COMPOSITION AS IDENTITY

Megan B. Wallace

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Approved by:

William G. Lycan
Keith Simmons
C. D. C. Reeve
Dorit Bar-On
John Roberts

ABSTRACT

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(Under the direction of: William G. Lycan, Keith Simmons, C. D. C. Reeve, Dorit Bar-On, and John Roberts)

Unrestricted Mereologists claim that whenever we have two things, *x* and *y*, there is a further thing, *z*, which is their 'mereological fusion'. One complaint against unrestricted mereology is that its ontological costs are too high: for any two (non-overlapping) things in our universe, the mereologist will claim that there is a third (its fusion). And once we add fusions, we can also add fusions of fusions, and so on.

To escape the charge of ontological extravagance, many mereologists have insisted that their view is ontologically *friendly*. One way to do this is to advance Composition as Identity (CI), which claims that the fusion of *x* and *y* is not a third thing, distinct from *x* and *y*, but is *identical* to *x* and *y*. But, we might wonder, how could the fusion of *x* and *y* fail to be a third thing, distinct from *x* and *y*? Much of the current philosophical literature on mereology and composition is dedicate to criticisms of CI.

In my dissertation, I proceed systematically, taking on the objections to CI one by one, showing how this view can be defended and plausibly developed. Common to most of these objections, I argue, is that they all fail to take into account two important resources available to the proponent of CI. First, many ignore the availability of a plural logic and language, complete with plural quantifiers, plural predicates, and (perhaps most importantly) a plural/singular hybrid identity predicate. Second, none of them considers what I call "plural counting," whereby our "counts" of objects are not constrained by singular quantification and singular identity statements. I show how these two resources can bolster a strong defense of CI, securing that mereology *is*, after all, ontologically innocent.

In addition, I show how CI has the advantage of providing elegant solutions to an array of problems in philosophy: perception puzzles, problems of prevention and causation, shadow puzzles, and Frankfurt puzzles about moral responsibility. I also introduce a metaphysics of objects that, together with CI, addresses modal worries, including issues concerning CI and merelogical essentialism.

To my Mom and Dad,
for their unconditional love and support.

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TABLE OF CONTENTS

LIST OF FIGURES

Chapter 1

Parts and Wholes

1. Motivation: Why Worry about Parthood?

Here is one commonsense truism: the world abounds with lots of various sized objects. There are desks and chairs and rocks and trees. There are people and pubs and beers and eggs. Just look around; such things are everywhere. Let us call this the Existence Assumption.

Existence Assumption: Ordinary objects (rocks, trees, etc.) exist.

Here is another: these various sized, ordinary objects are made up of parts. Desks have drawers and legs and tops; chairs have legs and seats. Rocks are made of smaller rock bits; trees have roots, trunks, branches, and leaves, etc. Let us call this the Parthood Assumption.

Parthood Assumption: Ordinary objects (rocks, trees, etc.) have parts.

Now, there may be an issue about what it is for an object to *have* a part. What is this *having* relation that holds between an object and its parts? And we might wonder whether for any object there is, whether this object's parts have parts. Are there parts all the way down, for example? Is there a point at which the fundamental elements that are parts of an object simply cannot be broken down into any more parts? These are legitimate worries, but let us leave these particular concerns aside for now.

What I want to focus on now is how the two commonsense truisms—the Existence Assumption (EA) and the Parthood Assumption (PA)—while seemingly intuitive and innocuous, actually cause quite a bit of trouble for philosophers. Primarily, this is because the two assumptions give rise to what I shall call the Arbitrariness Thesis.

<u>Arbitrariness Thesis</u>: There is no non-arbitrary distinction between parts that make up an object and parts that don't.

Most of us (initially) think that the Arbitrariness Thesis is *false*. We think that there is a difference between, say, my cat Nacho, which *is* an object in the world, and the sum of Nacho's left paw and the Statue of Liberty's right foot, which is *not*. We don't think, most of us, that just any old things you please 'thrown together' will make an object. Yet just why we think this, and whether we are justified in thinking this, are issues that are up for debate. Moreover, it seems that a closer look at our intuitions about ordinary objects—in particular, EA and PA—lead us *to* the Arbitrariness Thesis, rather than away from it.

Suppose that EA and PA are true: there are various-sized objects in the world, and these objects have parts. And let us suppose that EA and PA are made true because all there is in the world is a cat, a dog, and the Statue of Liberty. Each of these objects has parts: legs, tails, torsos, toes, etc. Supposing all this, however, one might think that there is a determinate answer to how many things, or what kind of things are in this world[1]: there is the cat, the dog, the statue, and all of the parts that compose these objects. That's it! But *why* is this it? Why don't we count among the things in this world the *sum* of the cat's tail and the Statue of Liberty's left toe? Or the *sum* of all three of the cat, the dog, and the statue?

Once we have admitted that there are objects, and that these objects have parts, then it seems we have unwittingly assumed a difference between objecthood and non-objecthood. If we say that there *are* some objects, then we should have an idea of the identity criterion for objecthood; we need to know what is it for something to *be* an object (as opposed to not) in order to justify the claim that there are indeed objects. Moreover, if we admit that there are parts, and that objects are made up of parts, then we should have an idea of the difference between parts that make up an object and parts that do not.[2] Why can't any random parts make up an object? Why can't any random parts make up a cat, for example?

My cat Nacho is an ordinary object that has as parts four legs, a body, and a tail. And let us suppose (implausibly) that this is all of the parts that compose him. But if four legs, a body, and a tail are all the parts of my cat, then why isn't there a cat that's made from Nacho's legs, your body, and your dog's tail?

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[1] A version of this worry will be dealt with extensively in Chapter 2.

[2] Van Inwagen calls this the *Special Composition Question* [1990].

“Well, perhaps,” you might be thinking, “*cats* can only be made from *cat parts*; adding a dog’s tail and a person’s body to my cat’s legs does not a cat compose.” Fair enough. So take *different* cat parts from all of the cats in your neighborhood. Take Fluffy’s tail, Ms. Kitty’s legs, and Spot’s body. *Still* we do not have a cat. So it cannot be that mere cat parts make a cat.

“Well, of course,” you explain, “the parts have to be *connected*; they have to be attached! Cats are made of *connected* cat parts.” That attachment could make the difference between a cat and not a cat could be disproved easily with some rather freakish surgery. Luckily, we can make the same point with a less disturbing example. Take your desk and your cell phone. Now take some superglue and affix your phone on the side of your desk. Intuitively, the superglued phone-desk is not a *new* object. Or imagine that we have a fuse-machine, which will take any two objects and yield a smoothly fused product. We put the desk and your phone in the machine, and out pops an object that looks just like the superglued phone-desk, minus the hardened superglue. Still, we don’t seem to have a *new* object; just two old ones fused together. If it is protested that objects have to have certain object-specific parts, like cats have to be composed of cat-parts, then take your desk and lop off a leg. Now lop off a leg from your officemate’s table as well, and throw both it and your amputated desk into the fusion-machine. Out pops a desk, surely. But an entirely new desk? Or just *your* desk with a replacement part? Intuitively, it is still your desk, merely refurbished with a prosthetic limb.[3] So attachment cannot be enough for the making of distinct objects.

What's more, attachment is not only not sufficient for creating an object, it's not necessary either. It might be true that lots of ordinary objects like cats and desks and cell phones have lots of attached parts.[4] But there are also lots of ordinary objects that seem to have detached—or, at least, detach*able*—parts. Philosophers are fond of calling these sorts of objects *scattered* objects[5]. Perhaps you had an insufferable older brother (as I did) who was fond of playing '52 Pick-up.' If so, then it didn't take you long to realize that a *scattered* deck of cards is still a deck of cards. None of the cards need be touching—there could be one in every corner of every room in your (spacious) house, e.g.—yet it would still be an object, a deck of cards. Another example: perhaps when you were older, you were sent on an errand to pick up an item: a case of beer. Once delivered, you realized the case could be scattered and distributed (and quickly consumed!). But the case's detachability makes it no less of an object than a rock or a tree. Not to mention all of the scattered objects that we encounter daily: we can see a galaxy, a crowd of people, a heap of trash, a cloud. None of these objects is any less of an object simply because the elements that compose it are scattered. And, really now. Let's be rigorous. When we get right

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[3] Issues about identity over time, survival over change, and other constitution puzzles will be addressed in Chapter 4. For a brief note on the (apparent) difference between composition and constitution, see below, footnote 17.

[4] As long as we are understanding 'attached' in a loose, folk-notion way. See below, and footnote 5.

[5] See: "Scattered Objects", in Keith Lehrer, ed., *Analysis and Metaphysics* (Dordrecht: Reidel, 1975): 153-171. Reprinted in *Philosophical Essays*: 171-186, Chisholm R. M., 1987, `*Scattered Objects*', in J. J. Thomson (ed.), On Being and 36 Saying: Essays for Richard Cartwright, Cambridge (MA): MIT Press, pp. 167-173.

down to it, ordinary objects such as rocks and trees have small, molecular parts that, technically, are not attached. Attachment, or *contact*[6], more specifically, seems to be an illusion that is dispelled as soon as we look closely under powerful microscopes.[7]

So we may all agree that there are lots of objects in the world (EA). And we may all agree that these objects have parts (PA). But some reflection reveals we are not at all clear on why certain parts make an object while other certain parts don't. We don't fully understand *how* it is that certain object can have parts, even though we're sure that these certain objects exist and we're sure that these certain objects are made of parts. Put yet another way: there doesn't seem to be any principled way—ontologically speaking—to demarcate parts that compose objects from parts that don't.[8] We are led, then, to holding the Arbitrariness Thesis, even though such a thesis may seem unintuitive and cuts against our usual way about talking about objects in the world.

This, then, is just one of the reasons why we should worry about parthood. It will illuminate us as to how and why we hold EA and PA, whether we *should* hold them, and how we might be able to either make peace with the Arbitrariness Thesis, or else find a way to make a non-arbitrary distinction between what counts as an object and what does not. Worrying about parthood, in other words, may help us to

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[6] See Hud Hudson, *The Metaphysics of Hyperspace*, ch. 3. Oxford University Press, 2005.

[7] This point about attachment or contact will be discussed quite extensively in Chapter 5.

[8] In fact, the lack of such a demarcation is what has led many to eliminativist views about objects or objects' parts. Van Inwagen and Unger, for example both reject at least one of our two commonsense truisms—Unger rejects the Existence Assumption, whereas van Inwagen rejects (at least) the Parthood Assumption, and perhaps even the Existence Assumption, depending on how you interpret his thesis about what ordinary objects *are*. See Van Inwagen (1990) and Unger (1979).

solve some tricky metaphysical puzzles that arise out of some seemingly intuitive assumptions we hold about ordinary objects.

2. Parthood: Composition and Mereology

2.1 Composition

There are many different theories about parthood and how this relation helps us understand the metaphysics of ordinary objects.[9] Some say that there are certain parts, which *compose* certain wholes, and that this composition relation is essential for understanding what makes an object an object. Others think that there is no such thing as the composition relation—that there are many, many parts, all arranged in-a-specific-way-wise, but none of which compose to form certain wholes.[10] In what follows, I am going to be assuming that there *is* such a thing as the composition relation, and that this relation is essential to understanding what makes an object an object. I maintain that if we can correctly capture what it means for some parts to

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[9] See: Burkhardt, H., and Dufour, C. A., 1991, 'Part/Whole I: History', in H. Burkhardt and B. Smith (eds.), *Handbook of Metaphysics and Ontology*, Munich: Philosophia, pp. 663-673. Henry, D., 1991, *Medieval Mereology*, Amsterdam: Grüner. Simons, P. M., 1991, 'Part/Whole II: Mereology Since 1900', in H. Burkhardt and B. Smith (eds.), *Handbook of Metaphysics and Ontology*, Munich: Philosophia, pp. 209-210. Smith, B., 1982, 'Annotated Bibliography of Writings on Part-Whole Relations since Brentano', in B. Smith (ed.), *Parts and Moments. Studies in Logic and Formal Ontology*, Munich: Philosophia, pp. 481-552. Smith, B., 1985, 'Addenda to: Annotated Bibliography of Writings on Part-Whole Relations since Brentano', in P. Sällström (ed.), *An Inventory of Present Thinking about Parts and Wholes*, vol. 3, Stockholm: Forskningsrådsnämnden, pp. 74-86.

[10] See Unger, Merricks, and Van Inwagen (Van Inwagen only says this for non-humans).

compose a whole, then we will gain some insight into the metaphysical puzzles alluded to above, and many more besides.

One of the upshots of my discussion of the composition relation will be to show that the Arbitrariness Thesis, contrary to our *prima facie* intuitions, is *true*. The theory of composition that I am defending here will show quite nicely, I think, that there is no principled way—ontologically speaking—to demarcate parts that compose objects from parts that don't, and so no demarcation is called for. This means that, contrary to some initial intuitions, 'throwing together' any old random parts you please *will* make an object. But given my views on composition, this will be shown to be perfectly acceptable.

Along the way, I will be assuming (i) that there are lots of objects in the world such as rocks and trees and things (EA), and (ii) that these objects (and then some) are composed of parts (PA). So, one of the results of my project will be to show that we can simultaneously (and happily!) hold EA, PA, and the Arbitrariness Thesis.

2.2 Mereology

One traditional way to make sense of the composition relation is by way of *mereology*, or the study of parts and wholes. Mereology was developed as an alternative to set and class membership relation, to possibly avoid difficulties that result from naive-set theory.[11] The idea was to take 'parthood' as a primitive notion, which we can represent as:

Pxy = 'x is a part of y'

Such a relation is (typically) assumed to obey the following relations:

Reflexivity: $\forall x\ (Pxx)$

Antisymmety: $\forall x \forall y\ ((Pxy\ \&\ Pyx) \rightarrow x = y)$

Transitivity: $\forall x \forall y \forall z\ ((Pxy\ \&\ Pyz) \rightarrow Pxz)$

Mereologists also claim that whenever we have two things, *x* and *y*, there is a further thing, *z*, which is the *mereological fusion* of *x* and *y*. Mereologists (typically) claim that there is one and only one fusion composed of particular parts (uniqueness) and that for any two (or more) things, there exists a fusion of those things (universality).

Some maintain that universality is much too strong because it will invite unwanted objects into our ontology. Suppose we have my coffee mug here and my cat, Nacho, over there, for example. And assume, as commonsense does, that coffee mugs and cats are relatively uncontroversial, ontologically speaking.[12] According to the mereologist who accepts universality, however, we also have a further thing—the *mereological sum* of my coffee mug and Nacho (call it Muggo); the mereological sum, Muggo, is as much of an ontological entity as is my mug and my

[11] See Lesniewski, Goodman, et. al.

[12] Again, some philosophers famously deny the existence of such composite, bulky goods. (See Unger (1979), Van Inwagen (1990), and Merricks (2006), for example.)

cat. Indeed, if we were to make a list of all of the things in the universe—all of the things that we can count and name and quantify over, etc.—Muggo would be on the list, along with rocks and trees and mugs and cats and a myriad of other ontologically uncontroversial things. Because such mereologists allow any mereological sums whatsoever into our ontology, this is often called Unrestricted Mereology.

One of the advantages of accepting Unrestricted Mereology is that we need not have some arbitrary, unprincipled distinction separating objects from non-objects. *Whenever* there are some parts, there is also a whole—a sum of these parts. And this sum is as much an object as the parts which make it up. So the worries voiced in the introduction will dissolve since whether some parts are attached or not, or attached in a particular way, or are specific sorts of parts, etc. is irrelevant. Sure, it may be that lots of objects are not worth mentioning or talking about. The mereological sum of my couscous salad and my left running shoe, for instance, is not an object we have much need for thinking about (except for the purposes of this example). So there are lots of objects that we don't ever think about, that don't even have proper names, and never occur to us as being objects at all. But this is just a matter of our psychological preferences and practical needs; it has no bearing on the actual ontological underpinnings of the world. Just because some objects are convenient for us to label and think about has no metaphysical impact on what counts as an object, ontologically, and what does not. We shouldn't be beholden to an anthropocentric metaphysical worldview; to do so is just an inexcusable form of ontological prejudice.

Despite the theoretical advantages, however, Unrestricted Mereology nonetheless rubs some the wrong way. Some of the main complaints against it center on the charge that its ontological costs are too expensive. Assuming our ontology is guided by a healthy balance of explanatory power and parsimony, mereology is suspected of being too ontologically extravagant for its own good. "Just think of how many things you want me to be committed to!" complains that anti-mereologist. For the mereologist, if she is right, is seemingly going to add considerably to the population of our universe. This is because for any two (non-overlapping) things in our universe we are already committed to, the mereologist will posit a third. And once we add this third thing, then other mereological sums—such as the mereological sum of Muggo and my sunglasses—will abound. So depending on how many entities we think populate the universe prior to a commitment to mereological sums, adopting a commitment to (unrestricted) mereology may result in an overwhelming expansive ontology.[13] This expansion will be unnecessary if any of the work that mereological sums do can be done by things that are not mereological sums.

3. Composition as Identity: 3 Varieties

To escape the charge of unnecessary ontological overpopulation, many mereologists have insisted that their view is ontologically *friendly*. They have

[13] I am assuming that ontological parsimony is a virtue of metaphysical theory-building. See section 5 of this chapter for elaboration.

primarily done this by looking at the relation between a mereological sum and its parts. Some say that if this relation between parts and wholes, composition, is one of identity—or even if it is something close to or *like* identity[14]—then in committing oneself to mereological sums, one is not thereby committed to something further, or something over and above, the parts. If a commitment to mereological sums is not a further commitment over and above a commitment to the parts, then there is no ontological reason to reject mereological sums, no matter how puritanical one's ontological standards are.

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

3.1 Weak Composition Thesis (WCT)

In *Parts of Classes*, David Lewis claims that mereology is ontologically innocent. He insists that this follows from his commitment to the *Weak Composition Thesis*: [15]

[14] See Lewis, David 1991: 72-87.

[15] This thesis, and the Strong Composition Thesis stated below, is formulated by Byeong-Uk Yi in [Yi 1999: 141-160].

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

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

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

If composition is *like* identity, but not *exactly* identity, Lewis claims, then it can reap the ontological advantages that result from a stronger thesis like the Strong Composition Thesis (see below), while avoiding the seemingly devastating objections SCT purportedly faces.[16] In short, WCT is a way of having your cake and eating it, too.

[16] See below.

3.2 Strong Composition Thesis (SCT)

A second, and perhaps more straightforward way to show that mereology is ontologically friendly, is to commit to the *Strong Composition Thesis*: [17]

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

Those who accept the Strong Composition Thesis (SCT) claim that whenever there is a mereological sum—or fusion—of something, that fusion or whole is literally identical to all of its parts. This does not mean that each of the parts, *taken individually*, are identical to the whole. Rather, that the parts—*taken together*—are identical to the whole.[18] And since, according to this view, the parts are *literally* identical to the whole, there is no problem getting the fusion of parts for free: the parts just *are* the whole, the whole just *is* its parts; so *of course* the whole is no further ontological commitment given that you are already committed to the parts.

[17] Notice that—so far—I am concerned only with *composition* as identity, not *constitution* as identity. One (apparent) difference between composition and constitution is that composition is purportedly concerned with the relation between one and many—e.g., a whole and its parts. Constitution is purportedly concerned with the relation between just one thing and another—e.g., a statue and the lump of clay that makes it up. In Chapter 4, I will explore the relation between *composition* as identity and *constitution* as identity, and show that any purported distinction between the two relations collapses on my view.

[18] This depends on the difference between distributive and collective identity, which will be discussed in detail in Chapter 3, sections 3.2, 5.1, and 5.2.

One implicit assumption made by SCT is that the identity relation is the classic identity relation that we've learned at our mother's knee. She is transitive, reflexive, and symmetric. She is unambiguous and intuitive. She also obeys the Indiscernibility of Identicals, and (perhaps) the Identity of Indiscernibles.[19]

*3.3 Strong**er** Composition Thesis (RCT)*

Contrast SCT with those who would like to claim (i) that composition is—not *is like* or *analogous* to—but literally *is* identity, yet (ii) identity is a different sort of relation than we may have supposed. In particular, this view claims that identity does not obey the Indiscernibility of Identicals. This means that, surprisingly, something can differ from itself. Endorsers of this view would be committed to the *Strong*er *Composition Thesis*:

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

[19] Since this last one is a bit controversial, I will leave it aside for now. [See: Max Black, "The Identity of Indiscernibles," *Mind*, Vol. LXI, No. 242, 1952. Etc.] As far as I can tell, support for or against the Identity of Indiscernibles does not hinge on one's position on composition, so it will be irrelevant for my purposes here.

Donald Baxter[20] claims that the Stronger Composition Thesis (RCT) is the only viable option for those that want to embrace Composition as Identity (CI). Moreover, he claims that puzzles about composition are *evidence* that our intuitions about identity are what are in need of revision, not our views about the relation between parts and wholes.[21, 22] He claims:

> "Countenancing the discernibility of identicals…ought not be regarded as accepting contradiction. Consider alteration. On the face of it, the same thing becomes different. This thing as it now is differs from itself as it was. That in such a case something differs from itself is as plain as day. So there is some way for something to differ from itself without contradiction."[23]

Baxter claims that cases of change over time, cases of fission and fusion, etc., all go to show that it is our concept of identity that is in need of revision, not our views of composition. Once we realize that composition is identity, but that the identity relation does not obey the Indiscernibility of Identitcals, then we can show easily how the parts of an object are identical to the whole. And so it can be no objection on his

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[20] See Donald Baxter: "Many-One Identity," *Philosophical Papers* 17 (1988), pp. 193-216; "Identity in the Loose and Popular Sense," *Mind* 97 (1988), pp. 575-582; "The Discernibility of Identicals," *Journal of Philosophical Research* 24 (1999), pp. 37-55; "Identity, Discernibility, and Composition," (MS) [2007], and in personal correspondence.

[21] See Baxter's new material (MS). Also, there are hints of this view in his old paper "Identity in a Loose and Popular Sense."

[22] Fans of Relative Identity may be friendly to RCT, although for reasons independent from issues of composition.

[23] "Identity, Discernibility, and Composition," (MS) [2007].

view to point out that the parts are many while the whole is one, hence, the parts are not identical to the whole. For Baxter allows that an object can differ from itself.

3.4 A Quick Note about the Nomenclature

Incidentally, I do not think that these three theses—WCT, SCT, and RCT—are aptly named. In particular, the so-called Strong*er* Composition Thesis (RCT) is not exactly a stronger thesis than the Strong Composition Thesis (SCT). If one is only considering the claims each thesis makes about the composition relation, then it looks as if SCT is the stronger of the three theses, since it is the only one that claims that composition is truly identity. RCT's strength seems to come from the boldness of claiming that the identity relation is different than we thought it was, not from it's position on composition *per se*.[24] Nonetheless, in an effort to be consistent with the terminology already in use in the literature, I will use the aforementioned names of the three varieties of CI, however inapt they may be.[25]

4. Rejecting WCT and RCT

In the chapters that proceed this present one, I will be endorsing SCT against many objections—some old and intuitive, some new and more technical. I also hope

[24] Thanks to Keith Simmons for input here.

[25] I also think that it is inaccurate to call RCT a variety of composition as *identity*. See below (section 4.2) for elaboration.

to show that SCT is not only defensible, but plausible as well. Yet let me first take a moment to explain why I think both the Weak Composition Thesis (WCT) and the Strong*er* Composition Thesis (RCT) should be rejected.

4. 1 Rejecting WCT

First, consider WCT. Two reasons Lewis offers for thinking that the 'are' of composition is only *analogously* the 'is' of identity are (a) that he knows of 'no way to generalize the definition of ordinary one-one identity in terms of plural quantification,' and (b) that 'we do not really have a generalized principle of Indiscernibility of Identicals' [Lewis 1991: 87].

The idea behind (a), I take it, is that anyone who endorses SCT must give an adequate account of the classic identity relation. Such a relation is a singular relation that holds between one thing and itself; everything is identical to itself, and no two distinct things are identical to each other. Presumably, the SCT theorist will want to embrace a plural language, which will allow for her to quantify over objects plurally, and will allow her to utter identity claims that involve a combination of plural and singular terms such as "The parts (plural) are identical to the whole (singular)," etc. [26] Yet if she does this, then there seems to worry about whether one can provide a correct analysis of the singular, classic, one-one (singular) identity relation. Moreover, even if one could provide an adequate analysis of one-one identity, then worry (b) crops up: it is not clear how an SCT theorist could accommodate the

[26] We will see in Chapter 3 the mechanics of just such a language.

Indiscernibility of Identicals. The parts are *many*, after all, and the whole is *one*. The Indiscernibility of Identicals tells us that for any x and any y, if x =y, then x and y have all properties in common. But if the parts are *many* and the whole is *one*, then this seems an outright violation of the Indiscernibility of Identicals. So how could a generalized principle of the Indiscernibility of Idenitcals accommodate this fact, if SCT is true?[27]

So, (a) and (b) seem to based on Lewis' (correct) assumption that anyone who endorses the Strong Composition Thesis (SCT) must provide an adequate account of identity using plural quantification, and they must also give an adequate account of the Indiscernibility of Identicals, given that on SCT, many things are many *and* one. Lewis doesn't think that such conditions can be met, and so he thinks that the only viable alternative to SCT is the weaker WCT. So his reasons *for* WCT are based on the presumed failure on SCT.

One of my aims in the present thesis is to show precisely how it is that a commitment to SCT *could* satisfy (a) and (b).[28] If I can show this adequately, then I will have undermined Lewis' reasons for rejecting SCT, and this alone will make SCT a view worth consideration. And if part of Lewis' reasons for WCT is the failure of SCT, and yet I can show how SCT doesn't fail, then I will have undercut the reasons for WCT as well.

[27] This particular point will be addressed extensively in Chapter 3.

[28] See Chapter 3.

Furthermore, recall that one of the main motivations for thinking that composition is identity in the first place (or that it is *like* identity in Lewis' case) is to make mereology ontologically innocent. But I do not see how Lewis's WCT can satisfy this desideratum. For as soon as Lewis gives up the idea that the relation between part and whole is *literally* a form of identity, he is also giving up the idea that the whole is nothing over and above the sum of its parts. If the parts are not literally identical to the whole, then in committing oneself to the parts, one has not committed oneself to the whole—a further commitment is needed if one wants both parts and fusions in one's ontology.

Perhaps Lewis has something like *supervenience* in mind—the idea that wholes supervene on their parts, much the way many have thought that immaterial minds supervene on physical brains, or evaluative facts supervene on the descriptive facts, or law-like facts might supervene on facts about particulars, etc. Once we have the parts, in other words, we (somehow) get the whole for free. Or something like that.

I must say that ontological free lunches have always been a mystery to me; if the relation between one thing and another is *not* identity, then *they* are distinct, and that means *two* things are in our ontology rather than one.[29] I just do not understand how some admittedly non-identical things can fail to count as separate (hence, *extra*) items in our ontology. But the debate about the coherence of supervenience and ontological free lunches will have to wait for another time. Moreover, even

[29] I'll be pressing this point a bit more below.

leaving my conceptual limitations and unsupported opinions aside, I am not entirely sure that supervenience was what Lewis had in mind when he suggests that composition is *like* or is a *kind* of identity. I suspect that if supervenience was what Lewis had in mind when he was proposing WCT, he would have just said so.

But then this invites worries about the conceptual obscurity of how something can be like—but not exactly!—identity; it is not clear how something can be *analogous* to identity. Usually, our understanding of analogousness or similarity is based on certain relevant, shared properties. We say that two objects are similar when they have the same—*viz*., identical!—properties. If a relation is not identity, but has some of the attributes of identity, then it will need to be specified which attributes it has and which ones it doesn't.

To be fair, Lewis does attempt to specify the details of his view. He claims that composition is analogous to identity in the following ways: (i) composition and identity are both ontologically innocent; (ii) identity obeys the following kind of principle: if x exists, then something identical to x exists, and composition seems to as well: if x and y exist, then the fusion of x and y exists; (iii) identity is transitive, and so is composition (sort of)[30]; (iv) identity and composition both share an 'ease of descriptions'—in describing something, we have thereby described whatever is identical to this something. Likewise, in describing the parts, we have thereby described the whole; and finally, (v) there is a necessity of location between a thing

[30] Lewis claims: "A *kind* of transitivity applies…If *x* is them, and they are *y*, then *x* is *y*." [1991:85, my emphasis.]

and whatever's identical to this thing.[31] Similarly, there is a necessity of location between the parts and the whole made up of these parts. So this *does* seem to be an extensive list delineating what features composition and identity have in common.

However, what is unclear is *how* composition could be the sort of relation that has all of these features. In order to claim that composition is ontologically innocent, for instance, we need to be able to point to some feature of composition that explains *why* it is ontologically innocent. In the case of identity this is easy, since we have the Indiscernibility of Identicals. A commitment to *a*, given a prior commitment to *b*, and given that *a* = *b*, is not a *new* commitment. For a *new* commitment is a commitment to something distinct from the commitments already in place. Yet the Indiscernibility of Identicals tells us that for any *x* and any *y*, if *x* = *y*, then for any attribute *x* has, *y* has. So this guarantees the *in*distinctness of *a* and *b*, showing that a commitment to one is nothing over and above a commitment to 'the other', making it clear how identity is *genuinely* an ontologically innocent relation. In the case of composition, however, there is no such parallel explanation. Lewis claims that mereological sums are metaphysically dependent on their parts (e.g., if x and y exist, then the fusion of x and y exists), that the composition relation exhibits a 'kind of' transitivity, and that they share an 'ease of descriptions.' But it is not clear how any of these features could *explain* the purported ontological innocence he claims the composition relation has. And if these features cannot explain it, then it is not clear what other features Lewis attributes to the composition relation could explain it.

[31] Lewis 1991: 85-7.

According to Lewis, composition does not obey the Indiscernibility of Identicals, so that cannot be what explains how it is that composition is ontologically innocent.

So even granting that composition has all of the features Lewis says it does (save ontological innocence), it is not clear how this relation could then be ontologically innocent as well. A commitment to the whole is a new commitment over and above a commitments to the parts if the whole and parts are distinct—i.e., if the whole and parts are *not* identical. It won't be of any help if composition is *analogous* to identity in certain ways; that composition is not identity is enough to generate ontological burdens. Moreover, the obscurity and near-incoherence of the idea that composition is only analogous to identity makes WCT an untenable thesis. So WCT should be rejected.

4.2 Rejecting RCT

Next, let's consider RCT. As explained above, Baxter thinks that puzzles about composition are *evidence* that our intuitions about identity are what are in need of revision, not our views about the relation between parts and wholes. In effect, he uses puzzles of composition as a modus tollens against our ordinary intuitions about identity. Unlike Baxter, however, I think that there are certain basic metaphysical principles we should never give up, especially if these principles are given up in favor of far sketchier ones. One of these basic assumptions is consistency; another is the Indiscernibility of Identicals. I admit that this may be nothing more than a Moorean move on my part: I am more certain of classical logic and the Indiscernibility of Identicals than I am of any of the other theses or puzzles that may call these principles into question.

So let me put my cards on the table as far as composition is concerned: I am more certain of the Indiscernibility of Identicals, than I am that Composition is Identity. If it turns out that CI cannot be maintained in light of the Indiscernibility of Identicals, then I think this gives us good reason to give up CI. So I certainly do not think that Baxter's move is the right one to make—we should be giving up CI if it means that we cannot maintain that the identity relation obeys the Indiscernibility of Identicals, not the other way around.

Moreover, in a certain sense, RCT doesn't even *qualify* as a view of Composition is *Identity*. Consider an analogous case. Suppose I endorse an identity theory of mind in the following way. "I am a monist about the mind. I believe that the mind is identical to the body. However, identity isn't what everyone thinks it is—the Indiscernibility of Identicals is false, so something can differ from itself. This is how the mind is identical to the body: the mind is immaterial, aspatial, private, etc., whereas the body—which is identical to the mind!—is material, spatial, public, etc. The mind is identical to the body, but identical things can differ from themselves, so the mind differs from the body."[32]

Such a view of the mind, while *called* an identity theory isn't really an identity theory of the mind. Once we have given up one of the essential features of the identity relation—the Indiscernibility of Identicals—we have ceased to be dealing with the identity relation any more. Of course, such an 'identity' theory isn't quite a

[32] No one I know holds this view, but it certainly seems available in logical space.

dualist theory either. For most dualists—substance and property dualists alike—at least agree with the material monist about what the identity relation *is*; they have to in order to deny the material monist position, and maintain the distinctness of the mental and the physical. In contrast, the above 'identity' theory of the mind seems to have switched topics all together. It characterizes the identity relation in such a way as to no longer plausibly count as the identity relation any more. It is not an identity theory; it's a schmidentity theory. But who cares about schmidentity? We want to know whether the mind and body are *identical*, not whether the main and body are *schmidentical*!

Touting RCT as a theory about composition as *identity* is a misleading description of the view. For once we have redefined the identity relation so that it no longer obeys the Indiscernibility of Identicals, we are no longer concerned with the original topic. RCT is not a variety of Composition as Identity; it's a variety of composition as schmidentity. But who cares about schmidentity? We want to know whether the parts that compose a whole are *identical*, not whether the parts that compose a whole are *scmidentical*!

Finally, if the Indiscernibility of Identity is denied, and rather the *Dis*cernibility of Identicals is accepted, then it seems that there will be no principled difference between one thing that differs from itself and two things that differ from each other. Since we can't rely on differences of properties, in other words, as our criterion of identity, then there seems to be no fact of the matter as to whether we are dealing with one thing (that is discernible from itself) or two things (that are discernible from each other). One could merely stipulate that there are two things rather than one in any given case, but this would be to embrace the number of things in our ontology as a mere brute fact. That is, there would be no difference-making feature that would explain why we have one object distinct from itself rather then two objects distinct from each other. And embracing brute facts about the number of entities in our ontology will count against the overall explanatory power of our ontological theory.

So RCT is flawed for three reasons: (i) it forfeits our intuitive notions of identity for less intuitive ones about composition[33], (ii) it isn't even a proper theory of composition as *identity*, and (iii) it collapses our criterion of identity for distinguishing one object and two (or more) objects. WCT, on the other hand, is unviable because (a) it undermines the very motivation for accepting Composition as Identity in the first place—i.e., showing that mereology is ontologically innocent, and (b) it utilizes an obscure concept—e.g., the idea that composition is a relation that is somehow *analogous* to identity, but is not identity.

