *will* rely on a robust plural language. I take it that a statement such as (31):

(31) Nacho and Mug are beside one another.

is best represented by either (32), where n = Nacho, m = Mug, Bxy = x is beside y, where 'Bxy' expresses a symmetric relation:

(32) Bnm

The *being beside each other* relation, in other words, is a two-place, distributive relation; it applies to Nacho and Mug individually, albeit in a two-place fashion. Still, it is not the case that Nacho and Mug are, taken together, beside….what? *being beside* is undeniably a two-place relation; some object(s) taken plurally cannot have this attribute *simpliciter*. That is, after all, what the "one another" in (31) is doing—it is an ellipsis that indicates which two things instantiate a two-place (symmetric) relation. Contrast this, for example, with (33)

(33) Nacho and an army of ants are surrounding the building.

Supposing that *surrounding a building* is not something that a cat and an army of ants[37] can do by themselves, (33) is best represented by (34), where n = Nacho, b = the building , a = an army of ants, S(*x*,*y*)*z* = (*x*,*y*) are surrounding *z*:

(34) S(n,a)b

In this case, 'S(*x*,*y*)*z*' is representing a two-place, collective relation that holds between some things (referred to plurally) and another thing (singular). Note: *surrounding* need not be a relation that holds between many things and one; it is not a metaphysical limitation on how many things can hold this relation to however many other things. One mereological sum, for example, can surround the metalheads (in which case, we have one thing surrounding many); one piece of string can surround the flagpole (in which case, we have one thing surrounding one thing), etc. So this isn't a metaphysical point about what kind of things and how many can hold a certain relation to certain other kinds of singular or plural things, etc. Rather, this is a point about when a relation is distributive or collective, not whether the relation holds between thing(s) singularly or plurally. The *being beside one another* relation, in other words, is best represented by "Bxy", where this is a symmetrical relation (and so it entails "Byx"). If this is right, then given our example above, it is true that objects such as Mug and Nacho are beside one another, but this just amounts to "Mug is beside Nacho" and "Nacho is beside Mug." But then this is a feature that they each have; it is a distributive

[37] Let's assume that the army of ants is just too small to surround the building without some help from at least one substantially larger co-conspirator; and that my cat isn't fat enough to surround a building all by himself.

(albeit two-place relation). In order to refute CI, however, it needs to be shown that the whole has a feature that the parts (taken collectively) do not have, or vice versa. (31) is not an example of this, since it is a distributive relation.

Another, less complicated, example: it may be true that some ballerinas each weigh 90lbs. But it is not the case that the ballerinas *taken together* weigh 90lbs. To assume this would be to commit the Fallacy of Composition. But we commit such a fallacy when we confuse a distributive predicate (in this case, *weighing 90lbs*) for a collective one.

Interestingly, once we've got a robust plural language like the one I have been developing, we can see that, contrary to traditional taxonomy, the Fallacy of Composition and the Fallacy of Division are actually formal rather than informal fallacies. These two fallacies are traditionally characterized as having the following forms:

Fallacy of Composition: The parts of O are F; Therefore, O is F.

Fallacy of Division: O is F; Therefore, the parts of O are F.

Seeming proof that the Fallacy of Composition is a fallacy: Take the molecules, M, which are part of my body, B. M are invisible. By the Fallacy of Composition, however, my body, B, is also invisible, which is false. Seeming proof that the Fallacy of Division is a fallacy: My body, B, is visible. By the Fallacy of Division, the molecules, M, are visible, which is false. Since both inferences can take us from true premises to false conclusions, they are non-validating inferences.[38]

[38] Nelson Goodman makes the distinction between expansive and non-expansive properties. Expansive properties are those that distribute from part to whole; non-expansive ones do not. So, for example, *visibility* and *invisibility* would be non-expansive properties, whereas *being a part* would be expansive (I take it).

Typically, these types of arguments are considered informal fallacies because it is supposed that they are non-validating for reasons *other* than their logical form. Formal fallacies, in contrast, are based solely on logical form. Informal fallacies are based on the content of the argument, and may be fallacious because of pragmatic or epistemological reasons.

In the logic we have been developing here, however, we can make the relation between parts and wholes—and distributive and collective properties—transparent, thus showing when an argument is valid and when it is not (when it involves parts and wholes, at least). So, for example, in the body and molecules case, we would represent some of the relevant statements as follows, where b = my body, A = the molecules (that are part of my body), V = are visible, ~V = are invisible[39], M = is a molecule:

(35) $\mathrm{b} =_{\mathrm{h}} \mathrm{A}$
(36) Vb
(37) $\exists \mathrm{n}\ (\mathrm{A} =_{\mathrm{h}} x_1, \ldots, x_{\mathrm{n}}\ \&\ \mathrm{M}x_1\ \&\ {\sim}\mathrm{V}x_1\ \&\ \mathrm{M}x_2\ \&\ {\sim}\mathrm{V}x_{\mathrm{n}}\ \&\ldots\&\ \mathrm{M}x_{\mathrm{n}}\ \&\ {\sim}\mathrm{V}x_{\mathrm{n}})$
(38) ~VA
(39) VA

It is true that my body is visible, as we can express by (36). It is also true that the molecules are invisible *taken individually*, as we express by (37). But even granting that my body is identical to the molecules, (35), we cannot infer from either (36) or (37) that (38) is true. In fact, (38) is false. For it says that the molecules *taken together* are invisible, which is patently false. The claim "the