Thus, having introduced WCT and RCT, I am now throwing them off the table, as neither seems to be an adequate theory of composition as identity. I will devote the remainder of this thesis defending SCT as best I am able. Also, from here on out, whenever I talk about Composition as Identity (CI), I intend to only be talking about SCT.

5. A Few Quick Words about Methodology

[33] At least *prima facie*, anyway. Since I am going to be endorsing the thesis that Composition is Identity, there is no distinction between the identity relation and the composition relation on my view.

I have already discussed some of the assumptions that I will be making in the following thesis: I will be assuming that ordinary objects exists (EA), that these ordinary objects have parts (PA), and that there is no non-arbitrary distinction between parts that make up an object and parts that don't (Arbitrariness Thesis), and so no demarcation is needed. I take it that EA and PA are relatively uncontroversial (with a few noteworthy exceptions[34]); and I hope to massage your intuitions and get you to accept the Arbitrariness Thesis along the way (if I haven't done so already). But there are a few other assumptions I will be making that might be worth flagging at this point.

First, I will be assuming a Quinean view of ontological commitment. I will be assuming that we are ontologically committed to those things that we existentially quantify over in our overall best theory of the world. I will be assuming that questions about existence and statements about what there is are unambiguous and univocal. I will be assuming that our ontological commitments can be "read off" of our ontological discourse; I will not be invoking hidden fictional operators, for example, or any sort of semantic tricks to show how our discourse pulls apart from what we're in fact ontologically committed to.

Second, I will be assuming that we are beholden to certain, traditional theoretical virtues. For example, I assume that we want our best overall theory of the world to be ontologically parsimonious. In general, we prefer a theory with fewer

[34] Again, see Van Inwagen and Unger, etc.

entities rather than more, and we prefer fewer kinds of entities rather than more.[35] I also assume that we want our best overall theory to yield the maximum amount of explanatory power—we don't just want a simple theory, in other words, we want the simplest theory that can explain the most. We don't want any phenomena unaccounted for, in other words. Finally, we don't want our final ontological theory to be one that posits any machinery merely to dodge objections; we don't want any part of our theory to be ad hoc.

Third, I assume that the above theoretical virtues may need to be pitted against one another; our best, overall theory of the world should strike the best balance between these virtues as is possible.

Finally, my aim is to show that mereology is ontologically innocent. I would like to provide an account of composition that obeys (at least) Transitivity, Uniqueness, and (perhaps most importantly) Universality:

> Transitivity: If x is part of y, and z is part x, then z is part of y.
>
> Uniqueness: If something, x, is a fusion of some things, $y_1, \ldots, y_n$, and something, z, is also a fusion of the y_is, then $x = z$.
>
> Universality: If there are some things, $x_1, \ldots, x_n$, then there is something, x, that is a fusion of the x_is.

[35] See, for example, my discussion of the difference between quantitative and qualitative commitment in Chapter 3, section 5.2. Also, see Lewis [1990].

As such, any argument against any of these principles will be seen as an attack against the view of CI that I am defeding in this thesis.[36]

I understand that each of these assumptions might be questioned or jettisoned. Unfortunately, I can only do so much in the space available here. My goal is to begin with these general ground rules and see what we might accomplish.

[36] See in particular Chapter 4, section 2.

Chapter 2

Counting and Composition[1]

1. Introduction

Suppose I were to give you the following instructions: “Please count and list *all* of the things in your room right now.” I hand you a huge pad of paper, a package of pens, and tell you to get cracking, since this project may take awhile. Being an accommodating fellow, you grab some coffee, sit down, and begin. After several minutes, you have produced the following list:

Things in my room: 1 table
1 computer
1 office chair
1 couch
2 pillows
2 bookcases
122 books
1 garbage can
5 coffee mugs, etc.

You pause to think. Then you remember that I have told you to list *all* of the things in your room. You begin to realize the difficulty of the task at hand. For the (one) table

[1] I would like to thank Ted Sider and Keith Simmons for helpful comments on earlier drafts of this paper and in personal correspondence.

is made up of four legs, one top, and several drawers. The (one) computer is made up of a flat screen, a hard drive, and a keyboard (which is in turn made up of many keys and a console, etc.). And all of *these* things are in turn made up of even smaller and smaller parts, such that you will eventually be counting and listing all of the molecules and particles that make up the wood that make up the legs and drawers and top that make up the table, etc.

Let's not be mistaken: the difficulty lies not in your ability to physically list all of these things. You have plenty of time[2] and plenty of patience, suppose. And the difficulty is not an epistemic one. Some of us may not know, for example, what material your table is made out of. Many of us will not know what kind and how many particles make up all of the medium-sized objects in your room. But not you. You are extra-empirically gifted. We can assume that you have the ability to "see" all of the parts of any object around you. So the fact that the larger objects in your room are made up of certain kinds of smaller objects is not a difficulty for you. The problem is not even a categorical one: does the air count as a thing? Do the air molecules? What about the light-waves emanating from the fluorescent bulb humming from the ceiling? Let's imagine that I don't care. If you want to count air molecules as "things," be my guest. I am an ontologist after all, so I would count such things as things easily. So, for now, let us assume you and I are not bothered by what qualifies as a

[2] Indeed, you may need to have an infinite amount of time, if there are an infinite number of things in your room, or if the world is a gunky one. (A gunky world is a world with parts all the way down—i.e., all of the parts have parts, etc.)

‘thing’ or not; the necessary and sufficient conditions for what falls under the category ‘thing’ is—so far—not a problem.

What *is* a problem, however, is that you are a metaphysician who is undecided on the question of composition and constitution. The careful reader will notice that I have been sloppy with my description of the task at hand: I have said that the “table is *made up of* four legs, one top, and several drawers” and that the “computer is *made up of* a flat screen, a hard drive, and a keyboard,” leaving it ambivalent as to what exactly I mean by the relation *made up of*.[3] But you, as a list-maker, must soon decide or figure out what this *made up of* relation is. In particular, you need to figure out whether this *made up of* relation is an identity relation or not.[4]

Suppose that you have (only) four quarters in your pocket, which makes up one dollar. Since you are in the room, so are your pockets, and so you add to your list: ‘one dollar’ and ‘four quarters.’ Yet if the one dollar is simply *identical* to the four

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[3] At the very least, I have left the *made up of* relation indeterminate between *composition* and *constitution*. One apparent difference between composition and constitution is that composition is presumably concerned with the relation between one and many—e.g., a whole and its parts. Constitution is presumably concerned with the relation between just one thing and another—e.g., a statue and the lump of clay that makes it up. (I discussed this briefly in Chapter 1, ftnt 17). As will be evident throughout this thesis, my examples and phrasing will be such as to suggest that the *made up of* relation is one of composition, rather than constitution. However, this is only because I think it is helpful to focus on one kind of problem at a time, not because I think there is a fundamental difference between the ‘two’ relations. In fact, I will argue in Chapter 4 that there is no difference between composition and constitution; if *composition* is identity, then *constitution* is identity, and so composition and constitution are the same relation. For more on this, see Ch. 4.

[4] I’m assuming that you wouldn’t be able to ‘see’ whether the *made up of* relation was the identity relation or not, even if you were equipped with extra-empirically gifted eyes. Could someone ‘see’, for example, that water is H_2O if they had microscopic eyes and could see everything at both the molecular and the macroscopic level? I suspect ‘seeing’ has really nothing to do with it. Philosophers still debate about whether the parts that make up the whole are identical to the whole, even when the parts aren’t super-tiny—e.g., a ship and the planks that the ship is made up of. And yet those who maintain that the relation between a ship and its boards is one of identity, do not think that there is something that is empirically available to them (just by looking, say) that is not available to their theoretical opponents.

quarters, then this may change the number of things that you think are in your pocket (and hence, in the room). For you may claim that there is one dollar in your pocket. You may also claim that there are four quarters in your pocket. But if you think that the relation between the dollar and the quarters is one of identity, then you may also put the following identity statement on your list: 'the one dollar = the four quarters.'[5] So then you think, if the *made up of* relation is one of identity, then there must be either one thing in your pocket (the dollar) or four things (the quarters), but in no way are there *five* things in your pocket. After all, it would be redundant to list the dollar *and* the quarters that make up the dollar, and count them as distinct. Wouldn't it?

2. Logic Book Counting vs. Plural Counting

2.1 Logic Book Counting

The above sort of example concerning counting has led some to formulate arguments against Composition as Identity (CI).[6] Peter van Inwgen, for example, has argued that an examination of how we count and quantify over objects in our ontology shows that CI must be false. Borrowing an example from Lewis (who

[5] If you don't like this example—because you think that you must have a dollar *bill* in your pocket in order to have one dollar in your pocket, say—then change it: imagine that you have two die in your pocket, that make up one *pair* of dice. Or, imagine if you can, that you have four mereological simples in your pocket that make up one mereological sum. And so on. Thanks to Adam Sennet for comments here.

[6] Recall that by CI, I intend to be discussing SCT, as discussed in Chapter 1.

borrows it from Baxter), Peter van Inwagen puts this type of objection against CI as follows: imagine that there is one big parcel of land, divided neatly into six smaller-parcel parts.[7] Van Inwagen argues,

> Suppose that we have a batch of sentences containing quantifiers, and that we want to determine their truth values: ∃x∃y∃z(y is a part of x & z is a part of x & y is not the same size as z)'; that sort of thing. How many items are in our domain of quantification? Seven, right? That is, there are seven objects, and not six objects or one object, that are possible values of our variables, and which we must take account of when we are determining the truth value of our sentences.[8]

The idea is that given how we usually quantify over objects in the world—i.e., with a singular existential quantifier—then there will be no way to quantify over mereological sums without *adding* to the number of things in our ontology. And if we are adding to the things in our ontology when we accept mereological sums, then mereology is *not* ontologically innocent. Let us call this the Counting Objection.

Similar reasoning might occur if, in response to the counting exercise I requested of you at the beginning of this chapter, you tell yourself the following. "Alright. I know how I can get an uncontroversial count of all of the things that there are (in this room). Let's start small and just count the number of things in my pocket. And to make things as simple as possible, let us suppose that I am poorer than I thought: let us suppose that I only have two quarters in my pocket, which makes up

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[7] Van Inwagen assumes that the smaller parcels are simples, and ignores (for brevity's sake) many of the overlapping parts.

[8] Van Inwagen, Peter 1994: 213.

one fifty cent grouping. [9] Now, let us existentially quantify over all of the things that are in my pocket, together with the non-identity claims of those objects. Then I will get a statement that looks something like the following (where 'Px' is read as 'x is in my pocket')":

(1) $\exists x \exists y \exists z(Px \ \& \ Py \ \& \ Pz \ \& \ x \neq y \ \& \ x \neq z \ \& \ y \neq z)$

This is, after all, how your logic book told you (and van Inwagen) to represent a statement such as "there are 3 things in my pocket." (Actually, this is how your logic book told you to represent "there are *at least* 3 things in my pocket." If one wanted to represent the statement "there are *exactly* 3 things in my pocket" then one would have to claim (1), plus a statement that represents "and there is nothing else in my pocket." This could be represented as (1*):

(1*) $\exists x \exists y \exists z(Px \ \& \ Py \ \& \ Pz \ \& \ x \neq y \ \& \ x \neq z \ \& \ y \neq z) \ \& \ \forall x \forall y \forall z \forall w(Px \ \& \ Py \ \& \ Pz \ \& \ Pw \rightarrow ((x = w) \vee (y = w) \vee (z = w) \vee (x = y) \vee (x = z) \vee (y = z))$.

For brevity's sake, however, I am just going to stick with the "at least" locution in the sections that follow. Also, van Inwagen doesn't seem to worry about the distinction between (1) and the more cumbersome (1*) in his objection to CI, so we won't worry about it either. From here on out, when I say things like "there are 3 things in my pocket", let us just assume that we are saying "there are *at least* 3 things in my

[9] I intend for "grouping" here to be metaphysically innocuous—i.e., I do not intend to be committing us to abstracta such as sets, etc.

pocket”, and we will symbolize such statements with formulations like (1) as opposed to (1*).)

So, modulo certain details, (1) is how your logic book told you (and Van Inwagen) to represent a statement such as “there are 3 things in my pocket.” Since each of the individual two quarters is non-identical to the one fifty-cent grouping, then there are the two things (quarters) plus the one thing (fifty-cent grouping) and, hence, there are *three* things in your pocket. Moreover, you realize that there must be much more than these three things in your pocket, since each quarter has a left half and a right half, a back and a front, etc. We can group two of the right halves of the quarters, and then the other two left halves of the quarters, such that you have two groups of halves-of-quarters in your pocket. Neither of these groupings is identical to each other, nor to the individual quarters that make up the groups, nor to the fifty-cent grouping that results from taking the two quarters together. We could represent this easily by supplementing (1) with some extra existential quantifiers and variables, together with the non-identity claims that hold between these groupings, the halves-of-quarters, the individual quarters, and the one fifty-cent grouping. And let’s not forget: each of the individual quarters is made up of small metallic bits, each of which you can see with your extra-empirically gifted eyes. If we had the time here, we could write out a similar equation as the one in (1), quantifying over all of the individual metallic bits that make up each individual quarter and show how none of them are identical to the quarters that they make up, yielding quite a large number of things in your pocket. (Lucky you.)

So (1) seems to be a pretty standard way to represent statements such as "there are three things in my pocket." As the number of things increases, so do the existential quantifiers prefixing the parenthetical formula. We can take a count, then, by mentally 'checking' all of the items that we can existentially quantify over, so long as that item is distinct from other things we have already existentially quantified over. The result is represented best by a sentence such as (1). At least, that is what we have been taught by our logic books. Hence, let us call this **Logic-Book Counting**.

"Neat-o," you think. "I can yield metaphysical conclusions just by using some tools in my logic book![10] Initially, I thought that the counting task assigned to me would be an extremely difficult one, since I am unaware of what the *made up of* relation is. I thought that if I did not know what the relation is—in particular, if I did not know whether it was the identity relation or not—then I would not be able to say whether there were 5 things in the room or 1 or 100,000,000 or what. But now I see that taking a count is uncontroversial: there are as many things here in this room as there are distinct items I can quantify over."

Indeed, this is exactly the line of reasoning that Van Inwagen seems to push when he argues that, contra David Lewis, composition is *not* ontologically innocent. If it were, then we wouldn't get *more* entities when we count the whole as distinct from the parts. If the whole just *is* the parts, then our counts should bottom out at the level of parts. But if we have a parcel of land, divided into six parts, and we quantify

[10] Together with a Quinean-spirited assumption about the ontological commitments we incur from the existentially quantified statements entailed by our best over-all theory of the world, which I discussed in Chapter 1, section 5.

over the parts, and then the whole which is presumably composed of the smaller six parts, we get a count of *seven* objects, not six. So a commitment to wholes seems to be an additional commitment to parts, in a very literal sense of the word *additional*: we can see that it is one more item in our domain whenever we try to take a count of all of the things that there are! Thus, composition is *not* ontologically innocent.[11]

Can it really be so easy? Can a seemingly futile assignment of counting up things in a room actually result in such profound metaphysical discoveries? Is Van Inwagen's argument against CI successful?

2.2 Plural Counting

Not so fast. Let us consider what a proponent of CI would say. A CI theorist would want to claim, for example, that your two quarters *just are* the one fifty-cent grouping; the one fifty-cent grouping *just is* the two quarters. But how could she possibly maintain this in light of the above sort of reasoning? Our method of Logic-Book Counting seems to uncontroversially show that there are at least three things in your pocket. Likewise, Van Inwagen's argument seems to definitively show that there are seven things in our domain, when we have a parcel of land that is composed of six smaller parcels of land. Must a CI theorist then *deny* the truth of statements like (1)?

[11] Van Inwagen (1994), 213.

$$(1)\ \exists x \exists y \exists z(Px \,\&\, Py \,\&\, Pz \,\&\, x \neq y \,\&\, x \neq z \,\&\, y \neq z)$$

Is a CI theorist maintaining her view at the cost of giving up well-entrenched rules of logic?

Not quite. For she could grant that statements such as (1) are true, yet maintain it does not follow from this that there are three things in someone's pocket. This is because, she might claim, the truth of (1) is independent from whether we think that (1) is *always* an appropriate representation of "there are three things in my pocket." In the particular quarter example under consideration, the CI theorist might maintain that (1) is true: it *is* true that there is one quarter, and then another one distinct from the first, and that there is a fifty-cent grouping that is not identical to the first quarter, nor is it identical to the second quarter. But, she might insist, it is *also* true that the one fifty-cent grouping is identical to the *two* quarters; the fifty-cent grouping is identical to both of the quarters *taken together*, but not identical to either one *taken individually*. Yet given the identity predicate of first order logic, which we used in (1), we do not have the tools to express a statement such as "one fifty-cent grouping is identical to two quarters." This is because the only terms allowed to flank the first-order logic identity predicate are singular ones. One doesn't have the tools to represent the claim that one thing is identical to many; one doesn't even have a way of referring to many objects at once in classical first-order logic.

Suppose we were to introduce a way of creating plural terms out of singular ones so that we could refer to many objects at once. Let us use ',' as a way of concatenating singular terms, where, for example 'x,y' means something like "x and y, *taken together*." Then we could have a sentence such as (2):

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

Notice that (2) would *not* be equivalent to (3), which is a statement expressed in first-order logic:

(3) $\exists x \exists y \exists z\ (z = x\ \&\ z = y)$

(3) claims that there is something, z, that is identical to x, and identical to y; it says that something, z, is identical to x and y *taken individually*. (2), in contrast, claims that something, z, is identical to x and y *taken together*.

Notice as well that (2) is *not* equivalent to (4), which is also something that a singular logic can say (where S = is a set, xMy = x is a member of y)[12]:

(4) $\exists x \exists y \exists z\ (\mathrm{S}z\ \&\ x\mathrm{M}z\ \&\ y\mathrm{M}z\ \&\ x \neq y\ \&\ x \neq z\ \&\ y \neq z)\ \&\ \forall x \forall y \forall z \forall w\ ((\mathrm{S}z\ \&\ x\mathrm{M}z\ \&\ y\mathrm{M}z\ \&\ x \neq y\ \&\ w\mathrm{M}z) \rightarrow ((w = x) \vee (w = y)))$.

(4) says that there is something, z, that is a set that has only x and y as members. But this means that there is *one* thing—a set, z. A CI theorist would not want to express the relation between parts and wholes using something like (4), because the relation between a whole and the *set* of some parts is not a one-many relation, but

[12] There are interesting, metaphysical reasons why this is so, but for now it is enough if we just stipulate that (2) is not equivalent to (3). I will discuss the reasoning behind this stipulation in more detail below, Chapter 3.

rather only a one-one relation. (2) explicitly posits a many-one relation, not a one-one, and so (4) is not equivalent to sentence (2).

Of course, sentence (2) is ill-formed in first-order logic, but this is exactly how a CI theorist might wish to represent "there is one thing (the fifty-cent grouping) which is identical to two things (the quarters)." Moreover, a CI theorist will want to have some way to talk about objects plurally, not just singularly as first-order logic does.

So let us introduce some terminology that may capture all that the CI theorist may want to say. For you may think that someone who embraces CI holds an incorrect or false view of the world, but you probably do not think that their view is *incoherent*.[13] You understand, at least, what a CI theorist is saying when she is describing her view; it isn't utter nonsense. If it were, you wouldn't be able to coherently *deny* her position. So we should at least be able to represent her position semi-formally.

Let us do this by introducing a singular/plural hybrid two-place identity predicate, '$=_h$', that takes either plurals or singulars as argument places—i.e., $\alpha =_h \beta$, where α and β can be either plural or singular terms. Let us also allow the concatenation of singular terms—e.g., x, y, z, etc.—into plural terms, with the use of commas, as we did in (2), and as demonstrated on the right side of the hybrid identity symbol in (2_h):

[13] Well, unless you're Peter van Inwagen. See his (1994) p. 211.

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

Let us be clear: the adoption of the hybrid identity predicate, $=_h$, will not force us to abandon the singular identity predicate used in traditional first-order logic, or in sentences such as (1). For singular identity statements are just a special case of hybrid identity statements. We can incorporate singular identity as follows[14]:

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

I intend for hybrid identity to *be* the classical identity relation, with only one exception: hybrid identity is transitive, reflexive, symmetric, it obeys Leibniz's Law, etc.; the exception is that the hybrid identity relation allows us to claim that many things can be identical to a singular thing.[15, 16]

Now we can re-interpret (1) in terms of the plural identity predicate, $=_h$, to yield (1_h):

(1_h) $\exists x \exists y \exists z(\mathrm{P}x \ \&\ \mathrm{P}y \ \&\ \mathrm{P}z \ \&\ x \neq_h y \ \&\ x \neq_h z \ \&\ y \neq_h z)$

[14] Thanks to Keith Simmons for help in this section.

[15] And as I will show below, letting many things be identical to one will not itself be a violation of Leibniz's Law.

[16] More on this in Chpater 3.

And we can further provide an acceptable and well-formed interpretation of (2), as shown above in (2_h). Thus, we can now describe the CI theorist as one who accepts the following sort of sentence, (5):

(5) $\exists x \exists y \exists z(Px \mathbin{\&} Py \mathbin{\&} Pz \mathbin{\&} x \neq_h y \mathbin{\&} x \neq_h z \mathbin{\&} y \neq_h z \mathbin{\&} \boldsymbol{z =_h x,y})$[17]

Notice that (5) is simply (1_h) and (2_h) combined (where the amendment to (1_h) in (5) is in bold typeface). Since the singular identity relation is special case of the hybrid identity relation, we can think of (5) as involving the singular non-identity statements of first-order logic together with the hybrid identity statement that is endorsed by a CI theorist. Because statements such as (5) allow and include plural subject terms such as '*x*,*y*', let us call this **Plural Counting**.

We now have a way of expressing what the CI theorist believes is going on with the various things in your pocket: we can use Plural Counting. But how does this address the original question: how many things are in your pocket? In the case of Logic Book Counting, we had an easy inference from statement (1) to a statement such as "there are three things in my pocket" because we simply *took* (1) to be the correct representation of the sentence "there are three things in your pocket." Yet

[17] To be clear, (5) does not exhaust the identity and non-identity claims that a defender of (R) accepts. For, in the particular quarter example under consideration, and assuming that each of the quarters has (at least) a right half and a left half, she may also endorse claims such as 't = y, z', 's = w, v', 'y,z ≠w,v', 'x = t,s', 't,s = y,z,w,v', etc. However, I have ignored these identity and non-identity statements (for now) to simplify the presentation.

the CI theorist wants to grant the truth of (1)'s equivalent—i.e., (1_h)—but deny that this always correctly expresses the sentence it is meant to express according to traditional first-order logic. This is because, she believes, there is more to the story (in this particular case). According to the CI theorist, one of the items quantified over in (1_h) is identical to some of the others, and this singular/plural identity statement cannot be ignored if we want to keep our counts accurate. Thus, we get a statement such as (5).

Yet suppose we grant all of this to the CI theorist. How are we supposed to interpret (5) as far as counting is concerned? How many things *are* in your pocket, if we grant the truth of (5)? More pointedly: just how, exactly, if Plural Counting utilizes sentences such as (5), is Plural Counting supposed to yield a *count*?

3. A Comparison: Plural Counting and Relative Counting

3.1 Relative Counting

We will be better able to answer these questions if we examine one more kind of counting: **Relative Counting**. Relative Counting claims that we cannot determine how many things there are until we have been given a sortal or concept or kind under which to count by. This view of counting is suggested by Frege in *The Foundations of Arithmetic* where he claims:

> The Illiad, for example, can be thought of as one poem, or as twenty-four Books, or as some large Number of verses; and a pile of cards can be

> thought of as one pack or as fifty-two cards (§22). *One* pair of boots can be thought of as *two* boots (§25).

In §46, Frege continues,

> …it will help to consider number in the context of a judgment that brings out its ordinary use. If, in looking at the same external phenomenon, I can say with equal truth ‘This is a copse’ and ‘These are five trees’, or ‘Here are four companies’ and ‘Here are 500 men’, then what changes here is neither the individual nor the whole, the aggregate, but rather my terminology. But that is only the sign of the replacement of one concept by another. This suggests…that a statement of number contains an assertion about a concept.

What seems to be suggested here is that we can think of thing(s) in various different ways—e.g., as cards, decks, complete sets of suits, etc.—and depending on these various ways of thinking about thing(s), we can yield different numbers or counts in answer to the question *how many?* One way to interpret this: there are multiple modes or senses a denotation or referent can have. So, for example, in the way that ‘Samuel Clemmons’ and ‘Mark Twain’ are two different senses for the same guy, so, too, would ‘52 cards’ and ‘1 deck’ be different senses for the same object or objects in front of you. No one of these numerical senses is privileged, and so there is no unique, non-sortalized answer to the question *how many things are in front of you?*[18]

[18] This is just one interpretation of Frege; I acknowledge that there are others. For my purposes, it is not important whether I have read Frege correctly or not. I am interested in relative counting as it is suggested above insofar as it can help support CI; it is of no importance here that Frege might not have actually endorsed the idea himself.

In this way, then, it is an ill-formed question to ask how many *things* there are. Rather, we need to ask how many *F*s or *G*s are there, where *F* and *G* stand in for specific sortals, concepts, or kinds. According to this view, since one can only take a count *relative* to these sortals, concepts, or kinds, but never a count *tout court*, this view is called **Relative Counting**.

I am leaving the exact details of Relative Counting intentionally vague, since I can imagine many variations on the Fregean theme suggested above. All that matters for my purposes, however, is that a theory of counting qualifies as Relative Counting if it claims (i) that there cannot be a unique numerical answer (e.g., ‘52’) to the question *how many things are there?*, and (ii) that there can only be a unique numerical answer to questions that include a legitimate sortal, concept, or kind term (e.g., ‘how many *cards* are there?’).

As concerns the number of things in your pocket, then, the relative counter would claim that a non-relativized question such as “how many things are in your pocket?” is an ill-formed question; and likewise for any equivalent sentences such as “how many objects are in your pocket?” or “how many parts or mereological sums or ontological items have you got in your pocket?”, etc. The only legitimate counting questions, she would claim, are ones that provide us with a legitimate sortal or concept or kind to count by such as “How many *quarters* are in your pocket?” or “Or how many *dollars* are in your pocket?”, etc.

Perhaps if an answer to non-relativized questions such as *how many things are there?* or *how many?* is demanded, a Relative Counter could give an answer such as: “well, there are four quarters, and one dollar, and the four quarters are identical to the dollar,” etc. The relativity implicit in the question can be flagged in the answer by having various numbers of things there are *depending on the sortal*, and an inclusion of the hybrid identity claims that hold between the various kinds or sorts of things.

At the beginning of this chapter I had suggested that if we think that the *made up of* relation is one of identity, then we will think that “there must be either one thing in your pocket (the dollar) or four things (the quarters), but in no way are there *five* things in your pocket.” Moreover, I said that “it would be redundant to list the dollar *and* the quarters that make up the dollar, and count them as distinct.” I was merely voicing an intuition at that point, but the intuition seems to be a strong one, and one which is nicely captured by Relative Counting. For it not only seems easier and more natural to take a count of things in your room or things in your pocket only *after* we have been supplied with a sortal, concept or kind with which to count by, it seems that we are incapable of doing anything different once all of the sortals, concepts, and kinds have been pointed out to us. Once it has been pointed out to us, for example, that the object(s) lying in front of us can be considered as cards, a deck of cards, sets of suits, etc., we are then seemingly unable to give a flat-out answer[19] to the question *how many?* In recognizing all of the different ways to ‘categorize’ whatever is on the desk in front of us, we then realize how underspecified the original question *how many things are there?* is.

[19] Where by “flat-out answer” I mean a non-disjunctive and non-relativized answer.

That we sometimes *do* give answers to unqualified *how many?* questions can be explained, perhaps, by the fact that the sortals we are interested in are often implicit or pragmatically understood. But a bit of reflection reveals that we seem to always have some sortal or concept or kind in mind when we answer a seemingly unrelativized counting question. Thus, Relative Counting is appealing because, on reflection, that's how it seems we *do* in fact count.

3.2 Three Worries for Relative Counting

Despite its intuitiveness, however, I have several worries about Relative Counting. I doubt that these worries are ultimately insurmountable, but they are initially troubling. I will first lay out my reasons for rejecting Relative Counting, and then show how, despite my reservations about the view, I think that it can nonetheless help us to understand—and ultimately convince us to embrace—Plural Counting. Moreover, if Plural Counting can do everything that Relative Counting can do, without the accompanying worries that Relative Counting brings, then this will be some motivation to favor Plural Counting over Relative Counting.

3.2.1 First Worry: Defining "sortalhood"

One of the primary, prima facie problems with Relative Counting is that in order for it to do what it's supposed to do, a distinction must be made between legitimate and illegitimate sortals by which to count. I had said above that a relative counter would not allow questions such as “how many *things* are in your pocket?”, nor any equivalent. This is because sortals, concepts, or kinds that apply too generally won’t be of any help to us when we are trying to figure out how many things there are. Since sortal terms such as ‘thing’, ‘part’, ‘mereological sum’, ‘ontological item’, and disjunctive sortals such as ‘cards or deck of cards or sets of suits’ or ‘quarters or dollars or fifty cent groupings or sums of metallic bits’ apply too generally—i.e., some of them can apply to *everything*, from the smallest imperceptible particle to the universe as a whole—they will be just as unhelpful in generating a count as *non*-relativized counting is.[20]

Now you might claim that generic terms such as ‘thing’, ‘part’, ‘mereological sum’, etc., are not sortals at all, in which case there would be no need to make the seemingly ad hoc distinction between legitimate and illegitimate sortals. But why not? Typically, one of the necessary and sufficient conditions for a term, *t*, being a sortal term is its ability to take numerical modifiers.[21] Thus, ‘cards,’ ‘deck of cards’, and ‘sets of suits’ would all qualify, since we can have fifty-two *cards*, or one *deck*, or

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[20] You might think that disjunctive sortals such as “apples or oranges or pears” are legitimate sortals because they are not cross-kind sortals—i.e., they are all kinds of fruit. But then disjunctive sortals such as “Granny Smiths or apples or pieces of fruit or edible goods” *would* be problematic, since these sorts of disjunctions are cross-kinds, and so the worry I raise above would repeat itself at the level of cross-kind disjunctions. Thanks to Bill Lycan for bringing this point to my attention.

[21] See Grandy (2006); F. Feldman, “Sortal Predicates,” Nous, Vol. 7, No. 3, 1973 268-282; , Michael B. Burke, “Preserving the Principle of One Object to a Place: A Novel Account of the Relations Among Objects, Sorts, Sortals, and Persistence Conditions,” *Philosophy and Phenomenological Research*, Vol. 54, No. 3 (Sep., 1994), pp. 591-624; Penelope Mackie, “Sortal Concepts and Essential Properties,” *The Philosophical Quarterly*, Vol. 44, No. 176 (Jul., 1994), pp. 311-333; Harold W. Noonan, “Sortal Concepts and Identity,” *Mind*, New Series, Vol. 87, No. 346 (Apr., 1978), pp. 267-269.

four *sets of suits*. But ‘blood’, ‘traffic’, and ‘dark matter’ don’t, since none of these terms can take numerical modifiers—e.g., we can’t say that there are five bloods[22], or eight traffics, or one million dark matters, etc.[23] But terms such as ‘thing’, ‘part’, and ‘mereological sum’ *can* take numerical modifiers—e.g., we can say that there are two *things*, or ten *parts*, or one hundred and one *mereological sums*. And so, on this criterion at least, ‘thing’, ‘part’, and ‘mereological sum’ should qualify as sortals just as much as ‘cards,’ ‘deck of cards’, and ‘sets of suits’ do.

Moreover, insofar as ‘cards’, ‘deck of cards’, and ‘sets of suits’, can each take numerical quantifiers, it seems that a disjunction such as ‘cards or deck of cards or sets of suits” can. Imagine that there are some cards on the table, only we can’t remember exactly how many. We do remember, however, that there are four of *something* card-related on the table, let’s say. Then the following sentence seems perfectly acceptable: “There are four cards or deck of cards or sets of suits on the table.” It is at least *grammatical*, anyway, to have a numerical predicate such as ‘four’ modify such a disjunction, in which case disjunctive ‘sortals’ should qualify as sortals, along with terms such as ‘part’, ‘thing’, and ‘mereological sum’.

Of course, you might think that it isn’t a matter of grammar: it doesn’t matter, for example, that “there are two things in my pocket” and “there are four apples or oranges or pears in the basket” are *technically* grammatical. What matters is whether we can count by the concept *things*, or the disjunctive concept *apples or*

[22] Unless you are talking about certain gang members, which is not what I had in mind.

[23] Thanks to Jason Bowers for help with these examples; his examples were way more interesting, and more relevant to the point being made here, than the ones I had originally used.

oranges or pears. If we can, the term qualifies as a sortal; if we can't, it is not.[24] But given the dialectic in play, a Relative Counter cannot say this. For she wants to claim that we can only count relative to sortals. She cannot then claim that a sortal is anything we can count by; this would make her definition of sortal and her thesis of counting viciously circular. [25]

In an attempt to avoid circularity, a relative counter might insist that whether a term, *t*, qualifies as a sortal or not is simply a *brute fact*.[26] Some predicates are sortal terms, she might argue, others are not, and we just happen to be really good at figuring out which ones are and which ones are not. If sortal-hood is a brute matter, then the relative counter will not run into circularity worries if she then wants to insist that we can only count by sortals. But committing oneself to brute facts is always a bit suspicious and reeks of anthropocentrism. How convenient that all of the object-types that we happen to pick out and name just happen to be the right ones! And how inconvenient for any other race or society that might pick out something else—perhaps they find it useful to track a mother and her child, for example, as one unit—since they would be *wrong*.[27] Moreover, appealing to brute facts seems a last resort; one should exhaust all other options before recourse to the claim that sortalhood is just a brute matter. I hope to show below how Plural Counting is a superior

[24] See, again, Grandy (2006), et. al.

[25] Note: someone who does not endorse Relative Counting may define sortals in this way without risk of circularity.

[26] See Geach (1972). Also, thanks to Bill Lycan for discussion on this point.

[27] See Hirsch (1982) and Sider (2008) for similar objections to bruteness.

alternative to Relative Counting, and one that need not resort to the bruteness of sortalhood.

So assuming that one does not want to take sortal-hood as a brute fact, and assuming that whether a term, *t*, takes a numerical predicate or not is not an adequate requirement for sortal-hood, then perhaps you think that a term's ability to take numerical modifiers is a necessary but not a sufficient condition for it being a sortal term. Perhaps you think that something, *s*, is a sortal iff (i) *s* can take numerical modifiers, and either (ii) *s* can answer the question "what is it", or (iii) *s* specifies the essence of things of that kind.[28] We've already seen how terms such as 'part', 'thing', and disjunctive terms such as 'apples or oranges or pears' satisfy (i). But such terms can satisfy (ii) and (iii) as well.

To show that a term such as 'thing' satisfies (ii), suppose I am teaching you about ontology. We have the following list in front of us:

Carburetor
Unicorn
Leprechaun
Horse
Harry Potter
Non-stick frying pan
Death stars
Running shoe
Pink motor scooter

You then point to each item and ask "what is it?". When you point to 'Carburetor', I say "That's a thing." When you point to 'Unicorn' and 'Leprechaun', I say "Those are

[28] See, again, Grandy (2006), and Penelope Mackie, "Sortal Concepts and Essential Properties," *The Philosophical Quarterly*, Vol. 44, No. 176 (Jul., 1994), pp. 311-333.

not”. Horse? A thing. Harry Potter? Not a thing. Non-stick frying pan? A thing. Death stars? Not a thing. Running shoe? A thing. And so on. Similarly, we can think of situations where ‘part’ and ‘mereological sum’ are appropriate answers to the question *what is it?*—in particular, ones in which our concern is a metaphysical or ontological one.

Now perhaps you think that the above example does not show that ‘thing’ is a sortal but that ‘actual thing’ is.[29] After all, you might argue, a unicorn is a thing, it’s just a non-actual thing. And similar reasoning applies for leprechauns, Harry Potter, and death stars. Those things are still *things*, even if they are only merely possible things, or fictitious things, etc.

I do not want to come down on the issue either way, since I think such a defense depends (in part) on how friendly (or unfriendly) one is to the existence of non-actual existents. And not wanting to commit myself at this point to either Meinongianism or Modal Realism or any other particular view about modality or merely possible things, I will simply say this: even if you think that the above example only shows that ‘actual thing’ is a sortal, then this will be trouble enough for the relative counter. For counting by the sortal ‘actual thing’ should be just as problematic as taking an unrelativized count. After all, if I ask you to count all of the things in your room right now, the relative counter will presumably insist that this is an inappropriate request because I have not provided you any sortals to count by.[30]

[29] Thanks to Bill Lycan for discussion here.

[30] Let’s assume that it is not contextually determined which sortal I had in mind either—i.e., I truly asked of you to give me an unrelativized count of all of the things in your room right now.

But I certainly didn't ask you to count by non-actual things! So my request "count all of the *things* in your room right now" should be more or less equivalent to "count all of the *actual things* in your room right now", and they both will be unanswerable according to the relative counter.[31] Yet it seems that 'thing' and 'actual thing' *can* answer the question *what is it?*, as the above example illustrates.

A less contentious (but maybe less convincing) example is the following: I have a game called 20 questions. It is a small, hand-held, computerized device that is supposed to guess what object you are thinking of in 20 questions or less. The questions range from *can you hold it in your hand?* to *does it bring joy to people who use it?* You can answer *yes*, *no*, *sometimes*, or *unknown*. After 20 questions, the machine will guess the answer to the question *what is it?* If it guesses wrong, then it will ask five more questions and then guess again. If it doesn't guess correctly on the second try, you win. (Go you.) The machine is an amazingly accurate guesser, although it admittedly has difficulty guessing such things as 'mereological sum' and 'proper part.' (I guess certain philosophical terms of art are not in its repertoire of possible objects people would think of when playing this game.[32]) I did, however, test out 'set' and 'thing.' For 'set', the machine's first guess was 'nothing'; its second was 'infinity.' For 'thing', its first guess was 'everything'; its second guess was 'something.' Limited and imperfect though this test of mine may be, clearly the programmers of the little game thought that 'nothing', 'everything', and 'something'

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[31] Again, assuming that context has not made certain sortals salient.

[32] But don't think for a minute that this stopped me from trying!

were legitimate answers to the question *what is it?* So what should stop us metaphysicians from doing likewise?

Now perhaps you think that I've just committed a cardinal quantifier sin: Just because there is nobody at the door, that does *not* mean that there is someone—nobody—at the door! Similarly, just because 'nothing', everything', and 'something', answer the question what is it?, we shouldn't think that there are these things—nothing, everything, and something—that are before us.[33] Fair enough. But then this should show that the proposed necessary condition for sortalhood of *being able to answer the question 'what is it?'* is the problem, not my application of it.

One more example. Suppose you and a friend are watching a scary movie at night. Your friend hears a noise and looks startled. You say, "What's wrong?" She says, "I thought I heard something." She gets up and looks out the window. You ask, "What is it?" She replies, "Something." You ask for more details. "Something like what?" She replies, "It's either a dog or a cat or a werewolf." Both the answer 'something' and the disjunctive answer 'a dog or a cat or a werewolf' seem perfectly legitimate answers to the question "what is it?" in this case; and no doubt countless examples like this one abound.

At this point, it might be evident that there is an odd tension present in the Relative Counter's story. The Relative Counter does not think that we can ever give a non-relativized count because the things in front of us can be considered (e.g.) as

[33] Thanks to Adam Sennet for raising this point.

cards, a deck of cards, sets of suits etc. But if this is right, then we should not expect a univocal, non-flat out, and satisfactory answer to the question *what is it?*

Consider: you've got something(s) in front of you. I ask you, "What is it?" You respond, "A deck of cards." This answer cannot be appropriate if the relative counter is right: she insists that the deck of cards can also be considered as *cards*, *sets of suits*, etc. Put another way: if there is a unique answer to the (non-relativized) question *what is it?*, then there should also be a unique (i.e., non-relativzied) answer to the question *how many?* Either the categorization of what is in front of us is ambivalent or the relative counter is incorrect in thinking that we can only make a count relative to a sortal. So it is odd to think that one of the necessary and sufficient conditions for sortal-hood is an univocal answer to the question *what is it?*, since by the Relative Counter's own lights, there are something(s) in front of us that can be considered as many various different kinds of things.

To show that a term such as 'thing', etc. satisfies (iii) as well as (ii),

(iii) *s* specifies the essence of things of that kind

first note that 'thing' is either going to qualify as a kind or not. If it does count as a kind, then it seems that there could be an essence of things *qua* things—e.g., existence, entity within the domain of all that there is, object of a bound variable, etc. If 'thing' doesn't count as a kind, then the onus is on the endorser of this particular definition of 'sortal' to say why not, and our worries about sortals will now repeat themselves at the level of kinds.

Similarly with disjunctions such as ‘apples or oranges or pears.’ If such a disjunction does count as a kind, then it seems there could be an essence of apples or oranges or pears *qua* apples or oranges or pears—e.g., the essence would just be a disjunction of the essence of the individual conjuncts: the essence of apples (whatever that is) or the essence of oranges (whatever that is) or the essence of pears (whatever that is). The essence of a disjunctive kind, in other words, would just be the disjunctive essence of the individual kinds that make up the disjunction. Yet if ‘apples or oranges or pears’ doesn’t count as a kind, then again the onus is on the endorser of this particular definition of ‘sortal’ to say why not, and our worries about sortals will now repeat themselves at the level of kinds.

To recapitulate, then, one of the primary problems with Relative Counting is that it relies on the controversial notion of a *sortal*. If her view is to work, she will need to (i) give an acceptable and non-circular definition of what, exactly, a sortal *is*, (ii) if overly-general terms such as ‘thing’, ‘part’, ‘mereological sum’, etc., qualify as sortals, then she will need to provide a non-ad hoc distinction between legitimate and illegitimate sortals by which to count by, and (iii) if overly-general terms do not count as sortals, she will have to give a non-ad hoc explanation as to why not. I do not wish to claim here that this first worry is devastating. Indeed, I have only considered a few proposals of the necessary and sufficient conditions for sortalhood, for example; no doubt there are many others, some of which may ultimately work. But it is enough to show that it will take some real work to make the Relative Counting thesis tenable. And until such work is accomplished, we should be hesitant about adopting any view such as Relative Counting that relies so heavily on as sketchy of a notion such as *sortal*.

3.2.2 Second Worry: Logical Inferences

A second worry that plagues Relative Counting is that it seems to prohibit us from using well-accepted inferences of first order logic. Typically, we are allowed to infer (7) from (6):

(6) Bottles of beer are in the fridge.
(7) Some things are in the fridge.

Intuitively, we should always be able to infer from a statement about particulars—i.e., that *beer* is in the fridge—something more general—i.e., that *something* is in the fridge. Yet if Relative Counting is correct, then it seems that as soon as numerical predicates are introduced, our ability to make seemingly acceptable inferences is somehow blocked. For the relative counter will not want to infer (9) from (8):

(8) There are (at least) two bottles of beer in the fridge.
(9) There are (at least) two things in the fridge.

Yet such an inference certainly seems legitimate, as is demonstrated by the following little argument (where B = is a bottle of beer, F = is in the fridge):

(P1) $\exists x \exists y$ (Bx & By & Fx & Fy & $x \neq y$)	Premise (sentence (8))
(P2) Ba & Bb & Fa & Fb & $a \neq b$	Instantiation
(P3) Fa & Fb & $a \neq b$	&Elimination
(C) $\exists x \exists y$ (Fx & Fy & $x \neq y$)	$\exists$Introduction

If the relative counter allows the above inference, then this would undermine her claim that all counting is relative, since (C)—i.e., (9)—is an *un*relativized count statement. The predicate "in the fridge" is not modifying the count in any way; and certainly, because "thing in the fridge" does not discern bulky produce from imperceptible molecules, it will not count as a legitimate sortal anyway. Yet if the Relative Counter prohibits the above inference, then it seems that she will have to prohibit the above sort of inference *across the board* (i.e., disallowing it even when counting predicates are not involved, as in (6) to (7)), or else she will only disallow it when counting predicates are involved, which would be suspiciously ad hoc).

Yet perhaps a relative counter would respond as follows: "I would allow the inference from (8) to (9), and, indeed, I would allow the truth of (9) in cases where context provides us with the relevant sortal. In most cases, when (9) is uttered, it is pragmatically understood which sortals or kinds we are to have in mind. It is only in cases where the context is not specified, that (9) is either trivially true or else undefined (or illegitimate)."[34]

Speaking as the relative counter does for now, I will grant that oftentimes context does determine which sortals or kinds we have in mind. In fact, I had said at

[34] Thanks to Bill Lycan for raising this response.

the beginning of section 3.1 of this chapter “that we sometimes *do* give answers to unqualified *how many?* questions can be explained, perhaps, by the fact that the sortals we are interested in are often implicit or pragmatically understood.” So even *I* will grant that context often makes sentences such as (9) acceptable by the relative counter’s own lights. But the point I am making above is that (9) *always* follows from a sentence such as (8); it is simply a matter of logic. And (9) follows validly, such that a relative counter *cannot* then claim that (9) is (out of context) either trivially true or undefined. Sentence (8) is adequately captured by P1 above. P1 contains the sortal “bottle of beer” via the predicate “is a bottle of beer”, which is represented by “B”. By the rules Instantiation, &Elimination, and ∃Introduction, we can then get from (8) to (9), *independent of any context or sortals*. So recourse to context will not help the relative counter with this objection.

3.2.3 Third Worry: Conceivability

Finally, a third problem facing the Relative Counter is the following. At the beginning of this chapter, I had stipulated that you are extra-emprically gifted. You can ‘see’ the parts of things *all the way down*, as it were.[35] If you do not think that this is powerful enough, then imagine that you are an omnipotent being. Surely one of the powers you will have *qua* omnipotent being is the ability to see everything—no matter what its category. You will have the ability to see every *thing*. So long as it qualifies *as a thing*, you should be able to see it. And if you can see it, you should be

[35] See also: Benardete (19??), and his “metaphysical microscope.”

able to count by it.[36] If the world is at rock bottom a heap of mereological simples, then you should be able to count them all up, one by one. It also seems that you would be able to count by mereological sums, and parts, and wholes—all of the things that the relative counter would insist we can*not* count by.

I do not mean for this to be mere fist-pounding and foot-stomping; and I do not mean to be (although perhaps I am) begging the question against the relative counter.[37] This is rather a point about what is possible and what is not. At the beginning of the chapter I had asked you imagine that you could 'see' everything. And assuming a connection between conceivability and possibility, this was supposed to convince us that it is possible for one to 'see' everything, all the way down, even down to the smallest mereological simple. But if one grants me this, then it seems an easy step from there to just *count all of the simples up*. Imagine: you are extra-empirically gifted. You can *see* all of the mereological simples that make up all of the world. OK. Now that you've got them all in your line of sight, and imagining that you have all of the time in the world, can't you start counting them up? What's to prohibit you from doing so? Are there too many? I've said you had all the time in the world! And how would you be able to know that there are too many anyhow, if you claim that there are too many of them to count up? The idea is that either it is possible for you to see everything all the way down or not. But if it is possible, then there seems to be no reason in principle why you can't count by the basic elements that there are, if there are any. But the relative counter cannot say this since she

[36] In principle, at least.

[37] Thanks to Adam Sennet for raising this point.

does not think that ‘mereological simple’ is a legitimate sortal. But then she will have to say that it is not possible for us to see the world all the way down, which is quite a bullet to bite. For it certainly seems possible that we could be so extra-empirically gifted; there is no apparent incoherence, anyway, about such an idea.

Now, true, if we were so gifted, our answer to questions such as *how many mereological simples are there?* or *how many mereological sums are there?* or *how many parts are there?* or *how many halves are there?* might be tricky, since some parts might be identical to another part (think of the top half of this piece of paper and the bottom half (2 parts) which are identical to the whole sheet of paper (1 part)), and some mereological sums (e.g., the sum of the northern hemisphere and the southern hemisphere) might be identical to another (e.g., the mereological sum of the earth and itself), etc. But this just seems to suggest that sometimes a non-unique answer is needed such as: “there 24 parts and 12 parts and 2 parts, and the 24 parts are identical to the 12 parts, which are identical to the 2 parts” or “there are 2 sums and 4 sums and 1 sum, and the 2 sums are identical to the 4 sums, which are identical to the 1 sum.” It does *not* seem to suggest that counting by general ‘sortals’ such as ‘thing’, ‘part’, ‘mereological simple’, ‘mereological sum’, is impossible; rather, it is just that our answer to how many of these things there are is decidedly more complicated than we may have first supposed.

So, contrary to what the relative counter would claim, it seems we *can* count by whatever ontological entity qualifies *as an ontological entity*, in which case ‘thing’, ‘part’, ‘mereological sum’, etc., would all be eligible as countable kinds.

3.2.4 Lesson Learned

In spite of its initial intuitiveness, then, Relative Counting does seem to have some substantial worries. Again, I do not mean to suggest that these problems are insurmountable, but they are worrisome enough for me to want to reject the view here. Or, at least, if there is another view of counting that avoids these worries, yet can still accommodate all of our commonsense intuitions about counting, then we should prefer this to Relative Counting.

And, as I said at the outset of section 3, there *does* seem to be something right about relative counting. In particular, it does seem that once we have recognized that the object(s) in front of us can be considered as one among many different sorts of things—e.g., as cards, decks of cards, sets of suits, etc.—then asking for or expecting a flat-out count of the thing(s) in front of us does seem confused, if not down-right impossible; our counts about things in the world are often complicated and non-unique. That is, they do not usually yield a unique numerical value without qualifications, whereby "unique numerical value without qualifications" means a flat-out count such as 'one' or 'two' etc., but not 'one and two, and the one is identical to the two', etc. Rather, our counts often involve several numerical values, together with some identity statements.

To see this, recall the task asked of you at the beginning of this chapter: to count up all of the things in your room right now. Or start small and count up all of the things in your pocket. As soon as you realize that some of things (e.g., millions of metallic bits) make up some of the others (e.g., quarters), then you realize that only a complex, non-flat-out answer will be appropriate: “There are five million things and four things and one thing, the five million are identical to the four, which are identical to the one.” Etc.

This does not mean that there is not *an* answer to the question *how many things are there?*, and it doesn’t mean that the answer is somehow indeterminate. But it does mean that the answer won’t be a single numerical value[38]. There will always be a maximum to the number of things there are—the number of simples, say—and there will always be a minimum—one mereological sum, say. And then there will also be all of the identity statements that hold between everything that is between the upper and lower bounds. For example, according to relative counting, we may have in front of us 1 deck of cards, which is identical to 4 sets of suits, which is identical to 52 cards. And let imagine for now that that’s all there is. If I ask *how many things there are in front of us?*, then the answer will be something like: there are 52 cards, and 1 deck, and 4 sets of suits, and the 52 cards is identical to the 1 deck, which is identical to the 4 sets of suits.” So there *is* an answer to the question *how many*?, it’s just that the answer is slightly more complicated than we may have first suspected. And *this* is what seems right about relative counting.

But what goes for cards and decks and sets of suits, etc., I want to argue, goes for simples and mereological sums as well. Imagine a world with 2 simples. The two simples are identical to one mereological sum. Never mind for now whether ‘simple’ and ‘sum’ qualify as sortals or not. We *should* be able to count up how many

[38] Except in the sad, lonely world that contains just one mereological simple.

things there are, even if the story is complicated, and we think that the two simples are identical to the mereological sum, for example. Analogous to the card/deck case, we should be able to say something like ‘there are two simples and one sum, and the two simples are identical to the one sum’ in answer to a question such as *how many things are in this world?*’ True, there may not be a single numerical value; we can’t say ‘one’ or ‘two’ or ‘three’ and be right. But that’s because the metaphysical facts are more intricate than we may have first supposed. Even so, there *is* a determinate answer, albeit a slightly complicated one.

This is exactly what I think Plural Counting can capture. My hope is that I can show how Plural Counting inherits the intuitive benefits of Relative Counting, while avoiding the troubles that seem to accompany any view that relies heavily on sortals or kinds as Relative Counting does.

3.3 Plural Counting (Again)

So let us return to the question posed at the end of section 2.2: how does a Plural Counter, if she is utilizing a sentence such as (5), take a *count*?

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

I suggest that she borrow a bit from each of Logic Book Counting *and* Relative Counting. From Logic Book Counting, she will take the ability to *singularly* existentially quantify over some objects, together with the identity and non-identity claims about those objects. Only instead of using Logic Book Counting to range over objects in our usual domain—the universe—I suggest she use it to range over the distinct variables in her singular/plural hybrid identity statements.

For example, let us consider again our quarter example. You have two quarters in your pocket, which make up one fifty-cent grouping. The CI theorist wants to claim that, even though it is true that the one fifty-cent grouping is not identical to any one of the quarters, nonetheless the one grouping is identical to *both* of the quarters, *taken together*. I suggested that she express this by using a hybrid identity claim, as demonstrated by sentence (5). The distinguishing identity claim that falls out of (5) is: $z =_h x,y$.

Notice that we can take such a statement and count—i.e., Logic Book Count—all of the variables on either side of the identity predicate. 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 let us 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 note that, in this particular example, we never get a count of *three*.)

Now, due to the simplicity of the example, counting the variables is a relatively uncomplicated matter. But let us imagine that you now have three quarters in your pocket. And suppose we are interested in figuring out how many things there are in your pocket, according to a Plural Counter. The first step would be to quantify over all of the individual items in your pocket (for simplicity, let us assume that the quarters are simple—i.e., they have no parts, no right and left half, etc.), and express all of the identity and non-identity relations that a CI theorist accepts.[39] We will want a statement that quantifies over all three quarters, *x*, *y*, *z*, and all three sums of pairs of quarters, *w* (the pair of *x* and *y*), *v* (the pair of *y* and *z*), *u* (the pair of *x* and *z*), and the mereological sum of all three quarters, *t*. This will give us a (messy!) statement such as (10):

(10) $\exists x \exists y \exists z \exists w \exists v \exists u \exists t(Px \,\&\, Py \,\&\, Pz \,\&\, Pw \,\&\, Pv \,\&\, Pu \,\&\, Pt \,\&\, x \neq_h y \,\&\, x \neq_h z \,\&\, y \neq_h z \,\&\, w \neq_h x \,\&\, w \neq_h y \,\&\, w \neq_h z \,\&\, w =_h x, y, z \,\&\, v \neq_h w \,\&\, v \neq_h x \,\&\, v \neq_h y \,\&\, v \neq_h z \,\&\, v =_h x, y \,\&\, u \neq v \,\&\, u \neq_h w \,\&\, u \neq_h x \,\&\, u \neq_h y \,\&\, u \neq_h z \,\&\, u =_h y, z \ldots \&\, t =_h x, z)$.

The important and distinguishing identity statements—i.e., those identity statements that wouldn't fall out of usual Logic Book Counting, such as x = x, etc.—that fall out of (10) are:

$w =_h x,y,z$
$v =_h x,y$
$u =_h y,z$
$t =_h x,z$

[39] For simplicity, I am ignoring overlapping sums.

Once we have extracted these hybrid identity statements, we can then begin by (Logic Book) counting the variables on the left-hand side of the hybrid identity symbol, and then count the variables on the right-hand side. Notice that we will get a minimum count of one, and a maximum count of three. But we never have more than three variables on either side of a hybrid identity predicate.

In this way, then, the Plural Counter is utilizing our method of Logic Book Counting, but only at the level of variables. We still have yet to show how a count of variables could yield a count *simpliciter* of object in our domain. For this, I suggest the Plural Counter borrow a technique used by the Relative Counter: the Plural Counter should borrow the intuitive procedure of allowing more complicated answers to questions such as *how many?*

So, for example, we might take a statement such as (5), logic book count all of the variables on either side of any of the identity statements that fall out of (5), and produce a count such as: "there is one thing and two things, and the one thing is identical to the two things." The Plural Counter grants (in this case) that there is at least one thing, and also that there is at most two things. But she also endorses an identity claim that cannot be ignored in our count. Thus, similar to the relative counter, she will deny that there is a flat-out, singular numerical value. Rather, she will claim that there is one of something, and two of some other things, but that in addition, the one thing is identical to the two things. Thus, her answer to *how many?* in this case will reflect this, and be something like: there is one thing and two things, and the one thing is identical to the two things.

In the case of a more complicated example such as (10), the answer would again be more complicated than one might have first supposed: “there is one thing and two things and three things, and the one thing is identical to the two things, which is identical to the three things.” Notice that because the answer *includes* the hybrid identity claims that the Plural Counter accepts, we eliminate confused cases of double counting whereby someone might think there is one and two and three things, and then would *add all of these things up*, yielding a total of six things. This would be just as illegitimate as thinking that sitting in front of us is one deck of cards and fifty-two cards and four complete sets of suits, yielding a total of fifty-seven things in front of us, etc.

To show that this is not unintuitive, imagine that you are tempted by the Relative Counter and understand what she means when she says something like “one deck is identical to fifty-two cards.” You understand how it could be that one thing is identical to many when you affix sortals such as ‘deck’ and ‘cards’ to numerical predicates such as ‘one’ and ‘fifty-two’, respectively. But you also understand existential generalization: if there is one deck in front of you, then there is one thing in front of you; if there are fifty-two cards in front of you, then there are fifty-two things in font of you. Likewise, if you understand the identity statement “one deck is identical to fifty-two cards,” then you understand, via existential generalization, how one *thing* can be identical to fifty-two *things*.

In this way, Plural Counting can borrow the Relative Counter’s strategy of having non-brute count answers that include the hybrid identity claims she accepts.

Yet the Plural Counter has the added advantage of avoiding a reliance on sortals or kinds, or any of the complications that having such a commitment brings.

3.4 Back to the Counting Objection

This chapter began with a counting exercise: you were to count up all of the things in your room. This exercise was intended to motivate a response to Van Inwagen's Counting Objection to CI. Recall that his objection was to imagine that there is one big parcel of land, divided neatly into six smaller-parcel parts.[40] He then argues,

> Suppose that we have a batch of sentences containing quantifiers, and that we want to determine their truth values: ∃x∃y∃z(y is a part of x & z is a part of x & y is not the same size as z)'; that sort of thing. How many items are in our domain of quantification? Seven, right? That is, there are seven objects, and not six objects or one object, that are possible values of our variables, and which we must take account of when we are determining the truth value of our sentences.[41]

The idea was that given how we usually quantify over objects in the world—i.e., with a singular existential quantifier—then there will be no way to quantify over mereological sums without *adding* to the number of things in our ontology. And if we are adding to the things in our ontology when we accept mereological sums, then mereology is *not* ontologically innocent.

[40] Van Inwagen assumes that the smaller parcels are simples, and ignores (for brevity's sake) many of the overlapping parts.

[41] Van Inwagen, Peter 1994: 213.

We can now see that an appeal to Plural Counting will easily dodge the Counting Objection. For the Plural Counter does not count by singular existential statements and singular identity and non-identity claims. She counts by plural terms and variables, uses a hybrid identity predicate, '$=_h$', and Logic Book counts at the level of variables. So, for instance, in van Inwagen's (or Lewis's or Baxter's) land parcel example, the Plural Counter would existentially quantify over all six parcels of land, and the mereological sum of the six parcels (for simplicity, let us ignore for now all of the pairs and triples and any other non-overlapping or overlapping sums), to yield (11):

(11) $\exists x \exists y \exists z \exists w \exists v \exists u \exists t(x \neq_h y \ \& \ x \neq_h z \ \& \ x \neq_h w \ \& \ x \neq_h v \ \& \ x \neq_h u \ \& \ x \neq_h t \ \& \ y \neq_h z \ \& \ y \neq_h w \ \& \ y \neq_h v \ \& \ y \neq_h u \ \& \ y \neq_h t \ \& \ z \neq_h w \ \& \ z \neq_h v \ \& \ z \neq_h u \ \& \ z \neq_h t \ \& \ w \neq_h v \ \& \ w \neq_h u \ \& \ w \neq_h t \ \& \ v \neq_h u \ \& \ v \neq_h t \ \& \ u \neq_h t \ \& \ t =_h x,y,z,w,v,u)$

(11) expresses exactly what the CI theorist thinks is going on with the parcels of land: there are six smaller parcels, *x*, *y*, *z*, *w*, *v*, *u*, that make up one larger parcel, *t*, and the six are identical to the one, which is expressed by the identity claim '$t =_h x,y,z,w,v,u$' In order to get a count, the Plural Counter takes as her domain the right hand side of this identity claim, and then the left hand side of this identity claim, and then logic book counts all of the variables in these domains, separately:

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

Right-hand-side Domain: $\exists x \exists y \exists z \exists w \exists v \exists u\ (V_R x \ \& \ V_R y \ \& V_R z \ \& \ V_R w \ V_R v \ \& \ V_R u \ \& \ x \neq y \ \& \ x \neq_h z \ \& \ x \neq_h w \ \& \ x \neq_h v \ \& \ x \neq_h u \ \& \ y \neq_h z \ \& \ y \neq_h w \ \& \ y \neq_h v \ \& \ y \neq_h u \ \& \ z \neq_h w \ \& \ z \neq_h v \ \& \ z \neq_h u \ \& \ w \neq_h v \ \& \ w \neq_h u \ \& \ v \neq_h u) \ \& \ \forall x \forall y \forall z \forall w \forall v \forall u \forall s(V_R x \ \& \ V_R y \ \& \ V_R z \ \& \ V_R w \ \& \ V_R v \ V_R u$

$\& V_R s \rightarrow (s =_h y) \vee (s =_h x) \vee (s =_h z) \vee (s =_h w) \vee (s =_h v) \vee (s =_h u))$

In the first case we get a count of one, and in the second, six. So in answer to the question *how many parcels of land are there?*, the Plural Counter would answer something like: there is one parcel of land and six, and the one is identical to the six. Thus, we never get a count of seven, as van Inwagen claims.

And if the story gets more complicated—if we are counting all of the sub-parcels of land, for example—then the Plural Counter can express this as well. For she will claim that there are some identity claims such as $x,y =_h t$ and $z,w =_h r$, etc., and then we would get an answer such as: there are six things and five things and four things and three things and two thing and one thing, and the six things are identical to the five things, which are identical to the four things, …, which are identical to the one thing. But in such a case, we *still* never get a count of more than six (or a count of less than one). And so the Plural Counter can dodge the Counting Objection.

To push the point more visibly, we can put Van Inwagen's Counting Objection as follows[42]:

(A) Sentence (1) is true.
(1) $\exists x \exists y \exists z (Px \& Py \& Pz \& x \neq y \& x \neq z \& y \neq z)$
(B) If (A), then there are three things in front of us.
(C) If there are three things in front of us, then the (two) quarters are not identical to the (one) fifty-cent grouping.
(D) So, the quarters are not identical to the fifty-cent grouping.

[42] Thanks to Ted Sider for extensive discussion here.

Van Inwagen endorses (A)-(D), which is how he gets the conclusion that CI is false. I reject premise (B). I claim that we may *think* that B is true because of Logic Book Counting (LBC). But LBC is not the correct way to count; Plural Counting (PC) is. But if PC is true, then B is false. And so the argument against CI doesn't work.

Now one might argue against me as follows: Van Inwagen assumes that LBC is correct in order to endorse argument A-D and show that CI is false. You claim that LBC is incorrect, and argue for PC instead. But in your argument against LBC, you claim that it does not accurately reflect the world because (e.g.) there are some many-one identity relations that it does not account for. In other words, you seem to be saying that LBC is incorrect because of its failure to capture the world *if CI is true*. So it seems that you are presupposing CI in your defense of a theory of counting, which will ultimately factor in an argument for the falsity of a premise (premise (B)), which is an argument *against* CI. So aren't you just begging the question against yourself?

I have two responses. First, Plural Counting (PC) does not presume anything about the composition relation. Sure, one reason to endorse PC may be that there are some many-one identity relations out in the world, and that our theory of counting should reflect this. But this does not say that these many-one relations are the composition relation, or that composition is identity, or anything about parts and wholes, etc. PC is silent about which many-one identity statements are true, if any. Indeed, PC doesn't even claim that there *are* in fact any many-one relations at all.

But *if* there are, then PC can represent them and LBC cannot. Much like adopting a plural logic, PC's advantage is all about it's expressive power, not it's commitment to or presupposition of a particular view about ontology.

Second, while PC does not presuppose CI, van Inwagen's assumption that LBC is the correct way to count *does* presuppose the falsity of CI. So his argument against CI has no traction, and CI can meet Van Inwagen's objection.

Moreover, we can now begin to see is how it is that CI is ontologically innocent (as far as counting goes anyway; other objections will be dealt with in the following chapters). She embraces a method of counting that allows her to maintain the hybrid identity claims that she accepts, as well as avoid the complications of relying on sortals (as the Relative Counter must do).

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

[1] Lewis 1991:87

[2] McKay 2006: 38.

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:

> **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

[3] See Chapter 1, section 5.

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 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

[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).

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—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:
>
> Fx
> $x = y$
> ————-
> Fy

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.

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

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 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, 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

[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.
[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.

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, 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:

[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.

(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.

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 $x \neq_h y_1, \ldots, y_n$.

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

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 $a \neq_h b,c$ 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) $\exists x \exists y \exists z(Px \mathbin{\&} Py \mathbin{\&} Pz \mathbin{\&} x \neq y \mathbin{\&} x \neq z \mathbin{\&} y \neq z)$

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]

[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

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*.

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*

---

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.

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):

(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

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

[18] Kaplan and Geach, e.g.

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 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):

[19] See Boolos 1984; Rayo 2002.

[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.

(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.

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 $\mathrm{S}Xy$ = 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

[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.

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

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] (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]

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[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 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

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.

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

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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.

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.

(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,

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

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

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

[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.

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):

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

[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 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).

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:

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

(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.

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.).

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

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 $\exists x$ $\exists y$ $\exists z$, …$\exists n$, etc., and then form a concatenated plural term such as "*x*,*y*,*z*,…*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, M*Xy* = *X* are moshing in *y*):

(26) $\exists X \exists y$ (HX & Py & MXy)

[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'.)

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

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, MXy = 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

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

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) $\exists x \exists y \exists z(Px \ \& \ Py \ \& \ Pz \ \& \ x \neq_h y \ \& \ x \neq_h z \ \& \ y \neq_h z \ \& \ z =_h x,y)$

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: $\exists x \ (V_L x \ \& \ \forall x \forall y(V_L x \ \& \ V_L y \rightarrow x=y))$

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

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

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

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

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[35] Previously, in Ch. 1.

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 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 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

[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.

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.

[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.

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 (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] 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) $b =_h A$
(36) Vb
(37) $\exists n\ (A =_h x_1, \ldots, x_n\ \&\ Mx_1\ \&\ {\sim}Vx_1\ \&\ Mx_2\ \&\ {\sim}Vx_n\ \&\ldots\&\ Mx_n\ \&\ {\sim}Vx_n)$
(38) ~VA
(39) VA

[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).

[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.

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 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 & $\sim Vx_n$ &…& 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 *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,

[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.

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

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

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. 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.

[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).

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*.

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

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

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 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

(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.

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[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.

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*. 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,

[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.

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 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,

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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.

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:
>
> $$\frac{\begin{array}{l}\mathrm{F}x \\ x = y\end{array}}{\mathrm{F}y}$$

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."

[49] Thanks to Ted Sider on this section.

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

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 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]

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[51] Sider p. 57.

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

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.

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.

(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

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

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*,

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

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 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:

$$\text{(55) } \exists X \exists n\ (\mathrm{N}n\ \&\ X =_h (x_1, \ldots, x_n)\ \&\ \mathrm{C}x_1\ \&\ \mathrm{C}x_2 \ldots \&\ \mathrm{C}x_n\ \&$$
$$\forall x_i \forall y\ (\mathrm{A}x_i y\ \&\ \mathrm{C}y \rightarrow \exists j \leq n\ (y = x_j\ \&\ x_i \neq y)))$$

(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 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

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

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*.

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

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

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

[57] Thanks to Jason Bowers for this example.

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:

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

(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:

$$(56^*)\ \exists X \exists n\ (Nn\ \&\ X =_h (x_1, \ldots, x_n)\ \&\ Ux_1\ \&\ Ux_2 \ldots \&\ Ux_n\ \&\ M =_h X\ \&\ \exists i\ (p =_h x_i)$$

This says that there are some things, *X*s, and there is some number, n, such that the Xs are (hybrid) identical to $x_1, \ldots, x_n$, 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.