[39] For now, I'm ignoring the fact that "*are* visible" and "*are* invisible" are plural predicates (in contrast with the counterpart, singular predicates "*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 an issue that will be dealt with below, in section 5.3.

molecules are invisible" is only true when we read the predicate 'are invisible' *distributively*. And we can only express this relation by way of a statement such as (37), not (38). In fact, from (35) and (36), and an application of the Substitutivity of Indenticals, we get (39), which *is* true: the molecules taken together *are* visible! In fact, if one wanted to conclude from the identity claim '$A =_h x_1,\ldots x_n$' and the Substitutivity of Identicals, that '$V(x_1,\ldots,x_n)$', then this will be true as well, since this would say no more or less than (39)—that the molecules *taken together* are visible. Moreover, we can substitute 'b' for 'A' in (37) using the Substitutivity of Identicals and (35), and we would get '$\exists n\ (b =_h x_1, \ldots, x_n\ \&\ Mx_1\ \&\ {\sim}Vx_1\ \&\ Mx_2\ \&\ {\sim}Vx_n\ \&\ldots\&\ Mx_n\ \&\ {\sim}Vx_n)$', which is also true, and doesn't commit us to any contradictions or unintuitive results.

We can now see that the Fallacy of Composition and Division trade on a formal ambiguity that gets uncovered once we have a rich enough plural language in place. In short, claims such as "the molecules are visible" have a distributive and a collective reading: on the collective reading, e.g., (39), it is true; on the distributive reading it is false. The plural language we have been developing 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.[40]

In this way, then, it will be no objection to the CI theorist that there are some parts of certain wholes that bear a relation to each other (yet which the whole—or the parts taken together—does not bear to itself). It is no objection to claim that there is a property that the parts have that the whole does not, such as

[40] 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.

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. And the distinction between distributive and collective predicates is going to be transparent in the language that we adopt.

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:

(32) Bnm

(40) u $=_h$ 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 (40) is distinct from the singular terms 'n' and 'm' in (32). In (32) 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 (40), 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. Second, the predicate in (32) is irreducibly *two*-placed, and so we cannot merely swap one singular term in for two. In this way, the above 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 predicates (or relations).

Notice, also, that the above sort of worry is similar to, but distinct from, one that was mentioned above, when we wondered whether one thing could meet for lunch. This particular worry was a purely metaphysical point about what one thing can and cannot do. In such cases, it will be enough for the CI theorist to admit that yes, strange though it may sound at first, one thing can meet for lunch. As explained above, the CI theorist will insist that, yes, a singular item (such as a mereological sum) *can* instantiate a certain property (or satisfy a certain predicate). Sometimes—the defender of CI might insist—we will find ourselves in the midst of metaphysical discoveries about just what, exactly, one thing can do![41]

In sum, then, the arguments against CI using the Indiscernibility of Identicals seem to make the mistake of either (i) using only Logic Book Counting (as opposed to Plural Counting), to generate a seeming counterexample to CI, or (ii) confusing the application of distributive and collective predicates or relations. Both of these mistakes are remedied when we adopt a rich plural language, and allow our counts to be disjunctive and at the level of variables, as Plural Counting does.

One might object at this point that there is an important argument against CI (that uses Indiscernibility of Identicals) that is noticeably absent from my discussion in this section. That is, many think that CI is false because of the varying *modal* properties between your hand and its parts: your hand could survive losing a few molecules here and there, but the molecules could not.

[41] See (again) Sider (2007: 9).

Conversely, your hand could not survive being thrown in a blender, but the molecules composing your hand presumably could.[42] Yet if your hand has a property that the molecules do not—*viz*., could survive a loss of molecules—and if the molecules have a property that your hand does not—*viz*., could survive being thrown in a blender—then by the Indiscernibility of Identicals, your hand is not identical the molecules. Let us call this the Modal Objection.

It is true that the Modal Objection is one that I have not included or addressed in this section. But this is not because of neglect or avoidance. On the contrary, I am going to be dedicating all of Chapter 4 to just this sort of objection. For my purposes in the present chapter, it is enough if I have shown that CI can defend herself against objections that appeal to the Indiscernibility of Identicals, which do not also appeal to the (purported) varying modal properties of the parts and the wholes. And this is something I think I have done successfully above.

5.2 *Responding to Argument 2*

Recall that argument 2 charged the CI theorist of violating the Principle of Ontological Parsimony.

> **The Principle of Ontological Parsimony:** Of two competing metaphysical theories, *a* and *b*, if *a* posits fewer items in our ontology than *b*, then, all things being equal, we should prefer *a* over *b*. More strongly: *a* is more likely to be true than *b*.

[42] I am modifying Wiggins' Tree and Cellulose example here, and his arguments against the claim that the tree just is the cellulose molecules. The modification? Wiggins considers only the *aggregate* of the cellulose molecules, a singular item, not the molecule*s*, plural. See Wiggins (1968).

The worry was that CI would find itself committed to strange entities such as Muggo, which had neither the property *being a mug*, nor the property *being a cat*. If such entities proliferate when we introduce mereological sums, then this will undermine the very motivation for adopting CI in the first place—namely, that it makes mereology ontologically innocent.

Yet, as explained above, once we have introduced a plural language, then we have an understanding of plural terms such as “Jason and Lucy” in (3):

(3) Jason and Lucy lifted the coffin.