Chapter 4

Constitution, Lump Theory, Mereological Essentialism and The Modal Objection

1. Introduction: The Modal Objection and Constitution

In Chapter 2, I explained how a CI theorist could defend herself against Van Inwagen's Counting Objection. In Chapter 3, I explained how a CI theorist could defend herself against four other kinds of objections: (i) those that appeal to the Indiscernibility of Identicals, (ii) those that appeal to the Principle of Ontological Parsimony, (iii) those that appeal to the Substitutivity of Co-referential Terms, and (iv) those that appeal to technicalities involving Plural Logic—in particular, the details of predicates such as *is one of.* Admittedly absent from these objections was what I have previously called the Modal Objection.

The Modal Objection runs as follows: Imagine that your hand is composed of millions of molecules. If CI is true, then your hand is simply *identical* to the millions of molecules. Yet there seems to be a clear difference-making feature between your hand and the molecules—namely, certain modal properties. Your hand could survive losing a few molecules here and there, but the molecules could not. Moreover, your hand could not survive being thrown in a blender, but the molecules composing your hand presumably could (assuming that we are dealing with a very precise and discerning blender).[1] 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. So CI must be false.

This objection is related to certain other puzzles involving *constitution*. Imagine that we have before us a lump of clay that is sculpted into a statue; we typically say that the statue is *constituted* by the lump of clay. Yet many would resist claiming that the statue is (identical to) the lump of clay, because the statue and the lump of clay differ in certain properties. In particular, they differ in their modal properties: the statue could have had some of its clay bits replaced (by gold, or other clay bits, e.g.), but the lump of clay could not; and the lump of clay could have been sculpted into an ashtray, but the statue could not. Yet if the statue has a property that the lump of clay does not—*viz*., could survive a replacement of parts—and if the lump has a property that the statue could not—*viz*., could survive being sculpted into an ashtray—then by the Indiscernibiltiy of Identicals, the statue is not identical to the lump of clay. And so, for reasons parallel to the Modal Objection against the claim that *composition* is identity, we have reason to think that *constitution* isn't identity either.

Up until now, I have only been dealing with composition, not constitution. So one might wonder why I am changing the focus of my discussion now. This is

[1] 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).

because I think that the answer to the Modal Objection dovetails nicely with solutions to *constitution* puzzles. This is in part because I think there is no genuine distinction between the two kinds of puzzles, or the two kinds of relations. Composition as identity (CI), I will argue, leads to a collapse of the distinction between the composition and constitution relation, and thus suggests that *constitution* is identity as well.[2]

Many have thought that composition and constitution are distinct relations, and hence, the puzzles that involve one are unrelated to the puzzles that involve the other. In recent philosophical literature, for example, it is often supposed that puzzles of composition are one thing, and puzzles of constitution are another.[3] In certain footnotes of this thesis, even *I* have adopted (albeit temporarily) one purported difference between composition and constitution: that composition is the relation between one thing and many (the parts and the whole, e.g.), whereas constitution is the relation between one thing and another (a statue and a lump of clay, e.g).[4]

I will argue below, however, that we have little reason to think this is difference-making feature between composition and constitution, *independent* of the truth of CI. Moreover, if CI is true, then we have even less reason to think that there is a distinction between composition and constitution.

[2] Thanks to Adam Sennet for helpful discussion on this topic.

[3] Sider (2001, 2006); Van Inwagen (1990); Rea (1995); Thompson (1998); suggested in Wiggins (1968), Wiggins (1980); et. al.

[4] See Chapter 1, footnote 17; Chapter 2, section 1; etc.

Yet if composition and constitution collapse—if composition and constitution are indeed identity—then it seems that Mereological Essentialism follows as a consequence. Mereological Essentialism is the thesis that all objects have their parts necessarily. If the relation between (e.g.) your hand and its parts, or the relation between (e.g.) a statue and a lump of clay, is identity, then by the necessity of identity, the hand and the statue must have all of their parts essentially.[5] This worry is the contrapositive of the Modal Objection: the Modal Objection claims that the parts and whole differ in their modal properties, and so CI can't be true. The Mereological Essentialism worry claims that *if* CI is true, then the parts and wholes cannot differ in their modal properties. And so if the parts cannot survive a loss of parts, neither can the whole; thus, wholes (i.e., any object made of parts) must have their parts essentially.

Below, I first aim to show that we have little reason to think that there is a principled difference between the composition relation and the constitution relation. In the course of this discussion, I will discuss Mereological Essentialism, and whether it follows from CI. I will then present four (traditionally labeled) *constitution* puzzles—the Marriage Paradox, the Ship of Theseus, Tib and Tibbles, and Goliath and Lumpl—and will show how a CI theorist might respond to them to them in a novel way,[6] by embracing Mereological Essentialism and a

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[5] This argument as presented here is much too quick. I will lay it out more carefully in the sections that follow.

[6] While the view I am endorsing isn't originally mine (see the following footnote), the application of it to the constitution puzzles as presented in this chapter, and its connection to my defense of CI, is (as far as I am aware). Moreover, as far as I am aware, no one has defended this view as one we should take seriously, as I argue in this chapter that we should. So this is what I mean when I say that the CI theorist can respond to constitution puzzles "in a novel way."

'lump', or 5-dimensional, theory of objects.[7] This lump theory of objects also has the distinct advantage of being able to defend the CI theorist against the Modal Objection, thus completing our comprehensive defense of CI. I will dedicate Chapter 5 to discussing some advantages of CI—advantages that alternative views of composition do not enjoy.

2. Composition and Constitution: Deflating the Difference

Some maintain that there is a difference between composition and constitution. Of those who maintain this difference, there are some who do so merely by stipulation, and those who do so because they believe there is a principled difference. Wiggins, Rea, and Thompson, for example, all treat the puzzles of constitution as distinct from puzzles of composition, without much justification. [8] It is by way of example, and by the way that the puzzles have been taxonomized in contemporary literature, that one might conclude that composition and constitution are two difference relations. Sider (2007), on the other hand, explicitly maintains that the difference between composition and constitution is a principled one—the composition relation is many-one, whereas the constitution relation is one-one.[9]

[7] See Weatherson, "Stages, Worms, Slices and Lumps" (MS) http://brian.weatherson.org/swsl.pdf. To my knowledge, he is the first to coin the phrase 'lump theory' to the view I will be endorsing in this chapter, although he attributes this view to Kaplan (1979), which is a paper that was first presented in 1967.

[8] Wiggins (1968), Rea (1995), Thompson (1998). Also: Winston, et. al. (1987), Iris, et. al. (1988), and Gristl and Pribbenow (1995).

[9] Sider (2007:55, ftnt 14)

I think that either of these ways of distinguishing composition and constitution—by way of mere conventional stipulation, or in terms of the whether the relata are many-one or one-one—are inadequate means by which to distinguish composition and constitution.

To see this, it will first behoove us to note that throughout the literature on the metaphysics of objects, it seems to be a matter of convention and trend, and not of kind, which puzzles get labeled constitution puzzles rather than composition. Wiggins, Rea, and Thompson, for example, all seem to think that certain puzzles are of one kind rather than another, simply in virtue of the fact that they classify certain puzzles (such as Goliath and Lumpl and Tib and Tibbles) as puzzles of constitution, not of composition.[10]

But this is only a recent trend, and not a consistently recent one at that. Aristotle (Metaphysics, Δ, 1023b), for example, seems to have collapsed composition and constitution puzzles into one category: puzzles about parthood.[11] Or, if he did think that there was a difference, it was not a very significant one. He claims [1041b10-15]:

> "In the same way that an aggregate of parts does not make up a single being, nor do quantities of matter by themselves constitute something. Just as a syllable is more than the aggregate of letters, so is flesh something more than fire and earth."

Now, true, in this passage Aristotle is endorsing a view that is a clear denial of CI. But the point is that he is treating composition ("…an aggregate of parts does not make up a single being…") and constitution ("…nor do quantities of matter by

[10] Wiggins (1968), Rea (1995), Thompson (1998).

[11] Aristotle (Metaphysics, Δ, 1023b).

themselves constitute something.") as analogous relations. In fact, earlier Aristotle formulates a question akin to van Inwagen's Special Composition Question, but in terms of constitution. Recall that van Inwagen's Special Composition Question is: when is it the case that some parts, the *p*s, *compose* a whole?[12] Aristotle, on the other hand, asks: when is it the case that some quantity of matter, *m*, *constitutes* a unified thing.[13] If these are different questions according to Aristotle, they do not differ by much, and they receive the same answer: some parts, such as flour, eggs and sugar, or some matter, such as a lump of clay, compose or constitute an object when they share "in one form."[14] And while Aristotle's *answer* to the question(s) is not entirely relevant here, what is important is that he gives the same answer to both, indicating that he thought that composition and constitution were very similar—if not the same—relation.

Moreover, in the contemporary literature, puzzles such as Tib and Tibbles (explained below) are classified as puzzles of constitution by some, but puzzles of composition by others. Van Inwagen (1990), for example, uses a variation of the Tib and Tibbles puzzle to argue against the Doctrine of Arbitrary Undetached Parts, and to support his eliminative view of *composition*. That is, he treats a (purported) puzzle of constitution as a puzzle of composition, and draws a radical thesis about the composition relation (namely, that there isn't any such thing) from it.[15] Heller (1984) uses a similar puzzle to argue for his four-dimensional

[12] Peter van Inwagen, *Material Beings*, p. 30.

[13] Metaphysics 1041b1-10.

[14] Aristotle, *ibid*.

[15] Peter van Inwagen, *Material Beings*.

view of objects, where objects are composed of parts, both spatial and temporal. Thus, he—like van Inwagen—treats a (purported) puzzle of constitution as a puzzle of composition, and draws a radical thesis about objects (namely, that there aren't any) from it.[16]

So, often in the literature, while puzzles of constitution are sometimes treated separately from puzzles of composition, no justification is given for doing so; the difference between composition and constitution is presupposed but never explained. Moreover, the presupposed taxonomy is not even consistently uniform throughout the literature, both in the past and in contemporary literature. So if the only reason we have for thinking that there is a distinction between composition and constitution is mere precedence in the literature of making said distinction, and if such precedence is not even consistently uniform, then this undercuts the motivation for thinking that there is a distinction in the first place. Our default position should be that we only make distinctions when we have adequate reasons for doing so; otherwise, we might wind up positing distinct relations willy-nilly, violating our theoretical principles.[17]

Second, as we shall see below, all of the puzzles of constitution can be adequately recast as puzzles about composition. For every puzzle that we give that is purportedly a puzzle of constitution, as opposed to composition, (e.g., Goliath and Lumpl), I will show how we can easily recast it, without loss of metaphysical significance, as a puzzle about composition, even without

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[16] Mark Heller, "Temporal Parts of Four-Dimensional Objects."

[17] See Chapter 1, section 5.

assuming that CI is true. If this is right, then this will also weaken support for the claim that composition and constitution are distinct relations.

Third, let us address the claim that the difference between composition and constitution is a principled one—e.g., that composition is a many-one relation while constitution is a one-one relation. This claim can be doubted for at least two reasons, one of which is independent from the truth of CI, one of which is not. First, many of the puzzles that are traditionally hailed as puzzles of material constitution are puzzles about many-one relations (e.g., the Marriage Paradox, the Ship of Theseus, Wiggins' tree and cellulose example, all of which will be discussed below). And some puzzles that are traditionally hailed as composition puzzles are concerned with one-one relations (e.g., Unger and van Inwagen's discussion of the Body/Body-minus puzzle). This is a separate point from the one made above: it isn't just the fact that certain puzzles of constitution have been inconsistently treated as puzzles of composition, and vice versa; it isn't a matter of inconsistent, stipulated taxonomy. Rather, it's the idea that *given* the presumed principled difference—e.g., that composition is a many-one relation, whereas constitution is one-one—that even this difference is not honored by the literature.

Michael Rea, for example, in his introduction to *Material Constitution: A Reader*, claims that what is in common with all puzzles of constitution is that "…all of them present us with scenarios in which it appears that an object *a* and an object *b* share all of the same parts but are essentially related to their parts in different ways."[18] This seems to suggest that puzzles of constitution involve a *combination* of many-one relations and one-one relations. On the one hand, there is the relation between an object *a* and its parts, and an object *b* and its parts (which are both many-one relations), and on the other there is the relation between *a* and *b* (which is one-one).[19] Distinguishing composition and constitution in terms of many-one or one-one relations, then, is simply not supported by past or contemporary literature. And if such a principled difference is not supported by the literature, and there is furthermore no independent argument for it, then we lack sufficient reason to think that the principled difference should be upheld. Grounding a distinction in a principle is unhelpful if the principle itself is unsupported.

Yet, second, even if such a distinction *was* supported by the literature, someone who endorses CI should not (and maybe even cannot) embrace such a distinction. Suppose composition is a one-many relation, suppose constitution is a one-one relation, and suppose CI is true. Suppose also that we have a lump of clay that is *composed* of many clay particles (one-many), and a statue that is *constituted* by the lump of clay (one-one). CI claims that the relation between the lump of clay and the clay particles is identity; so the lump of clay *is* the clay particles. By the substitutivity of identity, the statue is constituted by the clay particles, which is a one-many relationship. So, by the supposition that

[18] Michael C. Rea (1997: xvi).

[19] As Rea later explains, just what this relation is between *a* and *b* is up for debate. Some think that the relation between *a* and *b* has to be one of identity (since no two distinct objects can share all of the same parts, e.g.); others think that *a* and *b* are distinct. But whether one thinks *a* and *b* are identical or not, the fact remains that the relation between them—whatever it is—still a one-one relation.

composition is one-many, the statue is composed of the clay particles; thus, the statue is identical to the clay particles.[20] So a CI theorist should not (and maybe even cannot) rest on the difference between composition and constitution as a difference between the relata being one-many or one-one.

Of course, one might think that all of this will lead to pretty counterintuitive results. First, if composition is identity, then it seems we are committed to claiming that all objects have their parts necessarily. Second, if composition and constitution collapse into the same relation—i.e., identity—then it seems we must not only say that all objects have their parts necessarily, but that (e.g.) statues and lumps have the same modal properties. So we will be committed to claiming such absurdities as (e.g.) a statue could survive being molded into an ashtray, or a lump of clay couldn't survive being so-molded; or: a statue couldn't survive a replacement of parts, or a lump could, etc. The absurdity of such claims is a large part of what's motivating the constitution puzzles that I will discuss in detail below.

To see the first point (i.e., that if CI is true, then all objects have their parts necessarily) recall that a classical mereologist is committed to the following axioms: [21]

Transitivity: If x is part of y, and z is part x, then z is part of y.

[20] I will have more to say about this particular example below, in the course of detailing the puzzles.

[21] See Lewis (1991), Yi (1999), McKay (2006), et. al.; this is discussed briefly in Chapter 1 of this thesis.

Uniqueness: If something, x, is a fusion of some things, $y_1, \ldots, y_n$, and something, z, is also a fusion of the y_is, then $x = z$.

Universality: If there are some things, $x_1, \ldots, x_n$, then there is something, x, that is a fusion of the x_is.

And let us suppose that we have a cat in front of us that is composed of a head, h, a body, b, and a tail, t. According to Universality, there is a fusion, f, that is composed of h, b, and t. According to CI, $f =_h h, b, t$. Given the Indiscernibility of Identicals, if $f =_h h, b, t$, then there is no world where f exists and h, b, and t do not; so f has as parts h, b, and t, in every possible world, hence, f has as parts h, b, and t, necessarily. Thus, if $f =_h h, b, t$, then necessarily $f =_h h, b, t$. And similar reasoning will apply to any object whatsoever, if CI is true. But then this is just to embrace mereological essentialism:

Mereological Essentialism: all objects have their parts necessarily.[22]

And mereological essentialism, while exciting for some, is wildly implausible for many.

For starters, mereological essentialism just *seems* flat-out false. We tend to think, most of us, that ordinary objects can lose (at least) small parts over time. Take my office desk, for example. Every day I come into my office and sit at my desk. I have been sitting at it and reading by it and putting books on it and spilling

[22] One might want to claim that there is a difference between an object having its parts *necessarily* and an object having its parts *essentially*. I don't quite feel the pull to make such a distinction, but I do not want to get into this issue here. As we will see below, we can cash out the definition of Mereological Essentialism using world-talk, thus eliminating having to choose between talk about *having parts necessarily* or *having parts essentially*. I hope this will mitigate worries about the difference (if there is one) between necessary parts and essential parts. Also, I hope that such a worry won't interrupt the fact that I have chosen to call the position whereby all objects have their parts *necessarily* ,"Mereological *Essentialism*." I have done this to maintain consistency with terminology already in use in the literature.

coffee on it for over four years. And never once have I thought, as I walked into my office, “Hey! Where the flip did my desk go?” This is because I think that my desk has remained *my* desk over these four years. Sure, I will admit that small portions of it have probably flaked off—tiny molecules get bumped off of it when I brush against it, or when I have to wipe off the spilled coffee, etc. I can admit that my desk has undergone some small changes, and that it has lost some of its original parts. But it is still my desk! And I am not alone: other people think my desk is still my desk, even after all these years, and all the loss of its various (small) parts. And my *desk* is not alone: other people think that *lots* of ordinary objects are the same objects over time and over change. Yet if mereological essentialism is true, then our ordinary intuitions are wildly false. But if this is right, some may argue, then so much the worse for mereological essentialism, and any view which entails it.

In fact, some have explicitly used mereological essentialism as a direct modus tollens against CI. Trenton Merricks, for example, argues that CI entails mereological essentialism, so if one rejects mereological essentialism, then one should reject CI. The implication is that mereological essentialism is such a radical view, that any view—such as CI—which entails it, should be rejected.[23] Van Inwagen also thinks that a commitment to CI carries with it a commitment to (something very close to) mereological essentialism, and that this gives us reason enough to abandon CI.[24] Actually, to be a bit more careful: Van Inwagen

[23] Trenton Merricks, “Composition as identity, mereological essentialism, and counterpart theory” in Australasian Journal of Philosophy, Vol. 77, No. 2, pp. 192-195; June 1999.

[24] See van Inwagen (1981).

thinks that a commitment to Universal Composition (universality) carries with it a commitment to something like mereological essentialism; he doesn't specifically talk about CI. But since a commitment to Universal Composition is assumed by my account of CI, his argument will apply to CI (as I'm defending her here).[25] The important issue, however, is to note that mereological essentialism is often seen as a reason to *reject* CI.

Yet I propose to modus ponens the above sorts of arguments. In what follows, I will argue that mereological essentialism can (and should!) be embraced. I will begin by showing that we already have a commonsense, liberal view about 'parthood,' which will be the first step in accepting mereological essentialism. Then I will endorse a "lump" theory of objects, or 5-dimensionalism: the view that objects are extended spatially, temporally, *and* modally. As we shall see, this move, despite its initial counter-intuitiveness in some ways, is actually amenable to some of our ordinary intuitions about objects in others. Moreover, such a view has the added benefit of providing elegant and novel solutions to the traditional puzzles of constitution.

Before launching into these views, however, let us first take a look at four of the traditional puzzles of constitution. As I do so, I will re-emphasize the points made in this section—namely, that we have little (or no) reason to think that composition and constitution are distinct relations.

3. Four Puzzles of (Material) Constitution

[25] See Chapter 1 section 5.

3.1 The Marriage Paradox[26]

Suppose you have finally decided to marry the love of your life. The two of you exchange vows and promise to be together forever. However, seven years later you come home and find the closets empty of your spouse's belongings, some suitcases missing, and the following note propped up on the bedroom bureau:

> "As we both know, human beings are made up of a collection of skin and bones and tissue and veins and millions and millions of atoms and particles. When we made our marriage vows, there were two distinct collections of particles exchanging vows. However, over the last seven years, those particles have changed: bits of tissue and skin have been replaced by new bits of tissue and skin. In fact, there is not a single particle that makes up me now that is identical with any of the particles that made up the collection of particles that made a promise to you at the alter. Therefore, since the particles that make up me now are entirely distinct from the ones that married you, I am a different human being from the one who married you. Since we are not married, I am out of here. Good-bye."[27]

Understandably, you are heartbroken. But, more importantly, you are feeling duped. Surely *something* must be wrong with the above line of reasoning (otherwise divorce proceedings would be a much swifter process and there would be no need for expensive divorce lawyers). But where did your spouse's reasoning go awry?

Let us discuss a couple of assumptions at play in this puzzle. First, it presupposes the Existence Assumption (EA)—i.e., it assumes that objects such

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[26] Another version of this puzzle is called the Debtor's Paradox, where a borrower can weasel his way out of a debt (and a lender can likewise dodge culpability for the debtor's soon-to-be black eye!). See, e.g., Rea (1997).

[27] Example modified from Rea (1997), Introduction.

as people, or human beings, *exist*. Second, it presupposes the Parthood Assumption (PA)—i.e., it assumes that people or human beings are made of parts, such as bits of molecules and cells and material particles.[28] Moreover, in this particular formulation of the puzzle, it assumes that human beings are *entirely* made up of material parts; there are no souls, for example.[29] It also assumes that a human can gain and lose some of its material parts, that they can survive or endure through time, but that they cannot lose all of their parts and still remain the same object. Finally, the above puzzle appeals to the Indiscernibility of Identicals: it compares the properties of a collection of molecules at one time (the molecules at the time of the exchange of marriage vows) to the properties of a collection of molecules at a later time (the collection of molecules that is writing the note, seven years after the wedding). Since the collection of molecules at one time differs from the collection of molecules at a later time, then by the Indiscernibility of Identicals, the collections are not identical. Thus, the collection of molecules that was standing at the altar is not identical to the one writing the letter 7 years later.

Before moving on to the other puzzles, it is interesting to note that this puzzle is often hailed (in contemporary literature) as a puzzle of constitution, not of composition, even though the relation between the molecules and the human

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[28] See Chapter 1, section 5 for further elaboration on these assumptions. As discussed earlier, both of these are assumptions that some philosophers have denied (Unger, van Inwagen, etc.) but I will not be denying them here.

[29] Indeed, positing souls may be one way out of this puzzle. However, I suspect the puzzle may be recast at the levels of souls, depending on whether one thinks that souls have parts or not (psychological parts, perhaps?). And notice that an appeal to souls to solve this puzzle won't generalize to other versions of this puzzle, e.g. Ship of Theseus, or any puzzle that involves a soulless object, for example.

being is clearly a many-one relation—i.e., the molecules are many, the human being is one. So this is a fine example of where the stipulated taxonomy pulls apart from a more (purported) principled difference between the constitution relation and the composition relation.

Moreover, notice that we can easily recast this puzzle as one explicitly about composition. The puzzle was stated above using the *made up of* relation—one that I believe is neutral between composition and constitution (which we should predict anyway, if it turns out that composition and constitution are the same relation).[30] But notice that absolutely nothing is lost if we were to phrase the puzzle explicitly in terms of the composition relation. We could have easily begun the puzzle as follows: "human beings are *composed of* skin and bones and tissue and veins and millions and millions of atoms and particles," etc. The entire puzzle, in other words, could be rephrased as one about people being *composed* of certain parts, or being *constituted* by certain parts, rather than people being *made up of* certain parts, and the same contradictory conclusion would result. If we can generate the same puzzle using either 'composition', 'constitution', or 'made up of', without any significant loss of meaning, then this should weaken our motivations for thinking that the composition and constitution relation are distinct relations.

3.2 The Ship of Theseus

[30] Also, see Chapter 2, where I propose a counting exercise where we consider some objects that are *made up of* others.

Imagine that there is ship that is made up of just 100 planks of wood, a sail and a mast.[31] In the year 1800, the ship goes out to sea. In an effort to maintain a maximally seaworthy ship, however, the following restoration procedure takes place: every year just one of the planks will be replaced, and then the sail, and then the mask, so that in the year 1902, all of the 102 parts that make up the ship have (gradually) been replaced. Let us call the original ship that left port in 1800, ship A. Let us call the ship that pulls into port in 1902, ship B. And let us ask ourselves the following question: Is ship A identical to ship B?

Here are some reasons why you might think ship A is identical to ship B: first, we tend to think that objects can survive the loss of some of its parts. We tend to have a tolerance, for instance, for small changes over time. We do not think that the loss of one small part of an object results in a loss of that object. If we did, then that would mean that every time a speck of wood flaked off of your desk, or a molecule flaked off of *you*, then your desk and you would thereby cease to exist. So we tend to think that in the case of the Ship of Theseus, our tolerance for small changes will eventually lead us to identify ship B with ship A.

Second, we can imagine that all of the people aboard the ship in 1800, when it sails out to sea, *stay* aboard the ship. We can imagine that these (unusually long-living) sailors never leave the ship, that they say things like "I'm so tired of being on this dang ship" and "How much longer are we going to be sailing on this blasted ship, anyway?", etc. Never do they wake up and think they are on a different ship; the changes in the boards every year has not inclined

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[31] This puzzle is discussed in: Plutarch, *Life of Theseus*, Hobbes (*De Corpore*, II, 7, 2), Rea (1995), Rea (1997), Wiggins (1967), Parfit (1984), Nozick (1982), Kripke (1980), Gallois (1986), (1988), Carter (1987), Chandler (1975), Griffin (1977), Bakker (2002), etc.

them to think that their ship has popped out of existence and a new one has popped up in its place. So, we might conclude, ship A is identical to ship B.

Yet a complication arises when we discover that the discarded boards (and mast and sail) have been collected and assembled over the years.[32] In 1902, then, there is a ship—call it ship C—that is qualitatively identical to ship A, and indeed is made up of all of the original boards (and mast and sail) that ship A was made up of. So now the question before us is: Is ship A identical to ship C?

Here's why we might think so. Ship A and ship C have all of the same parts! There is not any part that ship A had that ship C does not now have. All of the parts are arranged in exactly the same way. There seems to be no difference-making feature that would distinguish ship A from C. So, ship A must be identical to ship C.

But if ship A is identical to ship B (by our first line of reasoning), and ship A is identical to ship C (by our second line of reasoning), then it follows by the transitivity of identity that ship B is identical to ship C. But ship B cannot be identical to ship C, since B and C are clearly *two* ships not *one* (we can imagine them side by side at port, say). Thus, unless we want to endorse some strange metaphysical view whereby a single object can occupy two places at the same time,[33] we cannot claim that B is identical to C. So then one of our above lines of reasoning has gone wrong.

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[32] This complication in the puzzle was first discussed by Hobbes (*De Corpore*, II, 7, 2). For contemporary discussions of this puzzle, see Simons (1987), Wiggins (1968), et. al.

[33] See O'Leary-Hawthorne (1995) "The Bundle Theory of Substances and the Identity of Indiscernibles", and Zimmerman (1997) "Disctinct Indiscernibles and the Bundle Theory," for discussions of bi-located objects.

Notice the parallel between this puzzle and the Marriage Paradox—both of these puzzles are about one thing (a ship or a person) and the parts (boards or molecules) that make them up. As such, both are about a many-one relation, and both should qualify as composition puzzles according to (e.g.) Sider's distinction between composition and constitution. Yet they are not treated consistently as such in the literature. Rea (1997), for example, labels both of these puzzles as puzzles of constitution, not composition. Also, notice that like the Marriage Paradox, the Ship of Theseus puzzle could be easily be recast explicitly as a puzzle about composition simply by making it explicit what the "made up of" relation is. Instead of beginning the argument with a premise such as "imagine a ship that is *made up of* 100 boards, a mast, and a sail, etc.," we could have said: "imagine a ship that is *composed of* 100 boards, a mast, and a sail, etc.," without affecting the puzzle in the least. Or we could have said that the ship was *constituted by* 100 boards, a mast, and a sail, etc. and the puzzle would still be just as puzzling. If the puzzle doesn't change when we swap in 'composed of'' for 'constituted by', or 'constituted by' for 'made up of', etc., then this is some reason to think that these terms are synonymous.

Now, true, there are two seemingly important differences between the Marriage Paradox and the Ship of Theseus. First, the Marriage Paradox involves the identity of people, whereas the Ship of Theseus involves the identity of ships. And one might—and in fact many philosophers do—think that there are significant, metaphysical differences between human beings and ships. Human beings, for example, might have minds, or souls, whereas ships do not. Or human beings might be *alive*, whereas ships are not, which might make all the difference, metaphysically speaking.[34] Second, in the Ship of Theseus puzzle, we have the added complication of having a competitor for identity. We have ship C, the ship that was reassembled from ship A's original parts. One might not think that having a competitor would change the metaphysical facts of the case—if we want to know whether x = y, then x and y are important for our query, but it certainly doesn't matter what the rest of the world is doing!—but others have maintained that it does.[35] So while there are noted similarities between the Marriage Paradox and the Ship of Theseus, there are some differences as well, but none these will affect my claim that constitution and composition are the same relation, or my bigger claim that CI is true.

3.3 Tib and Tibbles[36]

Imagine that we have a cat named Tibbles who is a regular looking and ordinary cat. When we meet him one morning, at t_1, Tibbles looks like a regular cat should, with legs, paws, whiskers, and tail, etc. Shortly after t_1, Tibbles steps outside and goes about his normal cat-like business. Unfortunately, a terrible tragedy befalls Tibbles when he gets too close to a lawnmower. At night, t_2, he

[34] Indeed, this is the line that van Inwagen takes in *Material Beings*. He claims that it is only when something is a living thing that composition occurs. So, for example, the Ship of Theseus is just a bunch of simples arranged ship-wise, but a person can be composed of parts, since composition only occurs when the composed thing is a *living* thing.

[35] See, for example, R. M. Gale (1984) in Wiggins' Thesis (x), *Philosophical Studies*, Nathan Salmon (1982), *Reference and Essence*, R. Nozick (1981), *Philosophical Explanations*, Noonan (1985) in *Analysis* Vol. 45, No. 1, pp. 4-8.

[36] Another version of this puzzle is called 'Body/Body-minus.'

comes back indoors as a tail-less cat. Let us name the name the part of Tibbles that came back—all of Tibbles *minus* his tail—Tib. Now at t_1, it seems that both Tibbles and Tib exist. After all, we could easily paint Tib purple, and see that Tibbles is partly painted purple, while his tail is unsullied. Moreover, it seems clear that Tibbles at t_1 ≠ Tib at t_1. For Tibbles at t_1 has a tail but Tib at t_1 doesn't (in fact, by definition, Tib *never* has a tail), so by the Indiscernibility of Identicals, Tibbles at t_1 ≠ Tib at t_1. But at t_2, Tibbles does not have a tail, and Tib doesn't either. So what, then, is the difference between Tibbles at t_2 and Tib at t_2? If you say nothing, then by the Identity of Indiscernibles, we will have to claim that Tibbles at t_2 = Tib at t_2. But then we will get into trouble by the transitivity of identity. For presumably, Tibbles did not go out of existence from t_1 to t_2—i.e., Tibbles at t_1 = Tibbles at t_2. But Tib did not go out of existence either, for nothing happened to Tib at all! So Tib at t_1 = Tib at t_2. But then we arrive at a contradiction. To see this:

1. **Tibbles at t_1 = Tibbles at t_2** (By commonsense intuition: we don't think that cats go out of existence when they lose their tails).
2. **Tib at t_1 = Tib at t_2** (Nothing happened to Tib at all!)
3. **Tibbles at t_1 ≠ Tib at t_1** (By LL: one has a tail and the other doesn't).
4. **Tibbles at t_2 = Tib at t_2** (Every region occupied by Tibbles is occupied by Tib; "they" have no difference-making feature).
5. **Tibbles at t_1 = Tib at t_2** (By 1, 4, Substitutivity of Identicals).
6. **Tibbles at t_1 = Tib at t_1** (By 5, 2, Substitutivity of Identicals).
7. **Tibbles at t_1 = Tib at t_1 & Tibbles at t_1 ≠ Tib at t_1** (3, 6, &I)

Notice that unlike the Marriage Paradox or the Ship of Theseus, this puzzle isn't straightforwardly about some parts (e.g., boards or molecules) and the whole that is composed of them (e.g., a ship or a person). The primary relation is not many-one, in other words. Rather, it seems that this puzzle is concerned with a singular thing, Tibbles, and another singular thing Tib. Or, more precisely, it is presumably concerned with *four* singular things: Tibbles at t_1, Tib at t_1, Tibbles at t_2, and Tib at t_2. Hence, we might be tempted to think that this is a constitution puzzle because it is concerned with one-one relations rather than many-one relations, if we thought that there was such a principled distinction between composition and constitution.

But it is important that these singular things overlap, and hence, share parts. In fact, van Inwagen uses a version of this puzzle to argue against a mereological thesis, the Doctrine of Arbitrary Undetached Parts, or DAUP.[37]

> **DAUP**: For every material object, M, if R is the region of space occupied by M at time, *t*, and if sub-R is any occupiable sub-region of R *whatever*, there exists a material object that occupies the region sub-R at *t*.[38]

First, let us see why DAUP is intuitively appealing. Throughout this thesis, I have been appealing to examples using ordinary objects and their undetached parts: a cat and his body parts, a coin and it's front and back half, a circle and its top third, its middle third, and its bottom third, my desk and its legs, drawers, top, and

[37] Peter van Inwagen (1981) "The Doctrine of Arbitrary Undetached Parts," *Pacific Philosophical Quarterly* 62 (1981), pp. 123-37.

[38] This is van Inwagen's formulation. His letters "M" and "R" are not intended to be plural terms, predicates, or variables, in the way that I have used them from chapter 2 and onward.

all of its wood-particle bits, etc. Indeed, even to understand any of the four puzzles described in this present chapter, it seems we presupposed that objects have undetached parts: in the Marriage Paradox, we accept that people have undetached molecules as parts; in the Ship of Theseus, we accept that ships have undetached wooden planks as parts; in Tib and Tibbles, we accept that cats have tails as undetached parts; and in Goliath and Lumpl (which will be discussed below), in order to understand the purported modal differences between Goliath and Lumpl, we accept that statues have (e.g.) arms as undetached parts (Goliath could have lost an arm and survived, but Lumpl couldn't have), and lumps of clay have undetached parts (e.g., Lumpl is made of lots of undetached clay bits, all of which are essential to Lumpl's survival; in order to understand that Lumpl's clay bits are essential to it, you first have to presuppose that Lumpl has clay bits as parts to begin with, and all of these parts are undetached).

So we have, at the very least, been implicitly assuming all along that objects have undetached parts; it seemed natural and even un-noteworthy to assume as much. To show that we think such undetached parts can be arbitrary, consider any example where we can talk about the arbitrary right half and left half of something—a pie, say.

Suppose we think that there is a right half and a left half of a piece of pie. If we don't, then what an odd state of affairs seemingly occurs when we slice and separate the pie straight down the middle: two brand-new objects pop into existence! But this reasoning proliferates: if we think that a pie has a right half and a left half, then we must surely think that there is a right half and left half to each of the *halves* of the pie. After all, we could take a knife to the already cut halves and halve the halves. If the halved halves didn't exist prior to the cutting, then they must have just popped into existence the moment we sliced the pie! To avoid such arbitrary poppings-in-(and-outs!) of objects, we should admit the halved halves already exist prior to the cut. And a right and left half of *those* halved halves exits as well, etc. Surely, any 'half' we think exists for a pie, goes similarly for any pieces of the pie, original halves included, and so on down to the smallest extended piece of the pie.[39]

So if it is natural and intuitive to think that there are arbitrary right halves and left halves—or top halves and bottom halves—of bulky (material) items like pies and people and ships and statues, then it is similarly natural and intuitive to think that there are right halves and left halves—and top halves and bottom halves—of the halves of those objects. But, on pain of having an implausible and arbitrary cut-off point to the halves of (material) objects that exist, it looks as if we must accept that every extended (material) object has (at least) a right half and a left half, or a top half and a bottom half, etc. But this just amounts to DAUP: For every material object, M, if R is the region of space occupied by M at time, *t*, and

[39] Of course such reasoning can get us into trouble. Is there a smallest bit of pie? Are pies (and other objects) parts 'all the way down'? Is there a rock bottom—some bit of stuff that can't be halved? Is the world a simple one (i.e., it bottoms out in parts with no parts)? Or a gunky one (i.e., there parts all the way down)? I need not get into all of this right now. All I need for my purposes here is the admission that some objects have parts (whether that be the right half and left half, the top and bottom, etc.). What happens 'in the end' or 'at rock bottom' is a story I can leave open-ended for now.

if sub-R is any occupiable sub-region of R *whatever*, there exists a material object that occupies the region sub-R at *t*.[40]

So we can now see why DAUP is intuitive. Second, however, let us take a moment to appreciate how DAUP is related to composition: if one accepts DAUP then one accepts that (material) objects have arbitrary, undetached *parts*. Of course, the relation between a thing and its parts is that of *composition*. So any objection to DAUP will be an objection to certain views of composition, since DAUP is a thesis about what kind of parts material objects have (i.e., arbitrary and undetached), and this will have a direct consequence for the composition relation, and the question as to when (or whether) it holds between some parts and a whole.

And, in fact, Van Inwagen uses a variation of the Tib and Tibbles puzzle to argue *against* DAUP, and ultimately for a particular answer to the Special Composition Question—

> **PvI's Special Composition Question**: when do some *x*s compose an object?

—namely, never.[41] Since DAUP is a thesis that a CI theorist (as I am imagining her) will embrace, then we can take Van Inwagen's argument as an argument against CI as well.[42]

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[40] DAUP commits us to the claim that there are no extended (material) simples (i.e., there are no extended, material, partless objects). I do not wish to get into the issue of whether there are or are not such things as extended simples, so let us just presuppose for now that there aren't. If after my discussion here, it is maintained that DAUP is false because there are extended simples, and not for the reasons Van Inwagen countenances, then I'd be happy to adjust the direction of the dialectic accordingly. For now, however, I am just interested in why van Inwagen thinks DAUP is false (namely, the Tib and Tibbles puzzle).

All of this is just to show, however, that Tib and Tibbles is not a puzzle about (merely) constitution; or, if it is, that this is not the only relation that the puzzle involves (assuming for the moment that composition and constitution relation are indeed distinct relations), since we can seemingly derive important conclusions about *composition* from the puzzle, as van Inwagen intends.

Furthermore, however, notice that we could easily rephrase the Tib and Tibbles puzzle in terms of many-one relations. Imagine (what is likely): that Tibbles is composed of millions of molecules. Tib, then, could be defined as some sub-set of those millions of particles, and we would be off and running with a puzzle explicitly involving composition, with no seemingly significant difference between the original presentation and the rephrased one. Thus, we see yet again that there is little support for a difference between the composition relation and the constitution relation.

3.4 Goliath and Lumpl[43]

Imagine that Sam the sculptor has decided to make a statue of Goliath out of clay. However, due to an odd superstition, Sam prefers to sculpt one half of the statue, and then the other, and then he puts them together after the halves are complete. So, on Day 1, he sculpts both the top half and the bottom half of

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[41] Cf. van Inwagen.

[42] See Chapter 1, section 5. In particular, recall that I am assuming (i) the Existence Assumption: that there are ordinary objects (tables, chairs, etc.) and (ii) the Parthood Assumption: that these objects have parts (front halves, back halves, etc.). If DAUP is false, then these assumptions are false (modulo the issue of extended, material, mereological simples, which I will ignore for the moment (see above, footnote 40)).

[43] The original presentation of this puzzle is found in Alan Gibbard (1975).

Goliath, from two separate lumps of clay. On Day 2, he sticks the two halves together and lets the statue harden. On Day 3, he realizes the endeavor was a complete failure, and takes a sledgehammer to the clay statue, smashing it to smithereens.

Suppose that *lumps* of clay are those bits of clay that are connected to other bits of clay, and that statues are what we ordinarily think they are—certain formations created to represent something and made of some kind of material like clay and bronze and what-not. Let us call the lump of clay that Goliath is made out of, *Lumpl*, and let us call the statue, *Goliath*. On Day 1, it seems that neither Lumpl nor Goliath exist. Yet on Day 2, it seems that Goliath and Lumpl come into existence at the same time. On Day 3, however, it seems they go out of existence at the same time (as soon as 'they' are smashed). So it would seem that both Lumpl and Goliath exist at the same place, at the same time, and for the same amount of time. But wait! Doesn't this violate an intuitive principle of ours, call this principle **S**?

> **S**: Two things cannot completely occupy exactly the same place or exactly the same volume (or exactly the same subvolumes within exactly the same volume) for exactly the same period of time.[44, 45]

"Well, perhaps," you think, "Lumpl and Goliath are identical. Then principle **S** would not be violated." Yet by the Indiscernibility of Identicals, it seems that

[44] David Wiggins, "On Being in the Same Place at the Same Time," in *Philosophical Review* (1968); reprinted in Rea (1997)

[45] **S** isn't entirely correct. Even Wiggins himself (*ibid*.) goes through various different amendments on the principle. You might think that regions of space, or space-time points, etc., *are* things, for example, but clearly a material object and regions of space occupy the same place at the same time—indeed this seems to be what it means for an object to be at a certain place. But let us ignore these issues for now.

Lumpl and Goliath are distinct. For Lumpl has a property that Goliath doesn't have: Lumpl *could* survive being smushed or rearranged, but Goliath *couldn't*. And Goliath has a property that Lumpl doesn't have: Goliath *could* survive the loss of a toe or an arm, say, but Lumpl *couldn't*. So by the Indiscernibility of Identicals it seems that Lumpl and Goliath are distinct; yet then how could they both be in the same place at the same time? Does this mean we should give up principle **S**?[46]

This puzzle is traditionally hailed as the paradigm puzzle of constitution. But notice that this is also a puzzle about composition, since we need to be able to make sense of the composition relation to get on the grasp of the difference between Goliath and Lumpl to get the puzzle off the ground. As explained above, in accepting the puzzle, we accept that statues have (e.g.) arms as undetached parts (Goliath could have lost an arm and survived, but Lumpl couldn't have), and lumps of clay have undetached parts (e.g., Lumpl is made of lots of undetached clay bits, all of which are essential to Lumpl's survival; in order to understand that Lumpl's clay bits are essential to it, you first have to presuppose that Lumpl has clay bits as parts to begin with, and all of these parts are undetached). Also, in order to get the puzzle going, we had to imagine that there were two halves of the statues (the top half and the bottom half), and two lumps of clay, that will eventually make up Lumpl, in order to understand that both Goliath and Lumpl

[46] Some think we should give up, or at least modify, principle S. See (e.g.) David Wiggins (1968). Others think that we should give up something else: Merricks (2001) thinks this puzzle shows that we should give up the Existence Assumption—i.e., he is an Eliminativist about ordinary objects and denies that (e.g.) tables and chairs exist. Van Cleve (1986) and Zimmerman (1995) think that we should reject the idea that objects lose their parts, and embrace mereological essentialism—although not for the reasons that I do (discussed below). And so on.

came into existence at the same time. We would not be able to understand that Goliath and Lumpl had overlapping temporal careers, an overlap of conception and destruction, if we didn't grasp that there were *parts* of each that existed on Day 1.[47] So, integral to the puzzle, is that Goliath and Lumpl involve issues of composition as well as constitution (assuming for the moment that these are indeed distinct relations).

Moreover, as I have mentioned before, since the CI theorist will claim, for example, that the lump of clay is identical to the clay molecules that compose the lump, then it is irrelevant whether the puzzle is formulated in terms of one-one relations, or many-one. Suppose that we have a lump of clay that is *composed* of many clay particles (one-many), and a statue that is *constituted* by the lump of clay (one-one). CI claims that the relation between the lump of clay and the clay particles is identity; so the lump of clay *is* the clay particles. By the substitutivity of identity, the statue is constituted by the clay particles, which is a one-many relationship. So, by the supposition that composition is one-many, the statue is composed of the clay particles; thus, the statue is identical to the clay particles.[48] So a CI theorist should not (and maybe even cannot) rest on the difference

[47] One might think to object to me here: "Aha! Gotcha! You just admitted that the parts of Goliath and Lumpl existed on Day 1, yet admitted above (to get the puzzle going) that Golaith and Lumpl do *not* exist on Day 1. So doesn't that show that Goliath and Lumpl are not identical to the parts that compose them?" My answer to this objection is just the answer I will give to the Modal Objection, and to the constitution puzzles in general: it depends crucially on my metaphysics of objects, which I will detail in the work that follows. Also, as with many of these puzzles, the solutions involve the charge that the original set-up of the relevant puzzle is misleading in some way. Again, see below for more.

[48] I will have more to say about this particular example below, in the course of detailing the puzzles.

between composition and constitution as a difference between the relata being one-many or one-one.

I hope that at this point, one can easily see why the purported difference between composition and constitution is on shaky ground, especially if CI is true. Yet this should not lead us to think that the purported constitution puzzles are thereby unimportant; they are still (initially at least) problematic. Let us now see how a CI theorist will respond to them.

4. CI and Solving the Constitution Puzzles

4.1 Does CI entail Mereological Essentialism?

As mentioned at the outset, I think that the CI theorist has the resources available to adequately address the above four puzzles. However, some might think that this project is doomed from the start. This is because some might think that there is an obvious difference between my thesis—CI—and the puzzles I've laid out above. Namely, CI is a thesis about mereological sums and their parts, whereas all of the puzzles I discussed above are concerned with ordinary objects, not mereological sums. When it comes to mereology, in other words, CI may be true, but when it comes to ordinary objects, it is not.

Moreover, at this point, one might be wondering whether I have been overselling the merits of CI. I began this thesis with talk about ordinary objects; I continued this way of speaking in the chapters that followed. In fact, throughout this project I have been pumping intuitions using ordinary objects in our ordinary life. "The one deck is identical to 52 cards," I insisted. "The 52 cards are identical to the one deck." I continued. "The table is made up of four legs, a top, and some drawer," I claimed, and then I tried my best to convince you that this 'made up of' relation was one of identity. I slipped easily from talk about ordinary objects that were 'made up of' other ordinary objects (e.g., that one dollar in your pocket is made up of four quarters, etc.), to abstract talk of parts and wholes. I brought in talk about mereology—the study of parts and wholes—and talked about why we might think that the mereological sum of any parts whatsoever is as much of an object as cats and mats and trees and rocks. In fact, the entire case for CI was built on the premise that, if we accept CI, mereology is ontologically innocent, and that, given some Quinean assumptions about ontological commitment and some traditional theoretical virtues (such as a commitment to parsimony, etc.), we could see that the relation between a mereological sum and its parts—the composition relation—is *really* one of identity.

But, you might be thinking, the relation between the parts of a mereological sum and that sum is one thing; the relation between the parts of an ordinary object and that ordinary object is another. The facts of mereology, in other words, whatever they may be, have no bearing on the facts of ordinary objects.

Mereological sums have their parts essentially, you might rightly point out, while ordinary objects, so we tend to think, do not. If one of the parts of a mereological sum goes out of existence, the mereological sum thereby goes out of existence. Not so with ordinary objects, so we tend to think. My running shoe could lose some flakes of plastic and bits of rubber or some of the tread could wear off or some of the thread could fray away from the laces. But despite the loss of these parts, my running shoe is still my running shoe; the loss of various parts has not resulted in a loss of the object, my running shoe. Contrast: the mereological sum of all of the parts of my running shoe when it first came out of the box is no longer located where it used to be—many of the parts have scattered and flaked off the longer I've been wearing them, many of the parts used to be attached and now they are not, etc.—and if some of the parts of the mereological sum of the parts of my running shoe when it first came out of the box have been destroyed, then the mereological sum has thereby been destroyed as well.

So, you might be thinking, it is all fine and well that CI is true as far as *mereological sums* are concerned, but this has no bearing on the metaphysics of ordinary objects. And you might further think that I have been wasting your time. I have just spent many pages convincing you that CI is true, only to have this mean very little when it comes to the status of ordinary objects such as cats and mats and running shoes. And you might think that this point has been most poignantly highlighted by the foregoing constitution puzzles, which get their force from considering ordinary objects, not weird, theoretical objects such as mereological sums.

One *might* be tempted to separate one's views of mereological sums from ordinary objects, and to claim that CI is true only with respect to mereological sums. But I have two objections against such a move. First, someone who claims that CI is limited *only* to mereological sums, and *not* to ordinary objects, is simply confused or mistaken about what the composition relation *is*. Second, it seems that many who are tempted by such a view are driven to this position via an argument similar to the one Merricks gives against CI.[49] I will lay out this argument below and show where I think such an argument goes wrong. Let me discuss the first point first, and then I'll discuss the Merricks-like argument against CI.

Suppose someone wants to claim that CI holds for mereological sums but not for ordinary objects. One of the problems with this position is that what has been at issue is the *composition* relation, not the *relata* that this relation is held between. It would be an odd view indeed if one were to say that the composition relation is identity when it holds between a mereological sum and its parts, but that this same(?!) relation is *not* identity when it holds between ordinary objects such as cats and mats and running shoes, and all of their respective parts.

Now, true, one might claim that, strictly speaking, when *we*, qua philosophers, use the word 'composition', this is a technical term that applies only to the study of mereology, and to formal, theoretical objects such as mereological sums. But, one might argue, this is not a relation that we ordinarily use when we are talking about the relation of ordinary objects and their parts.

One might try to take this line, but I suspect it would crumble under scrutiny. Mereology, as discussed by Lesniewski, Leonard and Goodman (1940), Lewis (1991), Bigelow (1996), et. al., is supposed to be the study of *parts and wholes*, intuitively and pre-theoretically understood. Indeed, Lewis reminds us

[49] Cf. Merricks (1999)

that the notion of ‘part’ in mereology is an ideological primitive. Talk of what it is for one thing to be a *part* of another *does* follow from certain axioms and principles (e.g., transitivity, reflexivity, anti-symmetry, etc.), yet this is supposed to reflect our intuitive sense of what it is for one thing to be a part of another. And this intuitive sense we acquire from our knowledge of things in the world—from our knowledge of ordinary objects such as cats and mats and running shoes and how these objects relate to their respective parts. So given that mereology is a formalism that aims to *capture* our intuitive notions of parthood, born out of our pre-theoretical notion of parthood as it applies to ordinary objects, it would be odd to claim that ‘composition’ is then a purely formal notion that only applies to technical ‘objects’ such as mereological sums, but not to ordinary objects.

Also, for similar reasons, one could not plausibly maintain that ‘composition’ is ambiguous—that on the one hand it refers to the relation between a mereological sum and its parts, which is identity, and on the other it refers to the relation between ordinary objects and their parts, which is not identity. For given that mereology is supposed to be *capturing* the relation that’s had between an ordinary object and its parts, then it would be unlikely (and unfortunate!) that ‘composition’ was ambiguous.

So it is implausible that there is one relation—composition—that behaves one way when its relata are mereological sums and their parts, and another when its relata are ordinary objects and their parts. And it is implausible that there are two different relations that are confusingly both called ‘composition.’ And our definitions of CI and ME reflect this well[50]:

Composition as Identity (CI): Any composite object, O, is (hybrid) identical with the objects $O_1, \ldots, O_n$ that are its parts; $O =_h O_1, \ldots, O_n$.

Mereological Essentialism (ME): Any composite object, O, is composed of (all and only) its parts $O_1, \ldots, O_n$, in every possible world in which O exists.

CI claims that so long as there is *any* composite object, O, that is made of (all and only) some parts, $O_1, \ldots, O_n$, then O is (hybrid) identical to $O_1, \ldots, O_n$. And ME claims that for *any* object O, which is composed of (all and only) its parts $O_1, \ldots, O_n$, O is composed of $O_1, \ldots, O_n$ in every possible world in which O exists. If any *composite* object will count, then it could not be the case that CI was true for mereological sums, but not true for ordinary objects. So long as the composition relation holds—whatever the relata happen to be—then CI claims that this relation is identity. And so I haven’t been overselling the case for CI; all of my examples of ordinary objects to motivate CI throughout this thesis have not been misleading, for we are dealing in each case with some kind of mereological sum or other.

But one might still insist as follows. Never mind whether CI and ME are defined in seemingly compatible ways. The fact remains that mereological sums,

[50] As noted previously, these definitions are borrowed and modified from Merricks (1999), “Composition as Identity, Mereological Essentialism, and Counterpart Theory”, *Australasian Journal of Philosophy*, Vol. 77, No.2, pp. 192-195; June 1999. See Chapter 1, 2, and 3.

traditionally understood,[51] have all of their parts essentially, whereas ordinary objects do not. Therefore, ordinary objects cannot be identical to any mereological sum, and so mereological sums must be something different from ordinary objects.

My answer to this kind of objection is related to my response to Merricks' argument against CI. Trenton Merricks (1999) presents a seemingly compelling argument against CI, which I think many are tempted by. The first premise claims that CI entails mereological essentialism. As mentioned previously, he then concludes that since mereological essentialism is objectionable, CI is as well. I have already said why most people find ME objectionable: we intuitively think that objects *can* gain and lose (at least very small) parts! If ME is true, then no object would or could survive the loss of even its very smallest parts. And this would seemingly lead to a very wacky view of objects (e.g., objects would 'pop' out of existence every time they 'lost' a part, and a new one would 'pop' up in its place, etc.). And this, as mentioned above, is one of the reasons one might have for insisting that ordinary objects cannot be identical to mereological sums.

But let us first focus on his conditional claim that if CI is true, then mereological essentialism follows. If he is right, then this gives us yet another reason why one cannot think that CI is true for mereological sums, but not true for ordinary objects. Then I will address where I think the CI theorist should resist his argument.

Recall again the above definitions of CI and ME:

[51] I say traditionally: it is usually assumed mereological sums do have their parts essentially. This assumption has been challenged, offering up a looser notion of 'mereological sum'—one which does not carry with it part essentialism. See Sider (?), e.g.

Composition as Identity (CI): Any composite object, O, is (hybrid) identical with the objects $O_1, \ldots, O_n$ that are its parts; $O =_h O_1, \ldots, O_n$.

Mereological Essentialism (ME): Any composite object, O, is composed of (all and only) its parts $O_1, \ldots, O_n$, in every possible world in which O exists.

To show that CI entails ME, Trenton Merricks gives the following argument:

> "…suppose that O, the object composed of $O_1 \ldots O_n$, is identical with $O_1 ... O_n$. From this, the fact that $O_1 ... O_n$ are identical with $O_l ... O_n$ in every possible world, and the indiscernibility of identicals it follows that O is identical with $O_l ... O_n$ in every possible world) Therefore, if composition as identity is true, there is no world in which O exists but is not composed of $O_1 ... O_n$. So composition as identity implies that O—and, of course, every other composite object—must, in every world in which it exists, be composed of the parts that actually compose it. Composition as identity entails mereological essentialism." [1999:192-1]

The idea seems pretty straightforward. If we have already committed to CI, as formulated above, then we think that any composite object is (hybrid) identical to its parts. But if a composite object is identical to its parts, then by the Indiscernibility of Identicals,[52] there is no world where the composite object exists and its (actual) parts do not.

Of course, one way to resist this move is to deny the Indiscernibility of Identicals. As mentioned in previous chapters, this is the move that Donald Baxter makes. Also, if one maintains a Weak Composition Thesis, as Lewis does (1991), then one might think that composition is *analogous* to identity, but not *strictly* identity, and that one of the (few?) differences between composition and identity would be that the latter obeys the Indiscernibility of Identicals while the

[52] One could also use the Necessity of Identity here to arrive at the same conclusion.

former does not. And so, on this view, one might endorse a version of CI (as stated above) but wriggle out of Merricks' argument, since the relation held between a composite object and its parts, while a *kind* of identity, does not obey the Indiscernibility of Identicals. Thus, one could—in letter but not in spirit—maintain CI but deny ME. But since I have already given my reasons for rejecting these two views,[53] let us move on.[54]

Trenton Merricks gives us a succinct argument against CI: a direct modus tollens against the view. And I actually *agree* with his first premise that CI *does* entail ME. Moreover—and this may be surprising—I think it *should*. That is, I think it is a good thing that it does. So, rather than resist Merrick's argument that CI entails ME, I will resist his claim that ME is a view that should be rejected. His modus tollens is my modus ponens. Moreover, going back to the line of reasoning that claims that ordinary objects cannot be identical to mereological sums because ordinary objects do not have their parts essentially, but mereological sums do, I am going pursue the line that, yes, ordinary objects *do* have their parts essentially. In other words, my response to both arguments will be a full defense of Mereological Essentialism. Once I show how ME can and should be embraced, then I will show how this view, together with CI, can solve the puzzles that were raised earlier in this chapter. Once that is completed, we

[53] See Chapter 1.

[54] Another way to resist Merricks' argument is to insist that something has gone awry. See Ross Cameron (2007) "The Contingency of Composition." Unfortunately, I do not have the space here to discuss Cameron's objection to Merricks' argument; I will be assuming that Merricks' argument is problem-free.

will then come full circle and see how CI can successfully defend herself against the Modal Objection.

4.2 Embracing Mereological Essentialism: the Lump Theory

I am going to try to convince you in the pages that follow that Mereological Essentialism is true *and* intuitive. I am going to do so by easing you in toe-first, little by little. Our first step in being so convinced will be to remind ourselves all of the many ways that we talk about some thing(s) being *part of* some other(s). This is supposed to be intuitive and commonsensical; I am relying on our pre-theoretical judgments for now. (We will get to the unintuitive, non-commonsensical, and post-theoretical bits in a moment.) Consider the following perfectly acceptable sentences:

(1) Nacho's tail is a part of him.
(2) Those pieces are part of the puzzle.
(3) This is the part when the girl turns into a vampire. [Said during a movie]
(4) Genocide is a very dark part of history.
(5) Adolescence was a depressing part of my life.
(6) The ability to love is the better part of humanity.
(7) Knowing that she could run the marathon is part of what motivated the girl to actually run it.
(8) God's foreknowledge is part of his omniscience.
(9) Trigonometry is part of mathematics.[55]

Up until this part of the thesis, I have been primarily concerned with material parts. I have talked about cards and cats and running shoes and all kinds of (material) parts and wholes. And it's true that we do talk about material parts in

[55] Sentences (1)-(7) are modified from Varzi (2009); (8) and (9) are borrowed from Lewis (1991). See also L. A. Paul (2002) "Logical Parts," in *Nous* 36:4.

the way that I talked about them throughout this thesis, as well as sentences (1) and (2) above. But although (1) and (2) are both about material things, notice that there is a difference—tails are attached or connected parts, while puzzle pieces are often detached, or at least detach*able*, or disconnected, or disconnect*able*. We talked briefly (in Chapter 1) about the difference between connected parts and disconnected (or scattered) parts;[56] (1) and (2) are just two more examples. So we've been in agreement with this up until now: parts are material, and they can be attached or unattached, as is evidenced by the acceptable (1) and (2).

But it also seems that we can talk about parts of an event or parts of a story, as in (3); we can talk about temporal parts, of history or of individuals, as in (4) and (5); we can talk about the parts of a natural kind or group, as in (6); we can talk about the parts of motivation or causal chains, even if these are modal in nature, as in (7); and we can talk about the parts of features or attributes or fields of study, as in (8) and (9).[57] And notice in each of these cases, (3)-(9), one might have particular metaphysical views that imply that the relevant parts in each case are immaterial. One might, for example, be an immaterialist when it comes to events or fictions; or one might think that temporal properties (of history or individuals) are abstract; or one might think that natural kinds or categories are lodged somewhere in Plato's heaven; or one might think that motivating reasons are somehow non-physical—perhaps some sort of dualism is true; or that

[56] And we will talk even more about this in Chapter 5.

[57] Varzi (2009).

properties, attributes, and fields of mathematical studies are abstract, sets of certain individuals, etc.

I am not going to argue here that any of these above kinds of things *need* be immaterial; in fact, I want to remain decidedly neutral on ontology *except* for the thesis that composition is identity (for now). And this is as it should be. Our views of composition and mereology should be silent about whether the world is a material world or not.[58] Mereology is concerned with the study of parts and whole, *whatever* those parts and wholes may be. So if Berkeley is right, and the world is an Idealist one, then my claims about composition will still hold; if Hume is right, and the world is a materialist one, then my claims about composition will still hold. So, no matter what one's ontological views about what there is, so long as it is admitted that there are some thing(s) and these things have parts (i.e., the Existence Assumption and the Parthood Assumption), CI will still hold.

What this means, however, and what I think the above examples (1)-(9) show, is that we *already* have a very liberal understanding about what kinds of things count *as parts*. We may have only used examples such as (1) and (2)—examples where the relevant parts and whole are material and spatial—up until this point in the thesis. But some reflection, and examples such as (3)-(9), show that that this is very often not the case. We do not always think about the part-whole relation (only) materially and spatially. In fact, I want to propose that not only do we often *consider* events, properties, time, modality, etc. as parts of things (i.e., (3)-(7)), but that this is what is in fact the case: objects *do* in fact have properties, time, modality, etc. as parts. I will say more about this claim below.

[58] See Lewis [1991: 76]

For now, however, let me return to the point at hand. And let us be open to—for now—just the mere possibility that an object has more than just its material, spatial parts. (I will argue that this is no mere possibility, that it is in fact the case, as we proceed.) We are already, as sentence (1)-(9) seem to show, very liberal with our use of the term 'part', and our concept of parthood in general.

Also, let us recall that one of the reasons for thinking that Mereological Essentialism (ME) is implausible is that we tend to think that objects not only *could* lose and gain parts, but that they in fact *do*. But if ME is correct, then there is no possible world in which an object O has parts different than it actually has; it cannot be the case that O could have had one part more or less than the parts O_1, .., O_n that it actually has, since O has O_1, …, O_n in every world in which O exists, according to ME. And if O cannot gain and lose parts across worlds, it cannot gain and lose parts across time either. According to ME, O has all of its parts necessarily, and so there is no gaining or losing of parts *across the board*. And this may just seem flat-out unacceptable. Ordinary objects in fact *do* survive the loss of some of their parts, we might insist, they *can* survive the loss of some of their parts, and so any view which claims anything to the contrary must be false.

However, I want to suggest that this intuition is misguided in a certain way. When we assent to claims such as "ordinary objects in fact do survive the loss of some of their parts" and "ordinary objects can survive the loss of their parts", we have forgotten to consider all of the many (non-spatial and (maybe) non-material) parts that ordinary objects have. Our intuitions about whether an object can or cannot gain and lose parts, in other words, is intimately tied up with our view of what sorts of things *count as parts*. And this, I have tried to show above, is something about which we are actually very liberal-minded.

Take my desk, for example. I had insisted above that it has remained the same desk over four years, even though I admitted that small molecules might have flaked off or have chipped away and been destroyed. But, at the time, we were only considering material, spatial parts—molecules and small bits of wood, say. Yet here is another claim that seems true of the desk, and that seems true about parts of the desk: there is part of the desk's life when it was just a hunk of wood. Think of it. Imagine that someone wanted to make a (rather boring) documentary about the life of my desk. We could imagine some grainy, poor-quality film footage of a hunk of wood in a furniture-maker's shop. The narrator says something like, "It all began right here in this shop. Here is the desk, about to be crafted." Etc. In a certain sense, then, the hunk of wood is part of the desk—the hunk of wood *is* the desk, way back when. It is true of the desk that it once was a piece of wood. And, in fact, this seems to be a very important feature of the desk. Put another way, it is a very important *part* of the desk that it once was a hunk of wood. If the desk had never been a hunk of wood, we might be inclined to say that the desk before us is very different desk from one that *had* once been a hunk of wood. So it is *part* of the desk that it *used* to be a certain way.[59]

[59] I am treading on interesting topics about essences, and what it is that makes certain objects those particular objects. Is it essential to the desk that it have the history it has? If the desk had a

And here is another thing that seems true of the desk: it is part of the nature of the desk to *possibly* lose parts. Part of what it is for this desk to be a desk is that it *could* lose a (material) part here, or it *could* lose a (material) part there, etc. If this is true, then it seems to follow that at least one of the features of the desk is a bunch of modal features about it—it could lose certain (material) parts, maybe it couldn't lose others, etc. Part of what makes this desk a desk is that it *could* lose some (material) parts here and there! We often think that persistence conditions—i.e., those conditions under which some object persists—are an essential (or necessary) feature of those objects. Indeed, it is an essential (or necessary) *part* of them.

I am admittedly stretching your intuitions here, given that you have already granted me that we have a liberal notion of parthood. We shall see that it ultimately won't matter to me whether you are convinced of the *intuitiveness* of the idea of having temporal and modal properties as literal *parts* of objects or not. Ultimately, I do not hold much stake in the connection between intuition and the underlying metaphysical truths of reality.[60] But it does help to get a feel for the theory of objects I will be endorsing, and thinking of temporal and modal properties as parts of objects is a first step.

Moreover, thinking of temporal and modal properties as parts can be captured quite nicely by combining metaphysical views already established in the

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different history from the one it in fact has, would it still be the same desk? Could the desk be made out of a different hunk of wood and still be the same desk? These are all fine questions, but ones I will not have time to adequately address here—unless, of course, you think that these questions merely collapse into questions about *necessary parts* of objects.

[60] See my comments below, p. 48-9.

literature. To see this, let us make two assumptions for now (that we may later chose to drop): let us be realists about time and realists about possible worlds. We will assume that there are times other than the present, and that (certain versions of) Presentism is false. Second, we will assume that there are possible worlds other than the actual world. We need not (yet) say what times and worlds amount to—i.e., times and worlds could be abstract, ersatz sorts of things—so long as we are in agreement that they *exist*. In what follows, I will often talk as if times and worlds are concrete, non-ersatz sorts of things, but we need not do this in order to capture the spirit of the metaphysical view of objects I will be proposing. If I speak of 'worlds' and 'times' and you think that there are no such things, simply apply your usual translation schema to my world-talk and time-talk, as you are accustomed to doing, and you will be able to see how my view of objects can be ontologically accommodating.

Following Weatherson (ms), let us also assume (for now) that "objects which exist at more than one time (world) do so by having different parts at different times (worlds)." So we will be committed to both temporal and modal parts, and we will be committed to the idea that objects are temporally and modally *extended*.[61]

A four-dimensionalist, or *worm* theorist, defends the view that individuals are trans-time fusions. Individual objects are stretched out in time (and space)

[61] Again, depending on your own view of time and modality, this idea of objects being 'extended' may be more metaphorical than literal. Details below.

the way that ordinary folk believe a road is stretched out (only) in space.[62] Desks, then, are spatiotemporal worms—mereological sums of time slices of three-dimensional objects. Our intuition that an important feature or part of the desk that it used to be a hunk of wood, just about to be carved, is nicely captured by the four-dimensionalist picture, since individuals are these spatiotemporally extended items that can be 'traced' over time.[63]

One of the benefits of such a view is that we can wriggle out of some of the traditional metaphysical puzzles.[64] Consider change over time: When you were 5 you were 3ft tall, not 5'3; now you are 5'3, not 3'0. We'd like to think that you, like the desk in my office, can remain the same object over time and despite some minor changes (a minimal growth spurt, say). But you at 5 years old had the property being 3'0 (and not 5'3). You at 32 have the property being 5'3 (and not 3'0). By the Indiscernibility of Identicals, then, you at 5 ≠ you at 32. So, despite what we might have initially thought, you do not survive over time and over change!

But four-dimensionalism to the rescue: this idea of 'you *at* 5' and 'you *at* 32' is a misdescription of the facts. Objects aren't wholly present *at* a time.

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[62] I am admittedly being a bit sloppy here. There are various different kinds of four-dimensionalism, and not all of them agree on the picture I am painting here. But since I am only using the four-dimensional view as a springboard for my own lump theory of objects, it is fine for now if I have not captured all four-dimensionalists exactly right. It is only the general idea of four-dimensionalism and temporal parts theory that is important for my purposes here. See Mark Heller's (1993) "Varieties of Four-Dimensionalism," Sider (2001), etc.

[63] Of course, there may still remain some vagueness issues about when exactly an individual's life begins and ends—i.e., where or when we can start to 'trace' an individual—but let us leave these issues aside from now, since they do not seem to affect the issue at hand.

[64] In fact, this is one of the leading reasons Sider is convinced that the view is true.

Rather, they are extended across time (and space). So a *part* of you is 3'0 (the part of you that is 5 years old) and a *part* of you is 5'3 (the part of you that is 32). But this is no more of a contradiction than that part of you is on the ground right now (your foot, for example) and a part of you is not (your head, let's hope). The four-dimensionalist can then give a nice gloss of what it is for an object to change over time: an object changes iff there is a a temporal part of the object that differs from another temporal part of that object. Change, then, "is difference between successive temporal parts."[65]

In a sense, then, an object on the four-dimensionalist picture does not, strictly speaking, gain and lose parts. Since an object, according to this view, is a trans-time fusion, the object—the fusion—has all of its parts all of the time; it doesn't gain and lose parts at all. But the four-dimensionalist accommodates our intuitions about ordinary objects gaining and losing parts by saying that what it *is* for an object to gain and lose parts is for the object to have a temporal part that differs from one of its other temporal parts. My desk has a temporal part, tp_1, let's say, that is composed of wood molecules m_1, …m_n. My desk has another temporal part, tp_2, however, that is composed of wood molecules m_1, …, m_n, m_{n+1}. To say that my desk gained a part, then, is just to say that my desk has two temporal parts, tp_1 and tp_2, which differ in their m_is, such that tp_2 has all of the parts tp_1 has, plus one. So it is not the case that our statements about ordinary objects concerning change are flat-out false, according to the four-dimensionalist picture. But what makes these statements true is different than we might have

[65] Sider (1997), (2001), (2007).