Such a plural term does not refer to a single item, Jason, or a single item, Lucy, nor a singular item the-sum-of-Jason-and-Lucy. The plural term “Jason and Lucy” in (3) refers to two things, Jason and Lucy.[43]

Going back to Argument 2, if there can be a plural term—namely “Mug and Nacho”—that does not refer to a single item, Mug, and does not refer to a single item, Nacho, but refers to both collectively, then it seems that the mereologist can use this when she claims that the fusion, Muggo, is identical to Mug and Nacho. In other words, if adopting a plural language—complete with plural terms that somehow refer to more than one object—is ontologically innocent, then the mereologist can think this as well.

If someone were to argue that mereology commits us to extra, weird things in our ontology such as Muggo, which is neither a mug nor a cat, the mereologist can respond that, according to standard plural logics, there is a plurality, *Mug and Nacho*, that is also neither a mug, nor a cat. Perhaps it is

[43] Yi makes this same point in Yi (1999). My example is borrowed and modified from his.

misleading to say ‘there is a plurality’ since this seems to suggest that there is some one thing that ‘my mug and Nacho’ refers to. If so, then one can say, “there is a plural term, ‘Mug and Nacho’ that refers to two things, Mug and Nacho, collectively.” In other words, there are some thing*s*, my mug and Nacho, which are not a mug, nor are they a cat—they are *a mug and a cat.*

The idea is to utilize the notion of plural terms, both as subjects and predicates. According to any language which admits of plural terms, once we are committed to my mug and my cat, Nacho, we get the plural subject term “Mug and Nacho” for free. But we also get the plural predicate “are a mug and a cat” for free as well. So we can express (41), by (42), or (43), where A =Mug and Nacho, m = Mug, n = Nacho, M = are a mug and a cat:

(41) Mug and Nacho are a mug and a cat.

(42) MA

(43) M(n,m)

Just as “Mug and Nacho” does not refer to either the single item, my mug, or the single item, Nacho, likewise “are a mug and a cat” does not refer to either the single property *being a mug*, or the single property *being a cat*. It refers to the plural predicate or property *being a mug and a cat*. In this way, mereological sums will not be these extra, odd entities in our ontology that instantiate unusual properties, such as *being a mug and a cat*; for these plural properties are no more mysterious than plural objects—both are just the result of having plural referring expressions that pick out more than one object (or property) at once. If we are already committed to the singular, individual objects, Mug and Nacho, and if we are already committed to the singular, individual properties *being a mug* and *being a cat*, then we get 'plural entities' such as Mug and Nacho and the property *being a mug and being a cat* for free, simply in virtue of adopting a plural language. This is because these 'plural objects' are nothing more than the singular objects or singular properties we were already committed to *referred to plurally*.

Moreover, since we have already adopted two ways of referring to *objects* plurally—i.e., via our plural variables and constants '*X*', '*Y*', '*Z*', 'A', 'B', etc., and via our concatenated variables '*x*,*y*,*z*', etc.—I see no reason why we cannot adopt a similar strategy when it comes to our predicates. So, for example, we might represent the property *are a mug and a cat* as we did above with 'M' in (42) and (43), or we might represent it as '[Q,R]', where U = is a mug, C = is a cat, and so [U,C] = is a mug and a cat. So, for example, if m = Mug, n =Nacho, A = Mug and Nacho, we could have '[U,C]A' or '[U,C](m,n)' to express "Mug and Nacho are a mug and a cat."[44] And just as having two ways to refer plurally to objects increases the expressive power of our language, so, too, does having more than one way to talk about plural predicates. For suppose we wanted to express (44). We could do this by either (45), (46), (47), or (48):

(44) Mug and Nacho are a mug and a cat, but Nacho is (just) a cat.

(45) MA & Cn

(46) M(m,n) & Cn

[44] Again, I am ignoring the slip between the singular copula "is" and the plural copula "are" for now. As we will see in the following section, not much hangs on the ungrammaticality that results from keeping the copula consistent.

(47) [U,C]A & Cn

(48) [U,C](m,n) & Cn

(48), of course, reveals the most structure, allowing us to see the connection between the plural term 'm,n' and the singular term 'n', and the plural predicate 'U,C' and the singular predicate 'M'. Sometimes such structure is transparent, in which case we would want to use (48) to express (44). Other times, it is not, in which case we would use (45), (46) or (47).

In this way, it is no objection to CI that we will be committed to too many things if we accept mereological sums. There are not further, weird things—mereological sums—that have strange properties that the parts do not have. This is because mereological sums may have plural properties, but these are things we will get for free as soon as we adopt a rich enough plural language. It is not a further *quantitative* commitment, then, to accept CI, since any sums will just be identical to anything we are already ontologically committed to.

I said that there won't be any further *quantitative* ontological commitments. Let me explain. Notice that the Principle of Ontological Parsimony (POP) claims: "Of two competing metaphysical theories, *a* and *b*, if *a* posits *fewer* items in our ontology than *b*, then, all things being equal, we should prefer *a* over *b*." The idea is this: suppose we have two theories, *a* and *b*, where *a* posits 5 entities in its ontology and *b* posits 500.[45] Then, all else being equal, we should prefer the theory with fewer entities over the one with more—i.e., theory *a* over theory *b*.