(pre-theoretically) thought. In this way, we can have a view of objects that sort of captures our intuitions about my desk: my desk *does* gain and lose parts and still remain the same object. It's just that the metaphysical facts of what it is for something to *change* are slightly different than we may have first supposed.

But let us take things a bit further. Let us imagine for a moment that we are not only stretched out across time (and space), but that we are stretched out across possible worlds as well. This might be called a kind of *five-dimensionalism*, or *lump*, view of objects.[66] According to this view, individuals are not only trans-time, but also trans-world individuals. What makes it the case that my desk could have one or more parts than it actually has is that in some other possible world, a part of my desk (the part that is in another possible world) has more parts than another part (the part of it that is in the actual world) does.

One worry for the four-dimensionalist was that they would not be able to account for the fact that we think that objects gain and lose parts over time. For if an object is just a trans-time fusion, then it in fact has all of its parts all of the time, and so—in a certain sense—*it* (the fusion!) doesn't lose parts at all. But the move was to recast our talk of temporal change into differences between temporal parts. Similarly, the lump theorist will need to address a parallel worry: we think that objects *can* gain and lose parts. We think that, even if my desk is actually made out of parts $p_1, \ldots, p_n$, in the actual world, it *could have been* made out of parts $p_1, \ldots, p_n, p_{n+1}$ instead; that is, it *is* made out of parts $p_1, \ldots, p_n, p_{n+1}$ in some other possible world.

[66] Again, this terminology is borrowed from Weatherson (ms).

But similar to the move made by the four-dimensionalist, talk about differences of individuals (or counterparts) in distinct possible worlds will be cashed out in terms of differences between modal parts of trans-world (and trans-time, trans-space) individuals. An individual, then, has (at least) one part in one world, and another in another world.[67] Any differences between these parts will then be the basis for the modal facts about these individuals.

In what way can we make sense of 'modal facts' of these individuals? If objects such as tables and chairs and cats and mats—and all sorts of ordinary objects including you and me—really are these trans-world fusions, then how do we say of *these* trans-world individuals that it is possible that *they* lose parts or gain parts, or that it is possible that *they* run for president, or that it is impossible that *they* square the circle, etc? Just how do we make sense of what is possible and necessary for individuals that are stretched out over possible worlds?

This question is analogous to the following if, after the four-dimensionalist has described her view, we were to ask: "OK. I see that individuals are these trans-temporal fusions of instantaneous temporal parts. And I see that you have a way of recasting our talk of 'change' to capture our intuition that objects change over time. But what about these trans-time objects—these *fusions* of temporal parts—how can we make sense of *these* individuals changing over time?"

What the four-dimensionalist will surely point out to such an inquisitor is that such objects simply *do not* change over time. To think that they would or do

[67] I suppose there could be strange individuals that have only one modal part, just like there may be strange individuals that have just one (instantaneous) temporal part, just like there may be strange non-extended objects that have only one spatial part, etc. But let's leave these weird objects aside for now; I will be discussing them briefly below.

would presuppose a confusion about what such objects *are*. Such objects are mereological fusions of temporal parts, and given what it is for something to change over time, such fusions simply do not change over time.

Similarly, given that the lump theorist is going to cash out the modal facts in terms of parthood—i.e., given that what is possible and impossible for you is made true by *parts* of you doing thus-and-so in other possible worlds—then such trans-world objects do not *themselves* have anything that is possible or impossible for them. Or, rather: all modal facts about such trans-world fusions are vacuously true, since there is no *one* world in which such fusions exists. Modal talk, in other words, about such objects simply doesn't make sense, given that modal talk is cashed out (according to the lump theorist) as *parts* of these lumps being in different worlds. The lump itself—the lump's improper part—is not *in* any one world; it is stretched out among many of them! So to ask about the modal facts of the lump is as much of a confusion as it is to ask the four-dimensionalist whether space-time worms change over time.

But let us return to two of the assumptions that I made at the outset of my explanation of a lump theory of objects. I said that I wanted to assume: (i) that we are realists about time, or (at least) non-presentists, and (ii) that we are realists about possible worlds. Some may be balking at (i); even more, no doubt, will be balking at (ii). If my suggested method of embracing Mereological Essentialism requires a commitment to modal realism (some may argue), then so much the worse for my view!

But just because I assumed modal realism and temporal realism does not mean that I *need* be committed to them. Indeed, I only assumed as much for a smoother elucidation of my theory of objects. Now that we have an outline of the view on the table, we can see what such a view would be like if we were to drop either assumption (i) or (ii).

Let us first imagine that we are realists about time, but are not modal realists.[68] We do not believe that there are concrete possible worlds, spatio-temporally isolated from each other, that contain world-bound individuals living in them. Perhaps we think that there are possible worlds, but these are abstract sorts of things—sets of sentences in Plato's heaven, or propositions, or fictitious objects, etc. In that case, I *still* think that objects are lumpy, trans-world (and trans-spatiotemporal) objects. It's just that the parts of objects that are 'in' these abstract possible worlds are themselves abstract. Our non-actual world-parts, then, are still *part* of us, they just happen to be *abstract* parts of us.

That we can have abstract things as parts should be acceptable for three reasons. One, if the view we are imagining is an ersatz view of possible worlds, then abstract things are already included in the (assumed) ontology. So one should not be resistant to abstracta in general, if they are already included in the presupposed worldview. Second, abstracta are already part of the world (we are supposing); so they are already *part* of something (i.e., the universe). So we

[68] Recall that "modal realism" is unfortunately labeled, as readily admitted by Lewis (1986). A modal realist is the view that there are possible worlds and these worlds are concrete. So, a better name would be "Concrete world realism." An ersatzer about possible worlds believes that there *are* possible worlds, but that these worlds are abstract. So they might be labeled "Abstract world realism." Only the first view, however, is called "modal realism," even though both are realists about modality. And, of course, one could be a realist about modality, but not be a realist about worlds—perhaps one believes in brute modal facts, e.g.—and so one would *technically* be a modal realist. Unfortunately, since the inapt terminology has stuck, I'll keep using it as well.

should not find it objectionable that such things are *parts* of people. Third, we've already admitted at the beginning of this section that our ordinary use of 'part of' is quite liberal, and so claiming that we have abstract things as part should be (in principle) no different than claiming that (e.g.) trigonometry is a part of mathematics. So even if one believes that there are possible worlds, but believes that possible worlds are abstract, not concrete, I can still accommodate my lump theory of objects to suit such a view. I will still maintain that ordinary objects are trans-world individuals—it is just that the worlds and world-parts in question are abstract rather than concrete.

Now imagine that you are not a modal realist (i.e., you do not believe in concrete possible worlds), but you are not an ersatzer either (i.e., you do not believe in abstract possible worlds). Still, you must have *some* story about what makes our modal statements true. You either are committed to possible worlds, and they are either concrete or abstract; or you are a fictionalist about possible worlds, but you have a story to tell about how these fictions work; or you are an eliminativist about possible worlds, and are committed to brute modal facts or truths, or brute modal properties, etc.[69] *Whatever* your modal story is going to be, I can accommodate the lump theory of objects to suit it: you tell me what's in your ontology to account for our rich array of modal truths, and then I will tell what ordinary objects are—mereological sums of spatial, temporal, and modal parts (where the metaphysics of 'modal parts' here is supplied by you, and the theory of modality that you accept).

[69] Or I suppose you could deny that there are modal truths at all. But then the Modal Objection, and all of the worries being dealt with in this chapter, would never get off the ground. Thanks to Ted Parent for discussion here.

And a similar adaptation of my lump theory of objects will apply to your favorite view of time. Let us suppose that you are a Presentist about time. You think that there only exists the present, and present objects, and that there is no such thing as the past, or the future, or any past or future objects such as dinosaurs or flying cars. Still, on such a view, you *do* have a way of grounding the truths of our tensed claims. “Bill Clinton was president” still comes out true on the Presentist view (as it does on the four-dimensionalist view, e.g.). It’s just that the metaphysical story about what makes it true is different than the four-dimensionalist story. According to one kind of Presentist, what makes the above past-tensed statements true is that Bill Clinton presently has the property *having been president*. So past-tensed statements are made true by presently existing objects having certain tensed properties. So if this kind of Presentist has already granted that there are tensed properties in her ontology, then I can accommodate my lump-theory of objects to suit her metaphysical preferences. I will maintain that tensed-properties are *parts* of ordinary objects.[70] Indeed, ordinary objects are mereological sums of spatial, temporal, and modal parts—it’s just that ‘temporal parts’ here can be interpreted in a Presentist-friendly way.

Analogous with the move made concerning modal parts, *everyone* has to have a story about our temporal truths. *Whatever* your temporal story is going to

[70] This is assuming two things: (i) that tensed properties are the truth-makers of tensed statements, and (ii) that the relation between an individual and their properties is mereological (e.g., an immanent theory of properties). Neither of these assumptions is uncontroversial, but I do not have the space here to defend them. My main point in flagging the assumptions is to show that my lump theory is somewhat accommodating and flexible; it can be adjusted to many different views of time and modality. But it is not completely non-committal. See section 5 of this chapter for further discussion. Also, see Aristotle, Plato, Frege, Armstrong, Campell, Forrest, Bigelow for a discussion on assumption (ii). See Loux “Aristotle’s Constituent Ontology OSM vol. 2. Craig Burne is a presentist who denies (i). Thanks to Jason Bowers for discussion here.

be, I can accommodate the lump theory of objects to suit it: you tell me what's in your ontology to account for our rich array of temporal truths, and then I will tell what ordinary objects are—mereological sums of spatial, temporal, and modal parts (where the metaphysics of 'temporal parts' here is supplied by you, and the theory of time that you accept).

Thus, even though I assumed at the outset a certain view of time and a certain view of modality, we can see now that I need not have done so. (In fact, I only did so to maintain the analogous moves between the temporal parts theorist and the lump theory of objects, and make my theory of objects more accessible.) So it is no objection to my lump theory of objects that its ontological commitments are too costly. My lump theory of objects can be accommodated to suit nearly any ontological view of the world, so long as that view has some story about what grounds our spatial, temporal, and modal facts. So there should little objection to my lump theory on the grounds that it commits one an outrageous ontology.[71]

Obviously, this claim goes double if CI is true. For if mereological sums just *are* identical to the parts that make them up, and I claim that ordinary objects are mereological sums of spatial, temporal, and modal parts (where what counts as 'spatial', 'temporal', and 'modal' parts is filled in by you and your favorite metaphysical world-view), then there have been no extra ontological commitments made by bringing on board CI and the lump theory of objects. The only ontological commitments you will have are those that were already in place prior to my theory of composition and my theory of objects. CI and the lump theory subsume your preferred theory of time and modality, and deliver an

[71] This of course depends on how sparse your ontology already is. See below, section 5.

ontologically friendly package—ontologically friendly *relative* to commitments you are already beholden to.

But perhaps you are thinking: Look, I don't object to this view because I think it is ontologically excessive. I object to this view because it seems just plain unintuitive and crazy!

I do not have time for a complete defense of a lump theory of objects, so I will just say a few quick words here. First, I think our intuitions about what objects are—the underlying metaphysical facts of objecthood—are guided in part by what we say, and the sentences and utterances we accept. Some of the things that we say are the sentences (1)-(9) that we listed at the beginning of this section. And, as discussed above, most of these do not straightforwardly involve spatial or material parts; rather, many of them involve aspatial or immaterial parts, depending on your theory of (e.g.) events, propositions, reasons, properties, etc. Insofar as any of these sentences are acceptable, thinking about objects as having more than just spatial or material parts *is* acceptable.

Second, however, we use our ordinary intuitions to *motivate* us to think carefully about metaphysics, to get us initially intrigued about metaphysical puzzles. It may turn out that, after some reflection, our ordinary intuitions are misguided. We have been known to think that the earth is flat, that it is at the center of the universe, that objects such as tables and chairs are not mostly empty space, that Newtonian physics is correct, etc.; we don't have a terrific history of *intuiting* the truth. So, as a purely general point, I do not take 'incredulous stare' objections as having much weight, dialectally.[72] Of course, it will always be better, all else being equal, that a theory is intuitive rather than not. But if the only complaint against the lump theory object is mere incredulity, then I will consider my defense of the lump theory of objects as a success.

Finally, in metaphysics, it is common practice to let the utility of a view count as evidence in favor for it.[73] Sider, for example, thinks that the ability of four-dimensionalism to solve classic philosophical problems is a good reason to think that the view is true. If that's right, then it seems that my lump theory of objects adopts all of the reasons that Sider has for thinking that *his* temporal parts view is true (since I posit that there are at least temporal parts), and then some.

Sider's view takes a decidedly *ad hoc* turn when he considers objects (such as Goliath and Lumpl) that have completely overlapping temporal careers. Sider cannot resort to his temporal parts theory to solve this particular puzzle, because by stipulation, Goliath and Lumpl share all of their temporal parts. Sider claims that it is due to an "inflexible account of *de re* modalities" that is responsible for generating puzzle cases such as Goliath and Lumpl. He claims that the purported distinguishing feature between Goliath and Lumpl—e.g., *that Lumpl could have survived being smushed, but Goliath could not have*, etc.—should be resisted as a distinguishing feature. Rather, Sider claims that

> "…surely [this apparent difference] is due in some way to a shift in our conceptualization of a single object, rather than a difference between two

[72] Nor does Lewis. See Lewis (1986).

[73] See Lewis (1986); Sider (2002); etc.

> objects; surely, adopting a flexible account of *de re* modal predication, or a flexible error-theory, is a more sensible alternative than multiplying entities corresponding to their modal differences." [74]

Sider then invokes the notion of counterparts to solve the Goliath and Lumpl puzzle. He claims:

> "To say that Lumpl might have survived flattening is to say that Lumpl has *lump* counterparts that survive flattening; to say that Goliath could not have survived flattening is to say that Goliath has no *statue* counterparts that survive flattening. Nonetheless, Lumpl *is* Goliath."

So Sider claims that (i) we must choose between either ontological excess due to individuating objects according to their modal properties or adopting a flexible account of *de re* modal predication, or a flexible error theory, and (ii) that we should avoid ontological excess, avoid an error-theory, and instead adopt a counterpart theoretic explanation of how it is that we have a flexible account of *de re* modal predication.[75]

But (i) is a false trilemma, which undermines our primary reason for accepting (ii). On my lump theory of objects it will *not* be ontologically excessive to individuate objects (such as Goliath and Lumpl) according to their modal properties. I claim that ordinary objects are mereological sums of spatial, temporal, *and* modal parts. If Goliath and Lumpl have completely overlapping temporal careers, this need not mean that we cannot distinguish them—for they will not have completely overlapping world-careers (the details of this will be

[74] Sider 2001, p. 113-4.

[75] This last claim is not wholly supported by the passage I've quoted above, but can be surmised by what Sider does say in other sections of Sider (2001).

fleshed out below).[76] But it will not mean that we are being ontologically excessive either, since I am not positing any additional items that Sider himself does not already have in his ontology. For Sider already has all of the lump counterparts, and all of the statue counterparts of Goliath and Lumpl. He maintains that Goliath is identical to Lumpl; I claim that Goliath is distinct from Lumpl. This might seem then, on the face of it, that I am adding to the number of entities in my ontology: I have just distinguished two objects where he thinks there is one.

But I maintain that what ‘Goliath’ and ‘Lumpl’ refer to when Sider claims that Goliath is identical to Lumpl is merely a world-*chunk*—a world part that certain trans-world objects happen to share. When I claim that Goliath and Lumpl are distinct, ‘Goliath’ and ‘Lumpl’ refer to lumpy, trans-world, trans-spatiotemporal objects. In one world, it just so happens that Goliath (the trans-world fusion) and Lumpl (the trans-world fusion) overlap one of their *world* parts—just as two trans-temporal mereological sums can overlap one their *temporal* parts (e.g., Tib and Tibbles), and just as two trans-spatial mereological sums can overlap one or more of their *spatial* parts (e.g., an intersecting road). Goliath and Lumpl do not overlap *all* of their world parts, which is why it is that Goliath and Lumpl (the trans-world objects) are distinct; but the do overlap (at least) one of them, which is why we tend to (mistakenly) think that Goliath and Lumpl are completely coinciding.

[76] For a different take on the idea that purported co-incident objects (e.g., Goliath and Lumpl) are cases of (incomplete) overlap, rather than total coincidence, see L.A. Paul “Coincidence as Overlap” in Nous (2006). Paul takes objects to be fusions of properties, which may be compatible with the lump theory of objects that I am endorsing here.

Given that Sider already countenances (e.g.) lump counterparts and statue counterparts—i.e., individuals in other possible worlds that I claim are the world parts of trans-world mereological fusions—and given that his claim that Goliath is identical to Lumpl is translated on my view as merely a case of world-chunk overlap, my view will be no more ontologically excessive than Sider's. I am merely taking the 'part' part of counter*part* seriously. What Sider countenances as counterparts of world-bound individuals, I countenance as genuine world parts of trans-world individuals.

Moreover, I will have the added advantage of not appealing to counterpart theory in a suspiciously ad hoc way, to solve the modal analog of the temporal puzzle of the statue and the clay. Having parallel mereological explanations of spatial, temporal, and modal differences of distinct objects is theoretically elegant, which should add to its overall plausibility. There are no spatial, temporal, or modal differences, I claim, without a difference in spatial, temporal, or modal parts. Not so on Sider's four-dimensional view, however, where spatiotemporal differences are cashed out in terms of a difference in spatiotemporal parts, but where a modal difference is cashed out in terms of counterpart theory, and the flexibility of *de re* modality.

If in the course of the rest of the chapter, I can show how my lump theory of objects can solve the four constitution puzzles delineated above, then I will have thereby provided some reason to think it is true. If I can show that my lump theory solves the puzzles more elegantly than any of the competitors, then this will only add to the lump theory's appeal.

So in the end, if we have evidence that my lump theory of objects has enormous utility as a theory of objects—if it can solve puzzles, be explanatorily robust, be theoretically elegant, and be (reasonably) ontologically responsible—then this will counterbalance any initial cognitive resistance to it. A theory's ability to solve a myriad of problems should always count more than the theory's (initial) un-intuitiveness, all else being equal.

Alright. Now that we have the outlines of a lump theory of objects on the table, let us return to Trenton Merrick's claim in his argument that CI entails ME. I had said previously that I agreed with this premise; I think that CI *does* entail ME. But in light of my endorsement of a lump theory of objects, we can see that my interpretation of such a premise yields a slightly different interpretation than the one that was intended by Merricks.

Composition as Identity (CI): Any composite object, O, is (hybrid) identical with the objects $O_1, \ldots, O_n$ that are its parts; $O =_h O_1, \ldots, O_n$.

Mereological Essentialism (ME): Any composite object, O, is composed of (all and only) its parts $O_1, \ldots, O_n$, in every possible world in which O exists.

ME claims that any composite object O, is composed of (all and only) its parts $O_1, \ldots, O_n$, in every possible world in which O exists. But notice that this is going to turn out trivially true on my lump theory of objects. Suppose O is a lumpy, trans-world object, with parts $O_1, \ldots, O_n$ in different possible worlds. But then O doesn't exist in any *one* world—by hypothesis, O's parts $O_1, \ldots, O_n$ are scattered across different possible worlds. If ME was false, then O would exist in a world without O_1, …, O_n. Yet in every world in which O exists (none of them!), O is composed of all and only its parts O_1, …, O_n. So ME is never false; so it is true.

Now suppose O is a world-bound object—a strange object that has no modal properties because it is not worldally-extended; it is just a world-*chunk*. It exists in only one possible world, and no other. (This is analogous to an object that has no temporal properties because it is not temporally-extended; it is just a time-*slice*.) And suppose O is composed of (world-bound) parts O_1, …, O_n. If ME was false, then O would exist in a world without O_1, …, O_n. Yet in every world in which O exists (just the one!), O is composed of all and only its parts O_1, …, O_n. So, again, ME is never false; so it is true.

So either way—whether we are considering lumpy, trans-world fusions, or unlumpy, world-bound fusions—ME is true.

One might claim that this is a bit of a cheat on my part: I endorse ME only because it is trivially true given my lump view of ordinary objects. But ME, interpreted this way, seems to capture an intuition that metaphysicians thinking about modality have held for quite some time. Many metaphysicians have thought that claims about what is possible and necessary are themselves necessary.[77] If it is possible for me to be at a bar right now, then it seems necessary that it is possible for me to be at a bar right now. This intuition coupled with a liberal notion of parthood, such that we consider the idea our modal truths are made true by having modal parts (e.g., different parts in different possible worlds), just delivers us the lump theory of objects I am endorsing here. And on

[77] I.e., the modal system S5, where one accepts the following axiom: $\Diamond p \rightarrow \Box\Diamond p$.

such a view ME is true! If modal claims are made true by having modal parts, and if modal claims are true necessarily, then ME simply follows—i.e., it turns out that we have all of our parts necessarily, one way or another.[78] As such, I think that ME can be plausibly defended, and in such a way that blocks Merrick's argument. We simply accept that CI entails ME, accept CI, and then show how our theory of objects entails that ME is (plausibly!) true. In this way, Merrick's argument will be ineffective against CI.

4.3 Back to the Puzzles

Now let's apply my theory of objects to the constitution puzzles. Take, for example, the Marriage Paradox. We suppose that people are just a collection of molecules. And we also suppose that there are at t_1 two people, p_1 and p_2—i.e., two groupings of molecules, M_1 and M_2, such that $p_1=M_1$ and $p_2=M_2$—exchanging vows on a wedding day. Yet seven years later, at t_7, there are two groupings of molecules, M_3 and M_4, which are distinct from M_1 and M_2, such that $M_1 \neq M_3$ and $M_2 \neq M_4$. So by the transitivity of Identity, $p_1 \neq M_3$ and $p_2 \neq M_4$. But then the two people, p_1 and p_2 are not bound by the vows to be committed to each other, since they presumably do not exit at t_7 (only M_3 and M_4 do).

This puzzle assumes that people are identical to a grouping of molecules *at a particular time*. A four-dimensionalist view of the matter, however, claims that people are these four-dimensional worms, mereological sums of spatial and temporal parts. It is not the case that two people such as p_1 and p_2 are identical

[78] That is, it's either because we are trans-world objects, or world-bound objects, but either way, we have all of our parts necessarily.

to some molecules at a particular time, and so it is *not* the case that $p_1=M_1$ and $p_2=M_2$. Rather, p_1 and p_2 are each identical to some mereological sum of spatial and temporal parts. Moreover, what it would be to make a promise or vow on the four-dimensional view might be to promise that you, *qua* worm, will be committed to such-and-such; and so all of your temporal parts, from the time of the promise onward, are bound by the promise.[79]

Since my lump theory of objects subsumes the four-dimensional strategy, I will make a similar move, modulo the commitment to a particular theory of time. Since people, according to my theory of objects, are simply lumpy objects, with spatial, temporal, and modal parts, then I will deny the claim that the two people involved are identical to some molecules at a particular time; i.e., I claim that $p_1 \neq M_1$ and $p_2 \neq M_2$, and so the inference that a person does not survive a change in their spatial parts is blocked.

Similarly, with the Ship of Theseus puzzle. I will claim that an object is identical to all of its spatial, temporal, and modal parts. Of course, in the Ship of Theseus, we have the added complication of having a competitor for identity (recall: there is ship A in the beginning, there is ship B that is the result of small replacements of parts over time, and then there is ship C which composed of all of the material parts (board, mast, etc.) that composed ship A). But this shouldn't matter. For our mistake was in setting up the puzzle. We assumed that there were three candidates for identity ship A, ship B, and ship C. Of course, on my lump theory of objects, *ships* proper are five-dimensional lumps—mereological

[79] I do not intend to commit a four-dimensionalist to a particular view of promises here; I merely mean to suggest that this is one way the four-dimensionalist could go, and it would add to a nice detail to the solution of the puzzle.

sums of spatial, temporal, and modal parts. So, strictly speaking, calling A, B, or C a ship was a category mistake. A, B, and C were defined only in terms of their spatial parts (boards, mast, sail, etc.), and being located at a time. According to the lump theory, ordinary objects don't exist *at* a time. Ordinary objects are temporally (and modally) extended.

Still, you might think that this is a merely technical objection. "Who cares whether we call A, B, and C *ships*," you might think. "There is still a poignant question: what is the relationship between A, B, and C (whether they count as ships or not)? We had reason to think that A=B, and we had reason to think that B=C, but we also had reason to think that A≠C, thus violating the transitivity of identity. So this is a puzzle whether or not you think that the objects involved are properly ships or not."

The point about whether the objects involved are ships or not *is* important, however, since it will explain why it is that we deny one of the above identity claims. Our reason for thinking that A=B tracked our intuition that objects can survive a loss, gain, and replacement of parts, and still remain the same object. But this, according to the lump theory of objects, can be glossed as *one* object that differs in some of its temporal parts, just as you (or your body) might differ in some of your in spatial parts—e.g., your foot is flat and you head is round.

So suppose we take 'A' to designate some material, spatial parts at a time, and 'B' to designate some material, spatial parts at another time, then A≠B because A and B differ in some of their material, spatial parts—e.g., A is made up of boards b_1, …, b_n and B is made up of o_1, …, o_n, and none of the b_is are identical to any of the o_is.[80] The analogy to your body: your foot is not identical to your head because your foot is made up of molecules $m_1, \ldots, m_n$ and your head is made up of molecules $n_1, \ldots, n_n$, and none of the m_is are identical to any of the n_is. But just because A might not be identical to B does not mean that there isn't *one* ship that has A and B as parts. Similarly: just because your foot is not identical to your head does not mean that there isn't *one* body that has your foot and head as parts. Our reasons for thinking that A=B in the first place are now explained away as a mistakened bit of reasoning. We thought that just because there is one thing (the ship!) that has A and B as (temporal) parts, then A must be identical to B. But this would be just as mistaken as concluding from the fact that your body has your foot and head as parts, that your foot must be identical to your head.

So a lump theorist might deny that A=B, without denying that there is a single thing—the ship!—that has A and B as (parts), and survives over time. Explanation: what it means to 'survive over time' is receiving a different analysis than we may have first supposed (i.e., what it is for an object to 'survive over time' is just for *it*—the mereological sum of spatial and temporal parts—to have temporal parts that are connected in the right way (causally, e.g.)).

What about C? 'C', we might claim, picks out (only!) some material, spatial parts—the boards, mast, sail, etc., that 'A' picked out. And so A=C, if all of the

[80] It should be noted that this is *not* the solution the Sider prefers, since he thinks that 'A' and 'B' pick out spatiotemporal time-slices, rather than mere spatial parts as I am assuming here. See below for discussion.

material, spatial parts are identical, which by stipulation they were.[81] But this does not then mean that either A or C is a *ship*, since ships are lumpy objects, mereological sums of spatial, temporal, and modal parts. So even though a lump theorist will admit that A=C, she will deny that this means that there is another *ship* that is a competitor for the ship that was under discussion a moment ago—the mereological sum of lots of spatial and temporal (and modal parts), including A and B.

Of course, it might be argued that there is a distinct ship that includes spatial parts A, C (since A=C), and a bunch of temporal and modal parts, such that the lumpy object we are left with is one that began as a bunch of boards $b_1, \ldots, b_n$, then was just one board, then two, then three, then four, etc., until it was a bunch of boards again $b_1, \ldots, b_n$. This would just be the mereological sum that results if we 'trace' the object that is all of the original boards, and then an accumulation of those same boards as they are discarded from the *other* ship. If such a trans-spatiotemporal (trans-world) object is indeed a ship, then it would be distinct from the other ship, since they have distinct temporal (and presumably modal) parts. But even so, there is no puzzle here. At least, we no longer have a violation of the transitivity of identity as we did when the puzzle was originally being generated. There might be another issue as to which ship—which mereological sum of spatial, temporal, and modal parts—we mean to be picking out when we dub ships by a name, such as "Ship of Theseus." But there is no genuine paradox here. We will not be able to generate a contradiction, for

[81] Again, I am ignoring for now any temporal differences between A and C, and only concentrating on the spatial properties (or parts).

example, since we will simply deny one of the identity claims that was responsible for it—namely, we deny that A=B.

Alternatively, we might deny that ‘A’, ‘B’ and ‘C’ pick out *merely* spatial parts; we might claim that ‘A’, ‘B’ and ‘C’ as pick out spatio*temporal* parts.[82] Then the solution to the puzzle would be as follows: there are two relevant mereological sums, or ships. One is the mereological sum of all of the spatiotemporal parts A through B, and one is the mereological sum of all of the spatiotemporal parts A through C. Each of these mereological sums is distinct, because they have distinct spatiotemporal parts (in particular, one has B as a part, and the other has C as a part). But each mereological sum overlaps or shares the spatiotemporal part A. But overlap of spatiotemporal parts is no more of a problem than overlap of a (mere) spatial part: Franklin St. can overlap Columbia such that they share a bit of the road where they intersect; your office can overlap your colleague’s office by sharing a wall, etc. So if we think that ‘A’, ‘B’ and ‘C’ pick out spatiotemporal parts (instead of merely spatial parts) then it will not be the case that A=C; but it will be the case that the mereological sum that has A and B as parts, and the mereological sum that has A and C as parts overlap: the sums share part A. Either way, however, the lump-theorist (as well as the four-dimensionalist) has an elegant solution to the puzzle.

And similar reasoning will apply to the remaining puzzles Tib and Tibbles, and Goliath and Lumpl. In Tib and Tibbles, we simply deny that Tibbles (the cat) is an object that can wholly exist at a time. Like the ships and people, cats are lumpy objects, mereological sums of spatial, temporal, and modal parts. The

[82] This is the solution Sider favors. Sider 2001.

puzzle is generated, however, by the mistaken assumption that cats are only composed of spatial parts, or—more carefully—that they are not mereological sums of spatial *and* temporal parts. So in our argument—

1. **Tibbles at t_1 = Tibbles at t_2** (By commonsense intuition: we don't think that cats go out of existence when they lose their tails).

2. **Tib at t_1 = Tib at t_2** (Nothing happened to Tib at all!)

3. **Tibbles at t_1 ≠ Tib at t_1** (By LL: one has a tail and the other doesn't).

4. **Tibbles at t_2 = Tib at t_2** (Every region occupied by Tibbles is occupied by Tib; "they" have no difference-making feature).

5. **Tibbles at t_1 = Tib at t_2** (By 1, 4, Substitutivity of Identicals).

6. **Tibbles at t_1 = Tib at t_1** (By 5, 2, Substitutivity of Identicals).

7. **Tibbles at t_1 = Tib at t_1 & Tibbles at t_1 ≠ Tib at t_1** (3, 6, &I)

—we would (at least) deny premise 1. 'Tibbles' is the name of a cat, and cats are not the sorts of things that wholly exist 'at' a time, just as you do not exist wholly where your arm is or wholly where your head is. 'Tibbles', rather, picks out a mereological sum of spatial and temporal parts, one of which is (e.g.) a spatiotemporal slice at t_1, another of which is (e.g.) a spatiotemporal slice at t_2 . These two parts, of course, are not identical to each other, but (again) that no more implies that there isn't a single thing that has those slices as parts, as does the fact that your foot is not identical to your head implies that there isn't a single thing (your body) that has those appendages as parts.

Moreover, once we trace the Tib spatiotemporal worm, and compare it to the Tibbles spatitemporal worm, we will see that Tib and Tibbles merely overlap one of their spatiotemporal parts—the part at t_2. But, again, overlap is never a problem. Thus, there is no contradiction, and the puzzle is solved.

As for Goliath and Lumpl, we will need to move beyond an appeal to spatiotemporal parts, and appeal instead to modal parts—and this is where, incidentally, we will see an advantage of the lump theory of objects over the four-dimensional, temporal parts view. Recall that Goliath and Lumpl come into and go out of existence simultaneously; they have completely overlapping temporal careers. So unlike the previous puzzles, it will not help to appeal to the temporal parts of Goliath or Lumpl—by stipulation, Goliath and Lumpl share all of their spatial and temporal parts. Yet the features that were supposed to distinguish them were their modal properties: Lumpl *could* survive being smushed or rearranged, but Goliath *couldn't*. Goliath *could* survive the loss of a toe or an arm, say, but Lumpl *couldn't*. So by the Indiscernibility of Identicals, Lumpl and Goliath are distinct; yet if so, then this violates our principle **S**:

> **S**: Two things cannot completely occupy exactly the same place or exactly the same volume (or exactly the same subvolumes within exactly the same volume) for exactly the same period of time.[83]

Of course, if we accept my lump theory of objects, then we will quickly realize that **S** isn't quite right—in particular, it is misleading, and it is not strong enough. It is misleading because it suggests that objects can be wholly or completely located at a time. If ordinary objects are indeed lumpy, then they are mereological sums of spatial, temporal and modal parts. They are not wholly

[83] Again, this is pulled from David Wiggins, "On Being in the Same Place at the Same Time," in *Philosophical Review* (1968).

located at a particular place, time, or world. Moreover, S is not strong enough because, as the case of Goliath and Lumpl show, some objects might completely overlap spatially and temporally, yet still be distinct. What we need is a principle that claims that no two objects can completely overlap spatially, temporally, *or* worldally (or modally, if one prefers). We should adopt something like principle **S+**:

> **S+**: Two things cannot completely overlap in their spatial, temporal, and modal parts; for any object, x, and any object, y, if x and y completely overlap all of their spatial, temporal, and modal parts, then x = y.

Since S+ is stronger than S, it claims at least as much as S does. So someone who accepts S+ will be friendly to the spirit of S, albeit she will want need to reformulate S so that it does not presuppose that objects are wholly present at a time.

But even if we accept the stronger S+, Goliath and Lumpl will not be in violation of it if we accept the lump theory of objects. This is because while it may be the case that Goliath and Lumpl have completely overlapping spatiotemporal careers, they do not have completely overlapping world-careers. Indeed, by the very stipulation that they vary in their modal properties, this means (on the lump theory) that they vary in their modal *parts*. What makes it true that Goliath could have lost an arm, but Lumpl couldn’t have, is that there is a world where Goliath has a part and is armless, yet Lumpl does not have a part in any world that is armless. What makes it true that Lumpl could survive being smushed but Goliath couldn't have is that there is a world where Lumpl has a part that is smushed, but Goliath does not have a part in any world that is smushed.