[45] And let us ignore plural counting for now, since many who endorse POP do not endorse Plural Counting. However, we could make the same point using plural counting if we consider not the brute count of the number of entities a theory posits but the maximum count of the entities in a theory—that is, the upper bound of the disjunctive count that a Plural Count would yield.

However, we might also have a sister principle to POP in mind, one that isn't necessarily concerned with the *number* of entities posited in an ontological theory, but the *kind* of entities posited. Compare, for example, theory *c* and theory *d*, where *c* posits 5 items in its ontology, all of which are material, and *d* also posits 5 items, yet only one of which is material and the rest are immaterial (e.g., 3 Cartesian egos or souls, and one God, say). Appealing to POP, as formulated above, will not help us in this case, since both *c* and *d* posit the same *number* of entities in their ontology. But we may nonetheless use a sister version of POP to cut the difference between *c* and *d* based on the number of *kinds* of things that are posited: *c* has only one kind of thing in its ontology, material stuff, whereas *d* has at least two kinds of things, material and immaterial stuff.[46] This, then, is not merely a *quantitative* worry, but a sort of *qualitative* one.[47]

So perhaps the objection to CI that was raised in this section is not that mereological sums simply commit us to *more* stuff in our ontology, but rather, more *kinds* of stuff. Perhaps it's the qualitative commitments that bother this kind of objector.[48] Indeed, prior to accepting mereology, we will all be happy enough to admit of mugs and cats into our ontology. We will even be happy to admit (once we've adopted a plural language), 'plural things' such as *Mug and Nacho* into our ontology, since we will realize that *Mug and Nacho*, referred to plurally, is

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[46] This qualitative worry, I take it, is often behind many of the objections to Dualism, for example. That is, it's not necessarily that Dualists posit more things in their ontology, but that they posit weird, spooky things that are distinct from physical, material stuff.

[47] I say 'sort of' because we are still concerned with the number of things, only this time it seems we are worried about the number of kinds of things. It is a quantitative worry about qualitative things. But for ease of exposition, let us just dub this a 'qualitative' theoretical concern.

[48] Thanks to Tom McKay and Daniel Nolan for discussion on this section.

nothing over and above Mug and Nacho, those singular items we are already committed to.

Yet even if we are assured by CI that the mereological sum of Mug and Nacho is simply *identical* to something we are already happy with—namely, Mug and Nacho—we may cringe at the *kind* of thing the sum is. That is, we may not want to admit mereological sums into our ontology, *not* because they are ontologically explosive, but because they are just weird or repulsive or suspicious sorts of things. One might, for example, think that the mereological fusion of Mug and Nacho is a strange sort of scattered object, one part of which could be sniffing the contents of the other, and one may not want to admit such scattered, self-sniffing things into one's ontology. The methodology underlying this sort of objection would be one guided by qualitative—as opposed to quantitative—parsimony.

However, I do not understand why we should be bothered by the qualitative character of mereological sums. I do not see how they are intrinsically weird or spooky or suspect, unless of course, one is bothered by the quantitative worries that are usually associated with such entities. For example, if I am inclined to find a certain entity qualitatively suspect—say, magic crystals—it is only in virtue of the fact that such entities are a further *quantitative* commitment (one unnecessary, say, for my otherwise parsimonious theory of the world) that I find them so undesirable. If, in response to my rejection of such entities, someone were to explain to me that magic crystals are actually identical to things I am already committed to—say, for example, normal crystals and wishful thinking—then I fail to see why I would then reject a commitment to such entities on *qualitative* grounds. All of the spooky qualitative stuff disappears once I accept that the 'new' entities are simply identical to things I have already admitted into my ontology. Indeed, this is the appeal of giving reductive accounts of otherwise spooky stuff—the reduction of a suspicious entity to something already accepted takes the spook out of the specter.

Take the Identity Theory of the mind, for example. Once I am told that the mind is simply identical to the brain (or mental states are identical to brain states, etc.), then not only have my quantitative worries been dispelled, but my qualitative worries have been as well. That is, suppose I object to Dualism for two Occam's Razor-related reasons: (i) that the Dualist posits more entities in our ontology than the materialist (e.g., all of the material stuff the materialist accepts, *plus* hundreds of thousands of souls in addition), and (ii) that the she posits more *kinds* of things than the materialist (e.g., material stuff *plus* immaterial stuff). Then it seems that an Identity Theory of the mind would address both of these worries at once. Once I have been told that the mind is simply identical to the brain (or mental states are identical to brain states, etc.), then not only are there no longer *more* things in my theory than in the dualist theory, there are no longer more *kinds* of things either.

Like the Identity Theory of the mind, CI is a reductive account. It is a reductive account of mereological sums to their parts—the sums *just are* the parts, the parts *just are* the sum. I have already shown how a proponent of CI can dodge *quantitative* worries by appealing to plural predicates. A plural predicate such as “are a mug and a cat” can refer plurally to the property *being a mug and a cat*, just as the subject term “Mug and Nacho” can refer plurally to *Mug and Nacho*. We are already committed to things such as *my mug* and *Nacho*, and properties such as *being a mug* and *being a cat*. The acceptance of plural subject terms and predicates allows us to quantify over these things without any ontological repercussions. So, contrary to what the opponent may think, a commitment to the mereological sum is not a *new* thing, but neither is it a new *kind* of thing. Once we have shown that mereological sums are not additional items in our ontology, in other words, then we will also have the resources to show that sums are not new *kinds* of things either. So whether the objection is a quantitative or qualitative one, we need not go beyond an appeal to plural languages to see that we are not incurring further ontological commitments by accepting CI.[49]

5.3 *Responding to Argument 3*

Recall that third type of objection against CI is concerned with the ungrammaticality that results when we accept CI and allow the Law of Substitutivity of Co-referential terms.

> **Law of Substitutivity of Co-referential Terms**: the following inference is valid (i.e., truth preserving), and because of that, grammaticality-preserving as well:
>
> Fx
> $x = y$
> ————-
> Fy

[49] Thanks to Ted Sider on this section.

Sider, for instance, gives the following sort of example, which I mentioned above. Imagine, again, that we have the top third of a circle, *t*, the middle third of a circle, *m*, and the bottom third of a circle, *b*. Also imagine that we have the entire circle, *Circle*, such that *Circle* = *t*, *m*, and *b*.[50] Using the Law of Substitutivity of Co-referential Terms, we *should* be able to substitute "*t*, *m*, and *b*" for "*Circle*" in a statement such as "*Circle* is round". But to do so would yield the ungrammatical "*t*, *m*, and *b* is round."

To remedy this problem, Sider suggests that the CI theorist adopt a language where locutions such as "*t*, *m*, and *b* is round" *are* grammatical. He proposes the predicate "BE" which is neutral between being a singular or plural.[51] So, then, from the identity claim "*Circle* = *t*, *m*, and *b*" and the claim "Circle BE round", we can infer (preserving grammaticality!) "*t*, *m*, and *b* BE round".

I agree with Sider that adopting a predicate such as "BE" may be an acceptable way for the CI theorist to overcome this first, somewhat superficial worry about her view. However, I think it is also important to emphasize the superficiality of the worry. Specifically, it is important that we realize that whether or not CI thoerist adopts a language with a plural/singular-neutral predicate such as Sider's "BE" is somewhat orthogonal to the metaphysical issues at hand.

To see this, we should first question the connection between grammaticality and underlying metaphysical truths *in general*. In so doing, we

[50] Again,this example is modified from Ted Sider's "Parthood".

[51] Sider p. 57.

should recognize that preservation of grammaticality using the Law of Substitutivity of Co-referential Terms is not a problem for CI alone. For imagine that we do *not* think that composition is identity; i.e., we think that CI is false. But imagine that we do accept the following statements, (49)-(51):

(49) Superman is identical to Kal-el

(50) Superman and Kal-el are identical to Clark Kent

(51) Clark Kent is in the phone booth.[52]

From these statements, and the Law of Substitutivity of Co-referential Terms, we get the ungrammatical (52):

(52) Superman and Kal-el is in the phone booth.

Now, true, the grammatical equivalent of (52), (53)

(53) Superman and Kal-el *are* in the phone booth.

is misleading. But this is because what's grammatical isn't reflecting the underlying metaphysical truths. We know that there's just one guy in the phone booth—the man of steel—who just happens to go by several different names. The grammatical (53) is misleading because it suggests that there are two guys in the phone booth, not one. But this misleading-ness must be overlooked if we want to preserve grammaticality. And, going the other way, grammaticality must be overlooked when we want to preserve the Indiscernibility of Identicals.

[52] If a non-fictitious example is needed, concoct a parallel case using "The Morning Star", "The Evening Star", and "Venus".

What's at issue, it seems, is that we often look to language to reveal our metaphysics. If we cannot substitute a term, *a*, for a term, *b*, in a sentence, *S*, then this seemingly indicates the *distinctness* of the objects in question, a and b. Of course, there are many cases where substitution is not allowed—e.g., intentional contexts, propositional attitudes, modal contexts, etc.,—and in such cases, we say that there is an opaque, as opposed to transparent, context.

Now such a move might be available to the CI theorist: she could claim that the reason we cannot substitute co-referential terms—the reason we cannot substitute a plural terms for a singular term, even though according to CI, the two terms refer to the same thing(s)—is because we are somehow invoking an opaque context whenever we wish to swap a singular terms for a plural one, or a plural term for a singular one. But I do not think that such a move need be made here, since the worry seems to me to be irrelevant, and a problem for everyone, even if CI is false. For notice that even if one does not accept CI, one will still have to account for inferences such as the one from (49) to (52). The above example was carefully chosen to show that the grammatical problem is not isolated to CI; anyone who accepts that there is a distinction between plural terms and singular ones will not be able to substitute one for the other, on pain of ungrammaticality. Yet we can generate plural terms even if we are only dealing with one object, since we should always be able to allow the non-uniqueness of referring expressions (i.e., one object can have more than one name to pick it out).

Now, true: as mentioned in the second section of this chapter, it may be the case that the grammatical worry is supposed to be indicative of something metaphysical—e.g., it might aim to reveal whether or not one thing can instantiate a certain property (or satisfy a certain predicate). But then notice that this sort of objection will be a collapse into the argument using the Indiscernibility of Identicals, which I hope I have shown above how a CI theorist could respond. But if the worry is not a metaphysical one, but rather merely a superficial, grammatical problem, then it is a problem for everyone; it does not reflect anything deep about one's metaphysical commitments.

5.4 *Responding to Argument 4*

Finally, let us take a look at the fourth—and seemingly more substantial worry—concerning CI and a predicate such as *is one of*.[53] Recall that the argument against CI went as follows:

(i) If one adopts a plural language, then one must have a correct analysis of the predicate *is one of* (or an equivalent predicate).