On the spatial analog, what makes it true that the road changes terrain is that it is (e.g.) bumpy in one part and smooth in another. On the temporal analog, what makes it true that you changed from being short to tall, is that you have one temporal part that is short and another that is tall. Similarly, on the modal dimension, what makes it true that you could have won the lottery, but in fact didn't, is that you (the trans-world object) have one modal part that wins the lottery and one modal part that does not.

So, Goliath and Lumpl have parts that overlap in (at least) one world—the world that generates the puzzle. But they do not overlap in all worlds, or else they would not vary in their modal properties (and hence, 'they' would not be distinct). And so that it is how the lump theory of objects successfully solves the Goliath and Lumpl puzzle of constitution.

Incidentally, there is a modal analog to the Tib and Tibbles puzzle that is discussed in the literature.[84] Let us call this the puzzle of Nib and Nibbles. Consider a cat, Nibbles, who, in fact, never loses his tail. Surely, however, Nibbles *could have* lost his tail (and still survived). Using world-talk, we say that what makes it true that Nibbles could have lost his tail is that in some world Nibbles *does* lose his tail. Let us call the part of Nibbles minus his tail, Nib. And let's go to the world where Nibbles loses his tail. But then, this is just a world where Nib and Nibbles (seemingly) completely coincide!

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[84] See Van Inwagen (1981), Heller (1990), Sider (2001), etc.

Of course, on the lump theory of objects, such a puzzle will be seen as corrupted from the start. This is because the set-up assumed that ordinary objects such as cats and tails are wholly located *at* a world. Not so, says the lump theorist. Nibbles is a lumpy, trans-world object that has lots of parts in different worlds. Nib is, likewise, a lumpy trans-world object that has lots of parts in different worlds. The world where Nib and Nibbles purportedly completely coincide, is merely a case of overlap of a world part.

Interestingly, Sider thinks that the modal version of Tib and Tibbles—what I have here called the puzzle of Nib and Nibbles—is a paradox for everyone. He claims:

> "…the modal version of the paradox of undetached parts confronts everyone, not just a defender of temporal parts. A reasonable attitude about this sort of modal paradox might be a bit like one attitude towards the liar paradox: 'well, *that's* a difficult problem, and must be solved somehow, but until I learn how to solve the problem, I will carry believing what seems to be right on other grounds'."[85]

Sider then claims that his preferred solution here mirrors his preferred solution to the Goliath and Lumpl puzzle (not surprisingly): he appeals to counterpart theory, and flexible *de re* modal predication.

There is no need for this seemingly *ad hoc* maneuver on the lump theory of objects, however, since we merely appeal to the differences in parts of trans-world objects to individuate Nib and Nibbles. Moreover, the modal analogs of temporal puzzles (e.g., Goliath and Lumpl, Nib and Nibbles) no longer seem like paradoxes on a par with the Liar. On the contrary, we have a very straightforward

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[85] Sider (2001: 221).

explanation of how the puzzles are generated, and a solution to offer that is as elegant as Sider's solution to the temporal version of the puzzles. So, again, if utility and elegance are the measure of success for a metaphysical theory, the lump theory of objects has success in spades.[86]

5. Back to the Modal Objection

Let us now return to CI and the objection that began this chapter: the Modal Objection. Recall that the worry for CI was that parts cannot be identical to wholes because parts and wholes vary in their modal properties. Parts (such as the molecules that compose your hand) can (e.g.) survive being scattered, but wholes (such as your hand) cannot.

But let us keep in mind the lessons we've learned from my lump theory of objects, and its application to the constitution puzzles: most ordinary objects are not merely spatial parts. Rather, ordinary objects are mereological sums (lumps)

[86] Another advantage of my lump theory of objects is that it avoids Sorites-like arguments for the Eliminativism of ordinary objects. Van Inwagen (1990), Unger (1979) ["I do not exist" in Perception and Identity, G. F. MacDonald (ed.) (1979)], and Merricks (2001) all give such step-wise arguments to conclude that ordinary objects such as tables and chairs do not exist (i.e., they argue against the existence assumption). These arguments rely on accepting a tolerance for small changes—e.g., we must at least agree that objects can lose small parts. If my lump theory of objects is correct, however, and we should thereby embrace mereological essentialism as I've shown above, then strictly speaking objects do not lose parts, not even really, really small ones. So, one will block all sorties-type arguments for Eliminativism since we need not grant that we have a tolerance for objects losing parts. There are other arguments for Eliminativism that do not rely on Sorites-type objections (e.g., Merrick's arguments concerning overdetermination), but these arguments will be blocked by embracing (only) CI, or embracing CI and a lump theory of objects. Merricks claims that a ball and the parts of a ball seemingly *both* shatter a window, thus giving us reason to think that the shattering is overdetermined by the whole (ball) and its parts. According to CI, the ball is identical to its parts, so there are no distinct things to overdetermine anything. According to CI plus the lump theory of objects, the ball is a lumpy trans-world object that overlaps in this world with another lumpy, trans-world object (e.g., the ball, and the molecules of the ball). Since overlap is never a problem, then causation by objects at their overlapped bits should not be a problem either. So arguments for Eliminativism that appeal to overdetermination will also be ineffective if we accept CI, or accept CI and my lump theory of objects.

of spatial, temporal, *and* modal parts. Now, sure, there are some odd objects that are not extended worldally (or modally, if you prefer); there are some objects that are indeed world-bound. But such objects won't have modal properties, since what it *is* to have modal properties (on the lump view) is to be extended across worlds (or, at least, such objects would inherit certain modal properties trivially, because they only exist in one possible world).[87] Similarly, a four-dimensional temporal parts theorist might admit that there are non-temporally-extended objects, instantaneous objects that are extended only spatially, say. But such an object wouldn't have a history, a past, or a future. For what it *is* to have these temporal features is to be extended temporally—i.e., to be a mereological sum that has various temporal parts.

So someone claims that the parts (some molecules, e.g.) could survive being scattered, but the whole (your hand, e.g.) could not. On the lump theory of objects, this claim—like any other modal statement—is made true by having lumpy trans-world mereological sums whose world parts are doing thus-and-so. So 'the molecules' picks out a trans-world, trans-spatiotemporal object that has different (world) parts in different possible worlds. In some worlds, the (world) parts of this (trans-world) object has (spatial) parts that are scattered; in other worlds, the (world) parts of this (trans-world) object has (spatial) parts that are *not* scattered. This, then, is what makes it the case that (e.g.) the molecules *could have been* scattered—the relevant trans-world object has (at least) one world part that *is* scattered. In contrast, 'your hand' picks out a trans-world, trans-

[87] Recall that I am adopting world-talk because of its extreme utility. If you are not committed to possible worlds, then take this talk of 'being *extended* across possible worlds' metaphorically, and apply the appropriate translation schema to generate the modal claims you do accept.

spatiotemporal object that has different (world) parts in different possible worlds. Yet this trans-world object has no (world) parts in any world where its (spatial) parts are scattered. So this is what makes it true that (e.g.) your hand *could not have* survive being scattered—the relevant trans-world object has no part in any world where is it's spatial parts are scattered.

Thus, contrary to what some might have thought, I *will* grant that ordinary objects such as molecules and hands can differ in their modal properties. Yet this does *not* thereby result in an objection to CI. This is because, on my theory of objects, ordinary objects such as (e.g.) molecules and hands turn out to be lumpy mereological sums of spatial, temporal, and modal (or world) parts. As such, their modal features are inherited from their world (or modal) parts. If we ever have a case of overlapping world parts (which we very often do), then this presents no more of a problem than spatial overlap, (e.g.) intersecting roads. The reason many are perplexed by cases such as (e.g.) your hand and its molecular parts, is because they consider your hand and its molecular parts to be world-bound objects. Yet on my view, these trans-world objects are merely overlapping some of their world parts (as well as some of their spatiotemporal parts). So a case of (purported) complete coincidence (e.g., your hand and its parts) is now seen as mere world-part overlap. And so the Modal Objection is no longer a problem.

"But wait a minute!," you might be thinking. "Haven't you just been trying to convince us that your hand is *identical* to its parts?! And haven't you just now said that your hand is *not* identical to its parts (because they have different world-parts, apparently)? Prior to this chapter, you were defending Composition as

Identity tooth and nail. Now, in order to deal with the Modal Objection, you introduce a wacky, lump theory of objects, just to get out from under the objection. Yet in so doing, you seem to have undermined your entire thesis! Why in the world did you need to defend CI—i.e., that your hand is identical to its parts—if your lump theory of objects was going to ultimately deliver the verdict that your hand is *not* identical to its parts!?"

First, let's not be mistaken. I *do* think that your hand is identical to its parts. It's just that what counts as *your hands* and *its parts* is different than you may have supposed prior to reading this thesis. Your hand has parts—it has spatial, temporal, and modal parts. We ordinarily say that your hand is identical to (just) some spatial parts, e.g., some molecules. But just because we often restrict our discourse to spatial parts does not mean that these are the only parts of your hand that there are. And even when we say this, we usually have in mind just a world-chunk of your hand—the part of your hand that is in *this* world. Your (whole) hand—the trans-world object—is indeed identical to all of *its* spatial, temporal, and modal parts. And the relation between your hand and all of *these* parts is indeed identity. But this is just to endorse CI. So endorsing a lump theory of objects in no way undermines CI; it is completely compatible with it. The only difference is that now when we are talking about parts and wholes, we have a much broader (more liberal) conception of what counts as parts and wholes. And so this may seem (at first) to undercut the radical-ness of the CI thesis. But so what? If in embracing a lump theory of objects I have thereby made CI less radical and more intuitive, then so much the better for my defense of CI.

Second, CI is concerned with what the composition *relation* is—namely, identity. The lump theory of objects is a theory about what objects *are*. As I had claimed in previous sections of this thesis, a discussion of the composition relation is quite independent of claims about what kinds of things there are in the world.[88] Sure, I might have assumed the Existence Assumption (i.e., that ordinary objects exist), and the Parthood Assumption (i.e., that these objects have parts). But these were minimal assumptions, which I later admitted could be compatible with (e.g.) an idealist world, or a material monist world. I merely wanted to assume that there were indeed parts and wholes to give us a solid foundation for talking about the composition relation. In the end, if the only parts and wholes that exist are immaterial, this shouldn't affect the CI thesis in the slightest. As long as the relation between parts and wholes is identity, then CI is true; it doesn't matter what the rest of the world is doing, or what it looks like, or whether it's material or immaterial or what.

The lump theory of objects, on the other hand, is a slightly more substantive thesis about what kinds of things there are. It boldly claims that ordinary objects are lumpy trans-world sums of spatial, temporal, and modal parts. Now, sure, I was somewhat accommodating in positing this view. If you don't like concrete possible worlds, for example, then you could have abstract world-parts as parts. If you don't like worlds at all, you could have brute modal properties as parts. If you don't like being committed to time, you could have temporal properties as parts. But as accommodating as I can be, at some point my theory makes ontological commitments: I claim that ordinary objects are

[88] This chapter, p. 36.

mereological sums with spatial, temporal, and modal parts (how exactly you cash these parts out is of course up to you). If you deny that there are such things as spatial, temporal, or modal parts (however defined), then you will object to my lump theory of objects. Even so, the point is that my lump theory of objects is a decidedly weighty metaphysical thesis about the ontology of ordinary objects. CI is thesis about the composition relation. As such, embracing one shouldn't (in principle) undermine the other.

Finally, as should be evident in this chapter, I think that CI and the lump theory of objects are nicely suited for each other, rather than undermining of each other. If Merricks is right, then CI entails Mereological Essentialism. If I am right, then CI is true. Yet if the lump theory of objects is correct, then we can see that Mereological Essentialism is not a view to be avoided; nor is it incoherent, nor is it a view that should be outright rejected (without argument). If so, however, then this will undermine Merricks' modus tollens of CI. If Mereological Essentialism is not crazy, then it won't matter that CI entails it. We embrace CI because of the arguments I have given throughout this thesis; we embrace the lump theory of objects because of the arguments I have put forward in this chapter; and then we can embrace the entailment from CI to Mereological Essentialism, and Merricks' argument is ineffective. And, since Merricks' argument is the contrapositive of the Modal Objection against CI,[89] if we have

[89] This point is made above, p. 3. The Modal Objection claims that the parts and whole differ in their modal properties, and so CI can't be true. The Mereological Essentialism worry claims that *if* CI is true, then the parts and wholes cannot differ in their modal properties. And so if the parts cannot survive a loss of parts, neither can the whole; thus, wholes (i.e., any object made of parts) must have their parts essentially.

rendered Merricks' argument ineffective, then we have rendered the Modal Objection ineffective as well.

Can one defend CI *without* embracing the lump theory of objects? Yes, of course. If you object to my lump theory of objects, you can still embrace CI and avoid the Modal Objection. As was shown above, the Modal Objection is a variant of the modal version of the constitution puzzles (e.g., Goliath and Lumpl, Nib and Nibbles). Suppose you already have a solution to those puzzles. Then such a solution will simply carry over to the Modal Objection. For example, one might be inclined towards a Sider-like response to puzzles such as Goliath and Lumpl. One might claim that Goliath and Lumpl are indeed identical, it's just that when we run our counterfactuals, a single object can produce seemingly distinct modal properties, depending on which counterparts we are taking under consideration. Goliath *qua* lump could survive being smushed, but Goliath *qua* statue could not, etc. But if this is the solution to the modal puzzles that you favor, then this solution will apply to the Modal Objection (against CI) as well. You could claim that, yes, (e.g.) your hand is identical to the molecules that compose it. It's just that your hand, *qua* parts, can survive being thrown in a blender, but your hand, *qua* hand, could not, etc. We simply run the analogous response that you are prepared to give in the cases of Goliath and Lumpl and Nib and Nibbles, and apply it to the Modal Objection. Then one could embrace all of the other arguments for CI that I have presented throughout this thesis. And so, this is just one way one could embrace CI, reject the lump theory of objects, and still have a response to the Modal Objection.

Another way one could embrace CI, yet not endorse my lump theory of objects, is to adopt L.A. Paul's theory of objects, which maintains that ordinary objects are fusions of properties. [90] Paul endorses a *mereological* bundle theory, and claims that objects are mereological bundles or sums of properties; as such, objects are more than mere spatiotemporal parts. This view differs from my lump theory of objects, since on my view, I need not have a view about properties, and how they are related to ordinary objects. My view merely claims that objects are mereological sums of spatiotemporal and world (or modal) parts. Whether these parts are ultimately brute properties, or some other type of (non-property) abstract bits, or concrete world-chunks, etc., is left up to your preferred ontology. Moreover, I need not definitively say whether bundle theory is correct or not, since properties need not get into the mix (if your ontology is property-averse, e.g.).[91] Also, Paul ultimately wants to reject unrestricted or universal composition (universality), whereas I embrace it.[92] Nonetheless, if one has reason to prefer Paul's theory of objects over the lump theory of objects presented in this chapter, then this would be another way to embrace CI without the lump theory, and yet still avoid the Modal Objection. Paul herself does not embrace CI (although CI *is* compatible with her view), yet she does embrace mereological essentialism.[93] And, as we have seen, since the Modal Objection is simply the contrapositive of

[90] See L. A. Paul (2006) "Coincidence as Overlap" in *Nous*, (2006) "In Defense of Essentialism" in *Philosophical Perspectives*, and (2002) "Logical Parts" in *Nous*.

[91] I also avoid having to posit properties as primitive entities in my ontology.

[92] A bit more carefully: Paul rejects universality for fusions of properties, and allows that she could—if she was so inclined—embrace universality for spatiotemporal composition. See "Coincidence as Overlap."

[93] See L. A. Paul (2006) "In Defense of Essentialism," Philosophical Perspectives.

Merrick’s Mereological Essentialism worry, anyone who embraces mereological essentialism will be able to answer the Modal Objection. So this is yet another way to embrace CI and deny my lump theory of objects.

And no doubt there are other options as well. However, my point here is simply to illustrate that CI is indeed independent from my lump theory of objects, and as such, one certainly does not undermine the other in any way. Nonetheless, I do want to commit to both of these claims in this current project. I think that embracing both of these theories delivers the most unified response to the objections and puzzles, including the modal puzzles. I hope their joint application to the constitution puzzles, to Mereological Essentialism, and to the Modal Objection has demonstrated this well.

Chapter 5

Advantages of CI

1. Introduction

By now, I have hopefully convinced you that despite the many objections against it, CI is a coherent view worth defending. In Chapter 2, I have shown how a CI theorist can defend herself against Van Inwagen's Counting objection, using Plural Counting. In Chapter 3, I demonstrated how a CI theorist could defend herself other objections as well, such as those involving the Indiscernibility of Identicals, those that appeal to the Principle of Ontological Parsimony, etc., by invoking both Plural Counting and a robust plural language. And in the preceding chapter, Chapter 4, I showed how a CI theorist could defend herself against the Modal Objection, by embracing a lump theory of objects.[1] All of this should at least show that CI is metaphysical view to be taken seriously, and one that can't be dismissed out of hand merely because it seems incoherent on its face.

However, I would like to do more than merely make room for CI in logical space. I would like to illustrate, by way of a few (more) puzzles, how advantageous such a view can be. In the previous chapter, we invoked the strategy of measuring

[1] I also (quickly) showed two alternative ways a CI theorist could defend herself against the Modal Objection *without* embracing my lump theory of objects—*viz*., by either embracing a counterpart theory, and admitting high flexibility in *de re* predication, or by embracing a theory of objects (suggested by L. A. Paul) where objects are mereological sums of properties.

the success of a view by its utility. If (e.g.) the lump theory of objects can solve a myriad of constitution puzzles, then this is some reason to think that the theory is true. I would like to employ that same strategy here. Only, I will no longer be concerned merely with puzzles of composition and constitution; CI has a much broader appeal than this. This is primarily due to the fact that once CI is accepted, then one can appeal to mereological sums with impunity, because (e.g.) mereological sums are no longer an ontological burden. And this should be as expected. After all, we began this thesis with the worry about whether mereological sums were indeed ontologically innocent or not. I have defended CI so vigorously because it easily delivers the verdict that, yes, mereological sums *are* ontologically innocent: if you are already committed to a bunch of things, then you get the mereological sum of those things *literally* for free, because the sum is simply *identical* to those things. Of course, you might now be thinking, "OK. Fine. I see that CI is coherent, and that none of the traditional arguments against are effective. But so what? Even if CI is true, what good does having (ontologically innocent) mereological sums in our ontology do? "

What good it will do is exactly the point of the present chapter. I want to show, by way of a few puzzles, how accepting CI and embracing mereological sums will deliver wide-ranging application to many different areas in philosophy. This won't be a comprehensive list of *all* of the philosophical areas in which CI will be prove to be fruitful. But I will canvass just a few of them—e.g., areas in causation, prevention, and perception—and demonstrate how problems in these areas could be benefitted by appealing to CI, in virtue of the fact that CI delivers mereological sums burden-free. I will also hint at CI's application to other areas (e.g., moral responsibility, philosophy of mind, etc.). The general goal of this chapter, then, is to answer the "so what?" question. I will provide a template of problems that litter the philosophical landscape, and show how CI, and an appeal to mereological sums, offers a solution to them.

My strategy will be to first discuss two classic cases of causation: collective causation and overdetermination. Then I will lay out four philosophical puzzles and show how all of them are similar in structure, and can be taxonomized *in part* as a case of collective causation, and *in part* as a case of overdetermination; the cases of collective causation and overdetermination will be used to frame the four puzzles I introduce below. Then I want to show how adopting CI (and mereological sums) provides a unified, elegant solution to all of them. In doing so, it should then be easy to show that CI is not only merely available as a coherent metaphysical thesis, but that its utility and wide-ranging applications to various areas in philosophy should give us great reason to think that it is true.

2. Some Taxonomy

There are two kinds of causation I want to present: *collective causation* and *overdetermination*.

To illustrate a classic case of collective causation, imagine that two men, ONE and TWO, are given the task to set off a bomb. The bomb is designed so that two men must turn two separate keys at the same time. If ONE turns the key and TWO does not, the bomb will not go off. If TWO turns the key and ONE does not, the bomb will not go off. (And let us assume that no one except ONE and TWO have access to the keys.) So, ONE and TWO each reach for their respective keys, and turn them simultaneously. Predictably, the bomb goes off.

Now, who caused the bomb to go off: ONE or TWO? In a way, this is a misguided question, if the disjunction is read exclusively. Intuitively, ONE wasn't *the* cause of the bomb going off, since if TWO would not have turned the key, ONE's actions would have been causally ineffective (as far as a detonation of the bomb is concerned). But TWO wasn't *the* cause of the bomb going off either, since if ONE would not have turned the key, the bomb would not have gone off. So neither ONE nor TWO, taken *individually*, were sufficient for the bomb exploding. But our question—*who caused the bomb to go off?*—seems to imply that there is *one* person who caused the bomb to go off. But surely someone (or something) caused the bomb to go off! It didn't just explode causelessly! But then what?

We don't usually take the above case to be problematic. This is because we understand that individuals can act collectively to cause something to happen. If Rod and Todd lift the coffin collectively, such that neither Rod nor Todd could lift the coffin by themselves, then we understand that it is Rod and Todd together who *caused* the coffin to be lifted. What we have said in previous chapters about object*s*—plural—doing certain things collectively applies to causation as well. And, indeed, this notion is plenty familiar. I mention the case here so that we can catalogue it in comparison with the puzzles I will be introducing below. Before we evaluate the case of collective causation in comparison with the puzzle cases, however, let us take a look at a classic case of overdetermination as well.

Imagine that Man_1 and Man_2 have the unfortunate task of killing Man_3. Each is given a loaded gun, and each has excellent aim. Both shoot, and each shot is fatal: If Man_1 had not shot his gun, but Man_2 had, Man_3 would have died. If Man_2 had not shot his gun, but Man_1 had, Man_3 still would have died. A familiar way of describing the case is that each of Man_1 and Man_2 was sufficient for killing Man_3, but neither (taken individually) was necessary.

Overdetermination cases such as these[2] are often used as counterexamples to counterfactual theories of causation.[3] In the case of Man_1 and Man_2, there will be difficulty saying that either one killed Man_3. Man_3 would have died anyway if Man_1 would have shot him, but Man_2 did not. So it doesn't seem that Man_2 *did* anything (causally relevant, anyway). Likewise, Man_3 would have died anyway if Man_2 had shot him but Man_1 had not, so it doesn't seem that Man_1 did anything either. Man_1 and Man_2, for parallel lines of reasoning, then, both seem causally *ir*relevant. So the worry here is not so much that we would deny the existence of either Man_1 or Man_2 (or the existence of the bullets fired from Man_1 or Man_2's gun), as we might in other cases of overdetermination (e.g., mind/body dualism, or composite objects—see

[2] I do not mean to suggest that this case is the only kind of overdetermination, and indeed, there may be important differences between various different kinds of overdetermination. See Funkhouser (2002). However, I hope that for my purposes here, we can ignore the subtle distinctions of the different kinds of overdetermination there may be, and simply consider overdetermination in general.

[3] Overdetermination is also seen as a counterexample to nomic subsumption theories of causation, which claim that a property (usually a mental property) can be causally relevant if it appears under a law (e.g., mental-physical laws). Cases of overdetermination are seen as counterexamples to it because (e.g.) we might have a mental event and a physical event that both are sufficient for causing another physical (or mental) event, and this would undermine the intuition that (e.g.) the mental event is causally relevant. In the interest of time, I am going to omit discussion of this issue, but it may become obvious in the course of the discussion, what I *would* say about such a case. I am going to be arguing that overdetermination shouldn't trouble us in general, and so I do not think it should be a threat to nomic subsumption theories of causation either. Of course, there may be other reasons not to endorse such a causal theory, but these won't be investigated here.

below). Rather, the worry is that once we have admitted that one of the shooters is sufficient for the death of Man_3, then the other shooter becomes seemingly causally irrelevant, and hence, not a cause at all. Since this counterfactual reasoning is symmetric, we get the odd result that neither Man_1 nor Man_2 killed Man_3. This is why overdetermination seems problematic in the case of the two shooters: having two sufficient causes seems to lead to the absurd conclusion that each was causally irrelevant, or not a cause at all.[4]

Overdetermination is also seen as problematic in general, and a seeming violation of simplicity principles in theory building. After all, if one cause is sufficient for explaining an event, then it would be ontologically excessive to posit another, distinct cause in addition. For example, in philosophy of mind, many have thought that the Exclusion Problem shows that there cannot be mental causes in addition to physical causes, if the physical causes are sufficient for bringing about a particular event.[5] Mental causes are given up because to embrace them would unnecessarily proliferate instances of overdetermination, which is theoretically inelegant.[6]

As another example, Trenton Merricks argues for an Eliminativist view of ordinary objects (e.g., tables and chairs) in order to avoid rampant overdetermination.[7] Merricks claims that if composite wholes existed, they would overdetermine events which are sufficiently caused by the composite's parts—e.g.,

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[4] Of course, this assumes a counterfactual account of causation, which may be given up if overdetermination cases such as the one involving the two shooters want to be embraced as coherent possibilities.

[5] See: Kim (1993c), Schiffer (1987), Merricks (2001), etc.

[6] Merricks says, in response to overdetermination worries of the mental and the physical, "The redundancy *all by itself* is reason to resist…substance dualism." Merricks (2001: 67).

[7] Merricks (2001).

the parts of a baseball cause a window to shatter, and are sufficient for the shattering, so it would be causally redundant to claim that the (whole) baseball causes the shattering as well. Since the baseball example generalizes to all cases of part/whole causation, we should deny that there are any wholes. Such rampant causal redundancy, or overdetermination, in other words, should be avoided at all costs, and we would do better to deny that there are (e.g.) baseballs and running shoes than that overdetermination is ubiquitous. Merricks claims, "…we always have a reason to resist systematic causal overdetermination, along with any view that implies it."[8] So clearly, overdetermination is seen as problematic in general, and something to be avoided as often possible.

My purpose for bringing up overdetermination here is two-fold: I want to compare some of the puzzle cases with them, and I want to eventually argue that these may not be effective counterexamples to counterfactual analyses of causation after all, nor—contra Merricks—should rampant overdetermination necessarily be avoided in general. If we adopt CI and we admit that mereological sums can be causes, then our aversion to overdetermination might be mitigated. I will get to these two points further down below. Let us keep collective causation and overdetermination in mind, however, and take a look at some philosophical puzzles.

3. Four Puzzles

There are four puzzles I would like to present: (i) Shadow, (ii) Eclipse, (iii) Prevention, and (iv) Perception. I will present these below, and suggest how they might be categorized given our two causation cases above, and how they can be

[8] Merricks (2001: 67)

solved by appeal to mereological sums. After I have discussed these, I will gesture at a few other, similarly structured puzzles—cases involving moral responsibility, Frankfurt Cases, the Exclusion Problem in philosophy of mind, etc.—and show how these, too, might be solved by appeal to mereological sums.

i. *Shadow*[9]

Imagine that there is a light source aimed at an opaque disk, O_1. Several feet behind O_1 is another opaque disk, O_2. O_2 is in just the right position, and just the right size, such that if O_1 were not in front of it, and if the light source had hit O_2, then a shadow would be cast on the ground that is the exact size and shape as the shadow that is on the ground when O_1 is in place. So, if O_1 stays where it is, and O_2 is removed, the shadow is a certain shape and size, s. If O_1 is removed, but O_2 is in place, then there is a shadow of the certain size and shape, s. But let's return to the case where both O_1 and O_2 are in place, the latter several feet behind the former, as illustrated by Figure 1:

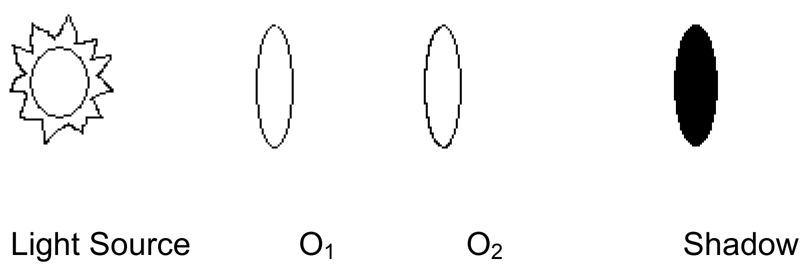

Figure 1

[9] This example modified from Sorensen (2006).

Now the question is: which object, O_1 or O_2 is casting the shadow? Intuitively, it is not O_1, because O_1's shadow is seemingly blocked by O_2. But it is not O_2's shadow either, since O_2 is blocked from light; intuitively, an object must be in the way of a light source, not in complete darkness itself, in order for it to cast any shadow at all. So it seems that neither O_1 nor O_2 are casting the shadow. But then *what* is? Clearly there is a shadow there!

We can contrast our intuitions about a situation involving two objects, as illustrated by Figure 1, with the usual, accepted case where there is only one object involved. Imagine that due to some mysterious physical event, O_1 and O_2 begin to move closer and closer to each other, and then begin to fuse into a single opaque object, where O_1 is the front half of the object, which faces the light source, and O_2 is the backside of the object which is closest to the cast shadow. But then this is just the ordinary case where one opaque object is causing a shadow! Ordinarily, when we have an instance of something causing a shadow—a building, a person, a wall, etc.—the object is almost always thick enough to have a front half and a back half. But just because O_1 and O_2 have fused together, this should intuitively make no difference as far as the difficulty of answering the question: *which object is causing the shadow?* If we don't have an answer in the case of two opaque objects, some distance apart from each other, it seems we do not have an answer in the ordinary case either. In other words, admitting that there is a problem in the case of two objects infects the ordinary case of one object. And so it seems that we lack a satisfactory explanation of how it is that a single object casts a shadow, if we don't have an answer to what object(s?) cast a shadow in Figure 1, contrary to our ordinary intuitions.

Clearly, what *I* want to say in the Shadow case, given my thorough defense of CI, is that it is mistaken of us to assume that the shadow-caster in Figure 1 must be either O_1 or O_2, *individually*. Rather, I will claim that *both* O_1 and O_2 can cast a shadow, *collectively*, without either one of them casting a shadow on their own. Indeed, in the ordinary case of just one object casting a shadow, we do not hesitate to say that the whole object casts the shadow, even if we readily admit that the object in question has a front half and a back half. Modus tollens-ing the above point: if we have no trouble saying that a whole (made up of a front and back half) can cast a shadow—if we have no trouble saying that the front and back half of an object can cast a shadow *collectively*—then we should have no trouble saying that O_1 and O_2 in Figure 1 can cast a shadow *collectively*.

Pushing the point further, we can reverse our case of gradual fusion above, and consider instead a case of gradual fission: take the ordinary case of one object casting a shadow, and divide the object into a front and back half.[10] Then we could slowly, bit by bit, remove the front half away from the back half. It would seem arbitrary to claim that one object could cast a shadow one moment, but that when the front half and the back half of this object are separated by a minute distance, it doesn't. Why wouldn't it, given that there *is* a shadow there, whether the halves are attached or not, and one that is seemingly indiscernible from the shadow that was there before the separating of the front half from the back half? Yet if the front half

[10] Let's assume that these halves are symmetrical.

and the back half form a shadow in the ordinary case (i.e., when they're touching), and a minute separation of the front half and the back half do not make a difference as far as the shadow is concerned (i.e., the halves are still casting a shadow even if they are minutely separated), then a step-wise argument will show us that the halves significantly separated will still (collectively) cast a shadow.[11] Yet the case where we have two partitioned halves, significantly separated, just *is* our original Shadow puzzle, modulo a particular history of the two shadow-casters (i.e., they used to be two halves of a conjoined whole).

Now perhaps one might claim that there is an important difference between the front and back half of a (whole) object collectively casting a shadow, and two unconnected objects such as O_1 and O_2 collectively casting a shadow (or two separated, unconnected halves collectively casting a shadow). Perhaps, one might argue, the difference lies in the fact that front and back halves of (whole) objects are attached or connected, whereas objects such as O_1 and O_2 are clearly *un*attached and *un*connected. And it is because front and back halves (of whole objects) are attached and connected that we have no problem saying that they can collectively cast a shadow, but that two (distinct, separated) objects cannot.

This is incorrect for two reasons. First, recall our case of collective causation: we can allow that two men may cause a bomb to go off, even when neither of the men are connected or attached in any way. Casting a shadow is a causal event: it is causing an absence of light. If we can allow collective causation when the objects

[11] By 'significantly separated' I mean enough to generate the kind of puzzle with which we began this section. I suspect there is a limit to the distance two (or more) objects could be separated and still cast a shadow—i.e., if the two objects are too far apart from each other, or too far away from the light source, then there won't be any shadow at all. I think we can ignore these details without detriment to the point being made here.

involved are unattached or unconnected (such as the two men) then we should allow collective shadow-casting when the objects involved are unattached or unconnected (such as O_1 and O_2). If we do not, then we either need to say why casting a shadow is significantly different than (e.g.) causing a bomb to go off, or we need to say why attachment or connection is required in one case but not the other. Either option, I'm afraid, would run the risk of being ad hoc.

Second, however, is the fact that we allow objects to act collectively in all sorts of ways: Rod and Todd can meet for lunch, carry a coffin, enter a three-legged race, hold hands, sing harmony, etc. It would be strange to admit that two unconnected and unattached objects[12] could do so many things collectively *except* cast a shadow. What is so special about casting a shadow that unattached and unconnected items couldn't do it together? If O_1 and O_2 can move in synch, can be symmetrical, can take up a certain region of space, can do-si-do (if they were so inclined)—all *collectively*—then they should certainly be able to cast a shadow (collectively).

Now, you might well agree that we allow objects to engage in activities collectively. You might agree that Rod and Todd can meet for lunch, carry a coffin, etc. But this is different than O_1 and O_2 casting a shadow (as illustrated by Figure 1), you might argue, because *each* of O_1 and O_2 could have cast the shadow all by itself, without the help of the other. Not so with Rod and Todd and all of the activities

[12] Granted, Rod and Todd might have to be connected or attached in some sense in order to (e.g.) run a three-legged race or hold hands, etc., but I take it that this is not the sort of connectivity or attachment someone pursuing this line of argument had in mind. That is, I take it that if O_1 and O_2 were 'touching' at the very edge (suppose they are spheres that are resting side by side for a moment, for example), but still casting a shadow, the imagined objector above would still find the case problematic.

they can collectively engage in—Rod can't meet for lunch by himself, or carry a coffin, or enter a three-legged race by himself; he needs Todd's help. Similarly, you might point out, O_1 and O_2 might be able to collectively cast a shadow only if in so doing they are casting a shadow such that the shadow could not be cast without *both* of them.