(ii) If one wants a correct analysis of *is one of*, then one should adopt **is one of** (as defined above).

(iii) If one adopts **is one of**, then one is also committed to the **Naïve Identity Principle**.

(iv) Assume CI is true.

(v) CI adopts a plural language.

(vi) So, by (i)-(v), CI is also committed to the **Naïve Identity Principle**.

(vii) But if the Naïve Identity Principle is true, then CI is false.

[53] See, for example, Sider (2007) and Yi (1999).

(viii) So (iv) must be rejected; CI is false.

And recall that **is one of** and the **Naïve Identity Principle** were formulated as follows:

> **is one of**: t is one of $u_1,\ldots, u_n \leftrightarrow (t = u_1$ or,…, or $t = u_n)$
>
> **Naïve Identity Principle:** If $x \neq_h y_1$, and …, and $x \neq_h y_n$, then $x \neq_h y_1, \ldots, y_n$.

Intuitively, **is one of** nicely captures our intuitions about the relation that one thing holds to many, when that one thing is among (is one of, is part of, etc.) the many. Yet, as we saw in section 2, a commitment to **is one of** entails a commitment to the **Naïve Identity Principle**, which is a principle that the CI theorist wants to reject.

I suggested above that the natural move for the CI theorist would be to deny (ii) in the forgoing argument. But then, because of (i), and given that the CI theorist will whole heartedly endorse a plural language (as discussed at length in section 3 above), the CI theorist will then need to provide an adequate account of the predicate *is one of*. Moreover, I had earlier suggested that even if the CI theorist had an analysis of *is one of* that accommodated the idea that one thing can be identical to many, there would still be a problem. But even amending **is one of** to the seemingly more CI-friendly **is one of*** didn't help matters. So what's a CI theorist to do?

Perhaps before rejecting (ii), the CI theorist might investigate her commitments to (i). Why is it the case, in other words, that accepting a plural logic requires an acceptable analysis of the predicate *is one of*? In section 3 of this chapter, where I introduce the fundamentals of a plural language, I claimed that having such a predicate allows one to express statements such as the Kaplan-Geach sentence (5) by (5'), where C = is a critic, A*xy* = *x* admired *y*, € = is one of:

(5) Some critics admired only one another.

(5') $\exists X\ (\forall y\ (y \text{ € } X \rightarrow Cy)\ \&\ \forall y \forall z (y \text{ € } X\ \&\ Ayz \rightarrow z \text{ € } X\ \&\ y \neq z))$

Recall that (5') claims that there are some things, the Xs, such that for anything, y, if it is one of the Xs, then it is a critic, and for anything y, and anything else, z, if y is one of the Xs and y admires z, then z is also one of the Xs, and is distinct from y. The predicate, €, is doing important work here; we need a way of talking about one thing being among (or one of or a part of) some other things. If we don't have a way of doing this, then many of the sentences that we would like to express using plural logic—such as (5) above—will be inexpressible. So insofar as we need to be able to adequately express sentences such as (5), then it seems that a plural language will require an adequate analysis of the predicate *is one of*.

But perhaps the CI theorist can offer a way of symbolizing sentences such as (5) which does not require the predicate *is one of*. After all, the CI theorist already has so many more tools in her language than traditional plural languages—e.g., she has the plural identity predicate, $=_h$, she has the notion of plural counting, and she has two ways of referring to objects (and predicates) plurally. Perhaps these provide the CI theorist with enough resources such that she can do away with the *is one of* predicate, insofar as it is *the* basic, integral element to a successful plural language; the predicate may be useful to have around for other reasons, but the success of our language need not depend on it. If so, then the CI theorist could deny (i) in the above argument, and dodge all arguments that assume (i) is true.[54]

First, we need a way of referring to many objects at once even if it is not clear how many objects there are. (5), for example, does not specify how many critics there are who admire only one another. This will not be a problem for the defender of CI (as I have imagined her) since we have plural variables, X, Y, Z, X_1, etc., that range over individuals plurally, no matter how many there are. But the plural theorist also has a way of specifying how many individuals make up a group if she needs to, since she could have a statement such as (54):

(54) $\exists X \exists y \exists z\ (X =_h (y,z))$

(54) claims that there are some individuals, the Xs, who are identical to some individuals, y and z, taken together. The ability to use the plural term, '*X*', as well as the concatenated term, '*y*,*z*', along with the hybrid identity predicate, affords the CI theorist expressive power that was heretofore unavailable.

Now, it need not be the case that we know, nor need there be a fact of the matter, how many individual terms are concatenated in a plural term such as (x_1, …, x_n), but because we have a way of counting at the level of variables, it should always be available for us to represent whatever individuals there are, if we need

[54] Immense thanks to Keith Simmons on the paragraphs that follow.

to. So, for example, for any group of things—for any Xs—there is some number, n, such that $X =_h (x_1, \ldots, x_n)$. If this is right, then perhaps we can take our first stab at representing (5)

(5) Some critics admired only one another.

By (55), where N = is a number, C = is a critic, Axy = x admires y:

$$(55)\ \exists X \exists n\,(Nn\ \&\ X =_h (x_1, \ldots, x_n)\ \&\ Cx_1\ \&\ Cx_2 \ldots \&\ Cx_n\ \&\ \forall x_i \forall y\,(Ax_i y\ \&\ Cy \rightarrow \exists j \leq n\,(y = x_j\ \&\ x_i \neq y)))$$

(55) says that there are some things, the Xs, and there is some number, n, such that the Xs are (hybrid) identical to $x_1, \ldots, x_n$, all of which are critics, and for any of the x_is (i.e., any of the $x_1, \ldots, x_n$), and for anything, y, if an x_i admires y and y is a critic, then there is a j that is less than or equal to n, such that y is identical to x_j, but distinct from x_i. The CI theorist, then, can use (55), which nicely captures (5), simply by availing herself of the resources of her rich plural language—i.e., having more than one way to refer to plural objects, the hybrid identity predicate, $=_h$, etc. [55]

Now one might think: OK, fine. A defender of CI can use her rich plural language to adequately express (5) without giving an analysis of the predicate *is one of*. But big whoop. Shouldn't we be suspicious anyway of any view that fails to provide an adequate analysis of *is one of*, even if it isn't our fundamental concept in our (plural) language? I mean, for all of the expressive power that you have been advertising that CI affords (given the adoption of the plural language I

[55] Immense thanks to Keith Simmons for discussion here.

am proposing), wouldn't it be a serious disadvantage if such a view nonetheless failed to give an analysis of *is one of*? This is, after all, a seemingly intuitive relation. It doesn't *seem* complex or unfamiliar. So why should we accept a view that fails to give an analysis of it? Another way of putting the point: CI might be able to wriggle out of the fourth objection by showing how it can represent sentences such as (5) without an *is one of* predicate, but the inability to give an analysis of *is one of*—regardless of whether it is the basis for a plural language or not—seems to indicate a fundamental weakness of the view in general.

It *seems* to. But it is not. This is because our intuitions about *is one of* are connected to our intuitions about counting. And, as I showed in Ch. 2, a careful look at our methods of counting reveals that we never have a brute count. We always yield disjunctive counts, and we allow that many things can be one, as Plural Counting predicts. But if this is right, then predicates such as *is one of* need to reflect this fact.

Yet an intuitive, first-pass analysis of this predicate, such as **is one of**, does no such thing. On the contrary, it assumes that we *can* take a brute count—i.e., the definition of **is one of** presupposes that it is determinate how many things there are in front of us, and that we can say definitively that *one* thing, x, is *one* of some others. But if Plural Counting is correct, then we never have a brute count of just one thing.[56] So if CI is correct, and if she adopts Plural Counting as I have suggested she should, then she will think that there is something fundamentally wrong with our first pass intuitions about the predicate *is one of*.

[56] Except in the odd case of the lonely mereological simple

Recall the challenge at the beginning of Chapter 2: I ask you to sit in a room and count up all of the things that there are. This task was shown to be quite difficult since if some things are identical to others (or one other) then there isn't a fact of the matter that there is just one thing, or just five, or just a million, or whatever (where these are all flat-out counts of the number of things in the room). Similarly, imagine that I ask you: "Go get me (exactly) six things." Suppose you then bring me a six-pack of beer. I then say to you, being difficult, but precise: "Is a bottle cap a thing? Is a bottle? Are the beer molecules inside the bottle?" Etc. Once it is pointed out that all of these things are indeed *things*, then we realize that you have brought me plenty more than exactly six things. But what could you have done? How could you have fulfilled my request, given that we understand—even in a very commonsense way—that many things (e.g., molecules) make up other things (e.g., beer)? The fact is you couldn't.

And what goes for six things, goes for one. It is just as illegitimate to ask for (only) one thing in the room as it is for me to ask you to bring me (exactly) six things. And this is why the *is one of* predicate is infected at its core—it implies that we *can* take brute counts, when in fact we cannot. And anytime we think we can, it is because we already have in mind what sorts of things are relevant to the count in process.

But the CI theorist *does* think there is a relation that the parts can have to the whole—a relation that need not presuppose that counts are brute, or that Plural Counting is false. For the parts—no matter how many there are—are always a *part of* the whole.

So let us analyze *is one of* not in terms of counting predicates or any other way which would presuppose that there are brute counts, but in terms of the *part of* relation. Call this (P):

(P) x is one of y, z iff x is part of y, z.

And let us take the Tom and Jerry example again. We have a cat, Tom, a mouse, Jerry, and the mereological sum of Tom and Jerry, Genie. Call Tom's left ear 'Lefty.' Call the mereological sum of the rest of Tom (i.e., Tom minus Lefty) and Jerry 'Leftover.' According to CI, (M):

(M) Lefty and Leftover = Genie = Tom and Jerry.

According to (P),

(N) Lefty is one of Lefty and Leftover.

Using the Substitutivity of Identicals, we get (O):

(O) Lefty is one of Tom and Jerry.

Now, true: (O) may *sound* counterintuitive, but according to (P), (O) is true. And think about the metaphysical facts: there are some thing(s) in front of us. There is a cat and a mouse, or a mereological sum of a cat and a mouse, or a bunch of molecules arranged cat-wise and mouse-wise, or a cat ear (Lefty) and the mereological sum of a one-eared cat and a mouse (Leftover), etc. Lefty, then, *is* one of the things that is there; Lefty *is* one of Tom and Jerry. So, (O) is true.

Now one might think that this leads to obvious counterintuitive results. Consider the following acceptable sentence, for example[57]:

(56) Miss Piggy is one of the Muppets.

And consider what is also true:

(57) Miss Piggy's nose is a part of Miss Piggy.

But then by my proposed analysis of is one of, (P), we get::

(58) Miss Piggy's nose is one of the Muppets.

Intuitively, we think, Miss Piggy's *nose* is not one of the Muppets; only muppets can be one of the Muppets! Similarly, we think that the Earth is one of the planets, and we think that the Pacific Ocean is a part of the Earth. But we don't want to claim that the Pacific Ocean is one of the planets, for (intuitively) only planets can be one of the planets!

My response to this sort of worry relates back to how I had suggested that the CI theorist (and Plural Counter) represent the Kaplan-Geach sentence, (5):

(5) Some critics admired only one another.

Recall that I suggest that this should be represented by (55), where N = is a number, P = is a critic, Qxy = x admires y:

(55) $\exists X \exists n\ (Nn \ \&\ X =_h (x_1, \ldots, x_n) \ \&\ Px_1 \ \&\ Px_2 \ldots \&\ Px_n \ \&$
$\forall x_i \forall y\ (Qx_i y \ \&\ Py \rightarrow \exists j \leq n\ (y = x_j \ \&\ x_i \neq y)))$

[57] Thanks to Jason Bowers for this example.

(55) has the advantage of including in the statement the predicate “is a critic.,” which ensures that all of the individuals involved are critics. Similarly, if we wanted to represent a statement such as (56)

(56) Miss Piggy is one of the Muppets.

where it is understood that we are only talking about Muppets, and nothing else, then we could do this by a statement such as (56*), where p = Miss Piggy, Ux = is a muppet, M = the Muppets:

(56*) $\exists X \exists \mathrm{n}\ (\mathrm{Nn}\ \&\ X =_{\mathrm{h}} (x_1, \ldots, x_{\mathrm{n}})\ \&\ \mathrm{U}x_1\ \&\ \mathrm{U}x_2 \ldots \&\ \mathrm{U}x_{\mathrm{n}}\ \&\ \mathrm{M} =_{\mathrm{h}} X\ \&\ \exists i\ (\mathrm{p} =_{\mathrm{h}} x_i)$

This says that there are some things, *X*s, and there is some number, n, such that the Xs are (hybrid) identical to $x_1, \ldots, x_{\mathrm{n}}$, all of which are muppets, and which are hybrid identical to the Muppets, and Miss Piggy is one of them. We can reap the benefits of Relative Counting, in other words, not by appealing to sortals or kinds, but by including the relevant predicates in our logical representation of the statement in question. In this way, it will not follow from (56*) that Miss Piggy’s nose is one of the muppets, since we have made it explicit that we are only considering those things that are muppets, and Miss Piggy’s nose simply does not qualify.

Similarly, if we are considering only the planets, then the reason the Pacific Ocean will not qualify as one of the planets is the simple fact that the Pacific Ocean is not a planet. So clearly we are presupposing that the items under consideration are limited to planets and nothing else. We could represent this by making it explicit in our logical representation of “The Earth is one of the planets” that we mean that the earth is one of some things, the planets, where an item must be a *planet* to be among these things.

So most of the time we in fact do have a restriction in mind—that is, we are just talking about muppets or planets—which is part of the reason Relative Counting is so intuitive to begin with. But our presupposed restrictions do not fit so neatly into sortals, per se. For example, suppose we are trying to teach a child about ‘matching pairs.’ We do not care what items are used as examples, just so long as we are presented with two things that (more or less) match. So we bring her a pair of pennies, a pair of shoes, a pair of identical twins, a pair of heaps of sand, etc. And once we have all of these displayed in front of us, it seems we could easily say something like “The shoes are one of the matching pairs.” The predicate *is a matching pair* can easily be incorporated into our representation of this statement, just as *is a muppet* and *is a planet* were represented above. But “matching pair” fails to qualify as a sortal, on any respectable account of sortalhood.

Moreover, let us consider the metaphysical facts of the matter: there is a bunch of stuff in front of us. It is Miss Piggy. It is also Miss Piggy’s nose and the rest of her. It is also Miss Piggy’s head, body, and limbs. It is also all of Miss Piggy’s particles. And let us suppose Miss Piggy $=_h$ Miss Piggy’s nose and the rest of her $=_h$ Miss Piggy’s head, body, and limbs $=_h$ all of Miss Piggy’s particles. Then Miss Piggy’s nose clearly *is* one of the things that is there. And this fact doesn’t change if we surround Miss Piggy with the rest of the Muppets, each one of which is (say) hybrid identical to their various different parts. So now we have a bunch of things in front of us: all of the Muppets, which are hybrid identical to all of the limb-sized parts of the Muppets, which are hybrid identical to all of the small particle-sized parts of the Muppets, etc. And I say: Miss Piggy's nose is one of the things in front of us (The Muppets). Stated this way, with our restriction to *things that are muppets* lifted, it is perfectly fine and acceptable to say that Miss Piggy's nose is one of the Muppets.

In this way, then, it seems that (P) is an acceptable principle. Moreover, we've seen how we can accommodate out ordinary intuitions by including any relevant predicates in our logical representation of particular sentences under question. This allows the CI theorist to have an analysis of *is one of*, and one that more accurately reflects her view of the world. Moreover, she can express everything that a non-CI theorist can express, such as the Kaplan-Geach critics sentence. Thus, CI can dodge the fourth objection, as well as the three others.