So, for example, if O_1 was above O_2, or slightly to the right or left of it, then the shadow might look like a filled-in figure eight (if O_1 and O_2 were arranged in just the right way). And *this* shadow, you might claim, is one that O_1 and O_2 *can* cast collectively, like Rod and Todd might tango collectively. For if either O_1 or O_2 were to be removed, then the figure-eight shadow would no longer be cast (since one half of the 'eight' would disappear along with the removal of either O_1 or O_2).

But if you grant me that O_1 and O_2 can cast a shadow collectively in the case where they are arranged side by side, then we can make a step-wise argument to show that they are casting a shadow collectively in a case such as that represented by Figure 1. Simply imagine that O_1 and O_2 are side by side and are (collectively) casting a figure-eight shadow. Now slowly move O_1 behind O_2. At each moment, the shadow will change shape. But so long as O_1 is not *completely* occluded by O_2, we should still grant that O_1 and O_2 are collectively casting a shadow (since *whatever* the shape of the shadow that is cast by O_1 and O_2, such a shadow would disappear or distort if we removed either O_1 or O_2). But this means that even if O_1 and O_2 were not completely occluded, but overlapped *nearly* completely, with perhaps a small sliver of non-overlap, one would (presumably) still claim that they collectively cast a shadow. Then, the next moment, when O_1 is completely occluded by O_2, we have a situation such as the one represented by Figure 1. But then suddenly O_1 and O_2 are *not* collectively casting a shadow!? What's more, we could imagine that O_1 and O_2 continue along their respective paths, and O_1 now slowly moves away from O_2 on the opposite side. So now O_1 and O_2 suddenly *are* collectively casting a shadow again?! Strange indeed that objects could (by hypothesis) collectively engage in an activity one moment, not collectively engage in it the next, and then collectively engage in the activity again, when the objects in question aren't doing anything different, except having been moved just a tiny bit so as to be in perfect alignment (and then not) relative to the light source.

Thus, on pain of having to draw such an improbably harsh distinction, between a collective activity and a non-collective activity, we should grant that O_1 and O_2 are (at least) collectively casting a shadow. There might be some differences between (e.g.) two objects dancing a tango and two objects casting a shadow as is represented in Figure 1. (And, indeed, I will discuss these differences more fully below.) But the point is that we can grant that two objects can engage in an activity collectively, whether it be tangoing, carrying a coffin, or casting a shadow, etc. The objection that began this discussion, recall, was concerned with whether the front and back halves of objects are different than two separated objects (such as O_1 and O_2), because the former are attached, while the latter are not. Yet we can now see that attachment or connectivity is beside the point. If we can grant that two unconnected, separated objects can engage collectively in an activity (e.g., tangoing or casting a shadow), then someone will not be able to plausibly maintain that in the ordinary case of one object casting a shadow there is no puzzle (because the back and front are connected), yet in the case of two objects, such as the one depicted in Figure 1, there *is* a puzzle (because the objects involved are not connected). Either the ordinary case of one object and the case with two objects are both problematic, or else they are both unproblematic.

Clearly, I maintain that neither case is problematic. And we can see this by first granting that, in Figure 1, O_1 and O_2 cast the relevant shadow collectively. Given CI, however, the mereological sum of O_1 and O_2 just *is* (hybrid identical to) O_1 and O_2 taken collectively. And so if O_1 and O_2 engage in some activity collectively, then the mereological sum of O_1 and O_2 engage in this activity. So it is the mereological sum of O_1 and O_2 that casts the shadow in our puzzle, Shadow.

Note at this point that Shadow can not only be solved by an appeal to mereological sums, but that it could also be seen as a direct argument for the *existence* of mereological sums.[13] The argument might run as follows:

1. There is a shadow in Figure 1.
2. If there is a shadow, then something must cast the shadow.
3. O_1 does not cast the shadow (because O_1's shadow is cast on O_2).
4. O_2 does not cast the shadow (because there is no light hitting O_2).
5. If something must cast the shadow, and if neither O_1 nor O_2 do, then the mereological sum of O_1 and O_2 must cast the shadow.
6. By 1 and 2, something must cast the shadow.
7. So, by 5 and 6, the mereological sum of O_1 and O_2 must cast the shadow.
8. If something casts a shadow, then this something exists.
9. So, mereological sums exist.

Premise 1-4, and 6-8, are all fairly intuitive.[14] Premise 5, I take it, is the one that is the most contentious. But the argument for Premise 5 is one of elimination:

[13] Thanks to Bill Lycan for discussion here. Also, notice that this isn't my preferred argument for the existence of mereological sums, but is one I am obviously sympathetic to given CI.

mereological sums are simply the only viable candidate for shadow-casting. Let us imagine that O_1 and O_2 are the only objects in the vicinity (besides the light source, and whatever it is that the cast shadow is cast upon). Then what else besides the mereological sum of O_1 and O_2 *could* cast the shadow, if neither O_1 nor O_2 cast it?

One might be tempted to claim that the *set* of O_1 and O_2 cast the shadow, for example. But sets are abstract entities. As such, they do not interact, causally or otherwise, with the non-abstract, material world. They certainly do not cast shadows.

One might be tempted to think that if O_1 doesn't cast the shadow and O_2 doesn't cast the shadow, then perhaps O_1 and O_2 taken together or collectively cast the shadow, yet without this entailing that the mereological sum of O_1 and O_2 cast the shadow. Someone who does not embrace CI as I've defended her in this thesis, for example, may want to pursue this line. Such a person would grant the lessons learned from Chapter 2 about plural referring terms, and would claim that some object*s*—plural—may engage (collectively) in an activity (such as shadow-casting) without this activity distributing down to the objects individually.

Fair enough. But if someone is willing to grant me this much, then I will offer all of the arguments for CI in the present thesis to support the claim that if O_1 and O_2 collectively do something—e.g., cast a shadow—then their mereological sum does it, too, since the mereological sum of O_1 and O_2 just *is* O_1 and O_2 taken together or taken collectively. Anything O_1 and O_2 do together, their mereological sum does, given CI. So, if desired, we can break Premise 5 into two parts, 5a and 5b:

[14] Of course, this does not mean that they are completely uncontroversial. Someone could reject Premise 2, for example, and argue for some sort of eliminitivist view about (some) shadow-casters. If someone thought that sometimes nothing causes shadows, for example, then there might be reason to reject Premise 2. But I take it that this would be an unusual view, and so I will ignore it here.

5a. If something must cast the shadow, and if neither O_1 nor O_2 do, then O_1 and O_2 must cast the shadow collectively.

5b. If O_1 and O_2 cast the shadow collectively, then the mereological sum of O_1 and O_2 casts the shadow.

Premise 5a is supported by the reasons outlined above. Premise 5b is supported by CI, which is argued for throughout this entire thesis. So if someone objects to the above argument on the grounds that he grants that objects can engage in activities collectively (e.g. cast shadows), but disagrees that such collective activity entails that a mereological sum engages in said activity, then the above argument (on its own) will not be sufficient to prove the existence of mereological sums. Our debate will then shift to arguments for 5b. But since one way to argue for 5b is simply to endorse CI, then I offer all of the arguments in this present thesis to oblige such an objector.

Another way to resist Premise 5 is as follows: even if one grants that the only viable candidate for shadow-casting in Shadow is a mereological sum, there may be some question as to *which* mereological sum is the shadow-caster. I had assumed that O_1 and O_2 were the only objects around, modulo the light source and whatever it is that the shadow is cast upon. But this can’t be quite right, strictly speaking, since if O_1 and O_2 are separated by some distance, then there has got to be *something* between them—air molecules, spacetime points, etc. Whatever it is that is between O_1 and O_2, someone might argue, is also a candidate for parthood, and hence a candidate for being part of a mereological sum. Also, since we did not assume that O_1 and O_2 are mereological simples, O_1 and O_2 each have (at least) a front half and a back half. In which case, as concerns Figure 1, there is the mereological sum of O_1 and O_2, the mereological sum of O_1, O_2, and all of the spacetime points in between O_1 and O_2, the mereological sum of O_1, O_2, and only *some* of the spacetime points between O_1 and O_2, the mereological sum of the front half of O_1, the back half of O_2, and every other spacetime point in between the two halves, and so on. So even if we grant that some mereological sum or other casts the shadow in Figure 1, it need not be the mereological sum of O_1 and O_2, since there are numerous other sums, all of which are equally appropriate candidates for shadow casting (so one might argue).

I do not wish to belabor the above point too long, since I think an appeal to simplicity will rule out many of the arbitrary sums mentioned above. Moreover, since spacetime points (or air molecules or whatever it is that is between O_1 and O_2) do not usually cast shadows (e.g., none of them are opaque, for example, and they are just not the sort of things that *could* effectively block light, or cast shadows at all), then we lack motivation to think that such things play a part in shadow-casting, by being part of a mereological sum that shadow-casts, for example. Finally, the complaint launched above borders on a purely epistemic matter, not a metaphysical one: the above objector grants that a mereological sum is involved in casting a shadow, but is worried that we have no principled reason for picking out the right one (among the many viable candidates). But this just amounts to a worry that we don't (or can't) know which mereological sum (among the many) casts the shadow, even if we grant that one of them surely does. And my main interest is to convince the reader that there are indeed mereological sums, and that these sums are just identical to the parts that compose them. So an epistemological worry about our access to these sums, or how we can tell one of them is causally efficacious in a particular scenario over another is orthogonal to my aims here. As such, resistance to Premise 5 along these lines will be ineffective.

My main motivation for launching the above argument above is to impress upon the reader that mereological sums are not merely helpful in solving a puzzle such as Shadow, but—even stronger—a proof of their existence might be concluded from such a puzzle.[15]

The usual reason people resist an argument such as the one outlined above is because of concerns about ontological extravagance.[16] If CI were false, then claiming that the mereological sum of O_1 and O_2 casts the shadow multiplies our ontological commitments exponentially, especially since the shadow example generalizes to any of the usual cases of shadow-casting. And this is why many in the literature have shied away from mereological sums as a solution to the puzzle—it would seemingly carry with it too heavy of an ontological burden, given the ubiquity of shadows. Not so with CI, however, as I hope I have already shown in previous chapters. If composition is indeed identity, then we can appeal to mereological sums to solve puzzles such as the Shadow Puzzle without accruing any extra, unwanted ontological costs. And our conclusion, 9, of the argument above will seem appropriately benign, as it should.

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[15] Unless, of course, as I explained above, you accept 5a but deny 5b, in which case our discussion will take a decidedly different turn, and we will be debating other arguments presented in this thesis.

[16] See Carolina Sartorio (forthcoming) "Failing to do the Impossible" in *New Waves of Philosophy of Action*, and (2006) "Disjunctive Causes" in *Journal of Philosophy* 103. See also: Roy Sorensen (2008) *Seeing Dark Things*.

Before moving on to the next puzzle, I'd like a take a moment to compare Shadow with the two cases of causation I discussed in the previous section: collective causation and overdetermination. We have already seen how O_1 and O_2 casting the shadow shares some features of our paradigm case of collective causation (the bomb case): both O_1 and O_2 in Shadow and the men turning the key in the bomb case are object*s*—plural—that engage in some activity collectively. Since it is unproblematic to claim that both men can, collectively, cause the bomb to go off, it should be unproblematic to claim that both O_1 and O_2 can, collectively, cast a shadow. But as our discussion a few pages up revealed, there is more to the story. For, in some ways, our Shadow puzzle is more like a case of overdetermination than it is a case of collective causation. Here's why. In the collective causation case, the following two counterfactuals hold: if ONE would not have turned the key, and TWO would have, the bomb would not have gone off, and if TWO would not have turned the key, and TWO would have, then the bomb would not have gone off. In other words, in the bomb case, each man is necessary but not sufficient for the bomb's detonation. In Shadow, however, the following two counterfactuals hold: if O_1 would not have been there, but O_2 remained where it is, then the shadow still would have been cast, and if O_2 would not have been there, but O_1 remained, then the shadow still would have been cast. In other words, each of O_1 and O_2 is sufficient but not necessary for the shadow being cast.[17]

There's an interesting question here about the criterion of identity for shadows. Are shadows dependent upon their casters? If we begin with a situation as represented in Figure 1, and then remove O_1, and leave O_2 where it is, we can all

[17] Again, this was discussed briefly above, pp. 9-10.

agree that the shadow will *look* as if it hasn't changed. Similarly, if we were to keep O_1 in its original position and remove O_2, it will *look* as if we haven't done a thing, if we keep our attention focused on the shadow. As far as the appearances of shadows go, then, it will be indiscernible whether we have both O_1 and O_2 in place, or just O_1, or just O_2, or an entirely different opaque object that is neither O_1 nor O_2 but similar in size, or any number of different objects appropriately shaped, sized, and arranged. But if a shadow's identity is dependent on its caster, then it will be irrelevant whether many different shadows are qualitatively indiscernible: a difference in caster would make a difference in shadow, irrespective of whether or not we can tell just by looking at the shadow.

But I need not get too mired in these issues here. The counterfactuals that show the sufficiency but non-necessity of each of O_1 and O_2 as casters of *a* shadow (in general) are as follows: if O_1 would not have been there, but O_2 remained where it is, then a shadow still would have been cast, and if O_2 would not have been there, but O_1 remained where it is, then a shadow still would have been cast. No parallel counterfactual is true of the paradigm case of collective causation (e.g., the bomb case), and so this is an important way in which Shadow differs from a typical case of collective causation.

In paradigm cases of overdetermination (e.g., the two shooters), the elements involved are also sufficient but not necessary for bring about a certain state of affairs (event, effect, etc.). If Man_1 and Man_2 each deliver a fatal blow to Man_3, then the following counterfactuals are true: if Man_1 would not have fired, but Man_2 did, then Man_3 still would have died; and if Man_2 would not have fired, but Man_1 did, then

Man_3 still would have died. Each of Man_1 and Man_2, then, is sufficient but not necessary for the death of Man_3.[18] Again, for our puzzle case, Shadow: if O_1 would not have been there, but O_2 remained where it is, then a shadow still would have been cast, and if O_2 would not have been there, but O_1 remained where it is, then a shadow still would have been cast. Each of O_1 and O_2, then, is sufficient but not necessary for a shadow being cast.

It is typically the 'sufficient-but-not-necessary' feature that is hailed as problematic in cases of overdetermination—primarily because it violates simplicity principles. Why posit two causes when one will do? Yet if this is something that Shadow has in common with cases of overdetermination, then if it is problematic in cases of overdetermination, then it will problematic for Shadow in the same way.[19]

But I fail to see why overdetermination is problematic, for reasons that I will delineate in section 4 below. Essentially, I will be arguing that if CI is true, then we get to use mereological sums with abandon. Whenever we have a case of

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[18] Notice that we could make a parallel point to the one made above about the criterion of identity of shadows, and wonder instead about to the criterion of identity for events: is the death of Man_3 when it is caused *only* by Man_1 the same event as the death of Man_3 when it is caused *only* by Man_2, or when it is caused by both Man_1 and Man_2, etc.? (Admittedly, there are some dissimilarities between the shooting case and Shadow. There are two different bullets, for example, in the shooting case. But such dissimilarities are merely due to the arbitrary details of the story. The case could easily be re-described to maintain parallel structure (e.g., two psychics who can kill just by thinking about it, etc.).) In any case, I don't think that we need to (yet) come down on the question about the criterion of identity for events. For we could generalize by talking about the cause of *a* death of Man_3, in general, without worrying about whether the relevant death-events under consideration are identical or not. We can then run the relevant counterfactuals in terms of this general event, and yield the result that the men are each sufficient but not necessary, comparable to objects O_1 and O_2 in Shadow.

[19] Actually, whether overdetermination is problematic or not is up for debate. Some take it as a direct violation of simplicity principles (Kim (1989), Kim (1993a, b, and c), Merricks (2001), etc.). Some take it as a direct refutation of counterfactual theories of causation, or at least proof that a revision of the counterfactual theory of causation is needed (Fine (1975), Lewis (1979), Horwich (1987), etc.). Some take it as obvious, and do not argue for it at all (see Merricks (2001)). Others, however question whether overdetermination is problematic at all. See (e.g.) Sider (2003) "What's So Bad about Overdetermination?"

overdetermination, we can consider not the two (or more) sufficient-but-not-necessary causes as cancelling each other out; rather we can consider the one mereological sum of the two (or more) causes (which CI claims is simply *identical* to the two (or more) causes) as an unproblematic cause, resulting in just your usual, run-of-the-mill, ordinary case of causation. For now, however, it is only important that we see how Shadow is similar in structure to overdetermination cases, in that the relevant causal elements have the particular counterfactual features that they do.

ii. Eclipse[20]

Let us move on to our second puzzle. And let us modify Shadow slightly, to create another puzzle, Eclipse. Let's imagine that the light source in the above example is actually a sun. And let us imagine that the first object is one planet, P_1, and the second object is another planet, P_2. We observers are on a third planet, P_3, watching P_1 and P_2 align in front of the sun, creating an eclipse. The planets and the sun are arranged in such a way that we are the farthest from the sun, then P_2, then P_1, and then the sun, as represented by Figure 2 (not drawn to scale):

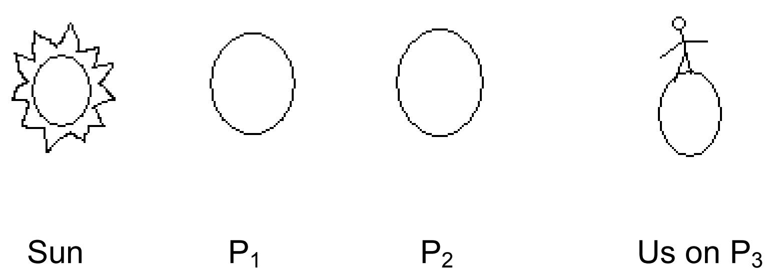

Figure 2

[20] This example modified from Sorensen (2006).

Equipped with appropriate eyewear, we stare at the celestial phenomenon. But what, exactly, are we seeing? We are seeing an eclipse, surely. But what does that mean? Are we seeing P_1? P_2? Or something else?

We are not seeing P_1, one might argue, since P_2 blocks our view of P_1. We can imagine that P_1 is just the appropriate size and distance from P_2, that P_2 completely obscures our view of P_1 (from our point of view on P_3). In fact, if the sun had not been behind both P_1 and P_2, and if it had been at the right angle to illuminate the planets, P_1 and P_2, we on P_3 would (intuitively) only be able to see P_2. But an eclipse is like (or simply *is*) a shadow. Indeed, the reason (total) solar eclipses are only visible from certain geographical regions on the earth is because the moon's shadow is only a few miles wide. So we can simply imagine that we have been inserted into our puzzle, Shadow, and we are now wondering, from the point of view of the shadow, what we are seeing if we are looking towards the light source. We know from our puzzle that there needs to be a light source hitting an object in order for that object to be blocking light from that light source. If this is right, then we on P_3 cannot be seeing P_2, since P_2 has no light shining on it at all. P_2 can be no more responsible for blocking the sun than O_2 in the Shadow Puzzle was responsible for casting a shadow—neither is in a line of light to cast a shadow!

Imagine that you are in a dark room of your house.[21] There is light outside, which you can see by looking toward the window. Suppose you have a giant cardboard cutout of Obama placed in front of your window. When you look at your window from inside your dark house, you see a silhouetted Obama-shape. Now

[21] Thanks to Keith Simmons for this example.

imagine that there is an intruder standing between you and the cardboard Obama cutout. It just so happens that the intruder is the same shape as the Obama cutout. Even so, do you see the intruder? Intuitively, no! This is why you would be truly frightened if the intruder were to move, or talk, or come closer—you didn't know (or see!) that he was there! So if you cannot see an intruder, who is completely hidden by a cutout in silhouette, then it seems—for similar reasoning—you do not see P_2 in Eclipse either. It does not matter that P_2 is closer to you than P_1—just as it doesn't matter that an intruder may be closer to you than the cardboard cutout that is causing a silhouette. So P_2 must not be causing the eclipse (just as the intruder is not causing the silhouette).

Yet if neither P_1 nor P_2 are causing the eclipse then what is?!

As with Shadow above, I'm going to suggest that not only can a single planet cause an eclipse (as we usually accept), but that a mereological sum of planets can cause an eclipse as well. And why not? After all, if Eclipse is just Shadow from the perspective of the cast shadow, then why should the ontological facts change just because of a change in perspective? If a mereological sum can cast a shadow, then a mereological sum can cause an eclipse, especially given that an eclipse just *is* a case of shadow-casting seen from the shadow's perspective.[22]

Moreover, we could create a slippery slope from the purportedly problematic situation as represented in Figure 2 to the unproblematic situation when there is just one planet creating an eclipse. Imagine that we begin with two planets, as in Figure

[22] I am obviously ignoring certain details about eclipses (and shadows), such as that light might be bending around the opaque objects that are blocking the original light source, etc. I hope such details are ultimately mere noisemakers for the broad metaphysical points I am interested in here, ones involving parts and wholes, and the relation between them, for example.

2. Yet by some mysterious cosmic event, P_1 and P_2 start inching toward each other. Eventually, P_1 and P_2 begin to fuse together, and are fused together perfectly such that there is just one round planet (call it P_4[23]). We begin (assume) by saying that neither P_1 nor P_2 causes the eclipse; we end by saying that P_4 causes the eclipse. But given our tolerance for small variation—e.g., having P_1 or P_2 a millimeter more or less closer to each other seems not to make a difference in whether either is or is not casting a shadow—and in order to avoid arbitrariness, we either need to give up that P_4 causes a shadow, or we need to say that something in the original case does.

Pushing the point further, P_4 admittedly has a front half (the half facing the light source, say) and a back half (the half facing us on P_3). Yet our reasoning that generated the Eclipse Puzzle from Figure 2 could just repeat itself at the level of the halves of P_4: it seems that we do not see the front half, since it is blocked by the back half. But we do not see the back half either, because no light hits it, and it seems that it is occluded by the shadow of the front half. So then it seems the situations are parallel: if we have a puzzle involving the two planets, we have a puzzle involving just one (if we admit that there is a front half and a back half of the one planet).

But we *don't* have a puzzle involving just one. We understand what it is to watch an eclipse in the case of just one planet blocking a light source. We are seeing the whole planet block light, even if we admit that the whole planet is made up of a front half and a back half. And if we understand how one (whole) can cause

[23] I need not assume (or speculate or come down on) whether P_4 is identical to either P_1 or P_2, or both, or what, for my purposes here.

an eclipse, then we understand how a mereological sum could cause an eclipse. If someone objects that there is an important distinction between halves that make up (connected) wholes and unattached or unconnected parts that make up a scattered whole, then I will repeat my response that I gave in the previous section. Attachment or connectivity is not going to make the difference between objects that can collectively cause an eclipse and objects that can't, any more than attachment or connectivity is going to make a difference for any activities achieved collectively.

And let us not forget the unproblematic case of collective causation. If we can make sense of two unattached, unconnected men collectively causing a bomb to detonate (by turning two keys simultaneously), then we can make sense of two unattached, unconnected planets, P_1 and P_2, collectively causing an eclipse.

The solution here, of course, is to embrace CI and to maintain that in the original eclipse case (represented by Figure 2) is one where a mereological sum—*viz.*, the mereological sum of P_1 and P_2—is causing the eclipse. As with the Shadow Puzzle, many will not want to resort to mereological sums here because of the heavy ontological costs that such entities presumably bring. However, with CI as I've defended her here, there are no such worries, and so we can appeal to mereological sums with impunity to solve the Eclipse Puzzle, as well as the Shadow Puzzle.

Now perhaps one might argue that there is a difference between the cause of an eclipse and what we see when we are looking at an eclipse. Put another way, do we see the cause of the eclipse when we are looking at the eclipse? Or is what we see when we are observing an eclipse something distinct from whatever is causing the eclipse?

Here is why you might think that the *cause of an eclipse* and *what we see when we are looking at an eclipse* are different: the cause of the eclipse is just whatever object(s) cast a shadow, whereas what we see when we are watching an eclipse is just whatever objects we would see if lighting conditions were normal, only in the eclipse case these objects just happen to be lit from behind. The cause of the shadow of the planets, as we learned from the Shadow Puzzle (assume), is just the mereological sum of P_1 and P_2. But what we see when we look in the direction of the light source, and see the eclipse, is just whatever object is in our line of sight and would be seen if lighting conditions were normal—and that's just P_2! If lighting conditions were normal, and we (on P_3) were looking at P_1 and P_2 in alignment, then we would presumably only see P_2, since P_1 is perfectly occluded by P_2. And why should the metaphysical facts about what we see change if the only difference has been the lighting? Whether the lighting is from above, in front, or behind P_2, the facts about what objects are placed in what order in our line of vision do not change: P_2 is closest to us, and P_1 is perfectly hidden behind it. So, this line of argument continues, what we see when we see an eclipse is just what we would see under normal lighting conditions. It's just that these objects just happen to be lit from behind (which doesn't affect what we see). So, what we see when we see an eclipse (such as the one represented by Figure 2) is not P_1, nor the mereological sum of P_1 and P_2, rather it is just P_2.

This line of reasoning is misguided for (at least) two reasons. First, lighting conditions clearly *do* make a difference to what we see.[24] When the lights are on,

[24] I am assuming a "non-epistemic" kind of seeing, or a "raw seeing", not an "epistemic seeing", or "seeing that." See Dretske (1979), and below for a brief discussion.

and conditions are normal, objects are lit from above or in front, and we see whatever is in our line of vision, in order. When the lights go out, we see nothing, not even something that may be right in front of our face. If lights being on or off can make a difference to what we see, then perhaps where the light is coming from can make a difference as well. And, sure, the metaphysical facts have not changed. If there are two apples in front of you, one lined up directly behind the other, so that the first perfectly occludes the second given your line of vision, then the one apple is in front of the second, no matter what the lighting conditions. Of course, this doesn't mean that you always see what's in front of what. If the lights are out, for example, you see very little (or nothing at all). If the lights are low, you may see very little, perhaps you can make out shapes and outlines. If the lighting is from behind the objects in front of you, then you will see objects in silhouette. And seeing objects in silhouette is just to see whatever is causing a shadow from the shadow's perspective. Like the Obama cutout example, if something is silhouetted against a lit window, while you are looking on from a dark interior, you will not see anything between you and the silhouetted object, even if there is such a thing (e.g., an intruder). Indeed, if an intruder wanted to hide from you, and you are sitting in your dark house. Looking towards the window, which is lit from outside, an effective place for the intruder to take cover would be to place himself between you and the Obama cutout that is silhouetted against the window—i.e., to place himself in *front* of the cutout![25] So lighting conditions *do* make a difference to what we see.

[25] Sorenson makes this point (Sorensen (2008)).

Second, even when lighting conditions are normal we never see *all* of an object. If Adam is looking at an apple, for example, Adam will not see the back of the apple, or the insides, or the top or the bottom. Once we admit this much, however, there seems to be even less reason to think that we (on P_3) are seeing *just* P_2 in Eclipse. For once we admit that that we need not see all of the parts of an object to see an object, then it won't matter that P_1 is completely occluded by P_2—the back of the apple is completely occluded by the front part of the apple! Yet we still say that Adam sees the apple, even if the back is occluded by the front. Similarly, someone looking at a (double) eclipse can see more than just (e.g.) the planet closest to them, even if such a planet is completely occluding another.[26] So it is not the case that we see only P_2 in Eclipse. And there is furthermore little reason to think that *the cause of the eclipse* (e.g., the mereological sum of P_1 and P_2) is distinct from *what we are seeing* when we are looking at the eclipse. If the sum of P_1 and p_2 are indeed causing the eclipse, then the sum of P_1 and P_2 must be what we are seeing when we are seeing the eclipse.[27]

Of course, similar to cast shadows, and causal events, there is an interesting question about the identity conditions of eclipses: are eclipses dependent on the object(s) that make them? Imagine P_1 and P_2 are aligned as they are in Figure 2 and we (on P_3) are looking at the eclipse that they make as they are lit from behind. Now imagine P_1 begins to shrink down until it is the size of a pea. Given the set-up, however, we on P_3 would be none the wiser, since the eclipse would be seemingly

[26] This move is foreshadowing my take on another puzzle, Perception, which is discussed below, section iv.

[27] Again, where 'seeing' here is non-epistemic.

unchanged. What we see is a big, round dark circle, outlined in bright light, and this doesn't change if P_2 remains as it is. However, now imagine that P_1 re-expands back to its original size, and then P_2 begins to shrink. Again, from our perspective on P_3, nothing seems to have changed. Of course, if eclipses are dependent on the objects that make them, then our opinion that nothing has changed means little. Lots of things have changed, and we may have been experiencing a grand succession of multiple (qualitatively identical) eclipses, depending on what the identity criteria for these things are. However, as with cast shadows and causal overdetermination, we need not settle on this matter here.[28]

Moreover, we can deflect this issue and talk about the objects that cause *an* eclipse, in general, and generate the relevant counterfactuals that are true of the P_1 and P_2. Similar to Shadow, and similar to cases of causal overdetermination, the following counterfactuals are true of P_1 and P_2 in the eclipse case: if P_1 would have not been there, but P_2 would have, we still would have seen (there still would have been) an eclipse; if P_2 would not have been there, but P_1 would have, there still would have been an eclipse. So each of P_1 and P_2 is sufficient but not necessary for us there being an eclipse.

[28] And, similarly, there is a question about the criterion of identity for silhouettes. Is the silhouette that is caused by the Obama cutout in the window the same silhouette if an (Obama-shaped) intruder stands between you and the cutout? If the cutout were to suddenly shrink, you would be none the wiser, since your experience is still of a Obama-shaped silhouette. But is this the same silhouette as the one caused by (e.g.) just the cutout, or just the intruder, or both the intruder and the cutout, or something else entirely that is also Obama-shaped. Again, I will leave these questions aside. Also, above, I have made the parallel between seeing a silhouette and seeing an eclipse, without arguing for their comparison. There may be another interesting issue here as well—e.g., whether there is any genuine distinction between seeing a silhouette and seeing an eclipse (i.e., is seeing an eclipse *just* seeing a planet in silhouette?). Again, I do not have time for these issues here, even though they may be relevant and intriguing.

We still have yet to see whether cases like this one, or cases of overdetermination in general are indeed problematic or not (which I will discuss in some detail below). But for now it is enough if we grasp the important similarities between the elements involved in Eclipse, Shadow, and the elements involved in causal over-determinism.

iii. Prevention

Let us consider a third case. Imagine that a ball is being thrown in the direction of a (currently) intact window. There is a catcher in between the window and the ball, however, who catches the ball. Yet even if the catcher would not have caught the ball, there was a wall behind him that would have stopped the ball, which is represented by Figure 3:

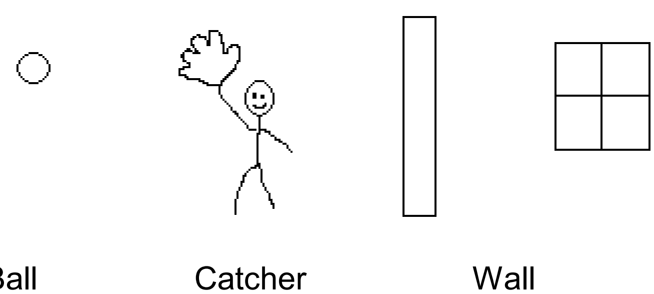

Figure 3

If the catcher would not have been there, the wall would have prevented the ball from hitting the window. On the other hand, if the wall would not have been there, it would not have mattered, since the catcher caught the ball, and so there was nothing for the wall to stop in any case. So it seems that neither the catcher nor the wall prevented the window from being shattered! But surely something prevented the window from being shattered: a ball was hurled in its direction, and yet the window remains intact! So what, exactly, prevented the window from shattering?!

We can see immediately how this case is analogous to Shadow and Eclipse: there is an event that cries out for explanation (the window being prevented from shattering, the casting of a shadow, the eclipse, etc.), there is the usual, unproblematic causal element (a ball being thrown in a particular direction, a light source beaming in a particular direction, etc.), and there is the pair of objects that gives us pause (the catcher and the wall, the two occluding objects, the two planets, etc.). The reason the pair of objects gives us pause in each case is because we have failed to consider that two (or more) objects can collectively engage in an activity, including casting shadows, causing eclipses, and preventing windows from shattering.

So clearly I am going to be suggesting a parallel solution in each case. The trouble arises only when we rule out the possibility that mereological sums can be causal elements, and that the parts composing the sum can engage in collective causation—the kind of collective causation outlined at the beginning of this chapter, that we are well familiar with and find (mostly) unproblematic.

To massage our intuitions, I will appeal to the strategy employed in the first two puzzles. Let us imagine the purportedly unproblematic case of just one object (e.g., a catcher) preventing a window from shattering. If we were to remove the wall from Figure 3, then we seemingly no longer have a puzzle. This is because we understand what it is to have a single object—a catcher—prevent a window from shattering. But the catcher is an object composed of parts. In particular, the catcher has a front half and a back half; indeed, his glove and hand each have a front half and a back half, etc. So if we think that it is unproblematic that a catcher prevents something, and we also admit that a catcher has parts, then we will be admitting of a case that is similar in structure to the our puzzle case, Prevention.

Let's grant that the catcher's mitt has a front half and a back half.[29] Then the front half of the mitt seemingly didn't prevent anything, since the back half was directly behind it, and (assume) if the front half wouldn't have been there, then the back half would have prevented the window from shattering. But, similarly, the back half didn't *do* anything, since no ball even hits it. So it seems that neither the front half nor the back half of the mitt prevent the ball from shattering the window. But surely something did!

Now, true, the above counterfactual *if the front half wouldn't have been there, then the back half would have prevented the window from shattering* assumes that the front half and back half of the mitt (or the various parts of the preventer, whatever they are) are each sufficient but not necessary for the prevention of the window breaking. This is stipulated so as to maintain the analog between the purportedly unproblematic case and our puzzle case, Prevention. Notice that if we do not make this assumption, then the case of a single preventer becomes a case of *collective* prevention, similar to a case of collective causation. And since, as discussed above, cases of collective causation are unproblematic, then cases of

[29] And let us ignore that it surely wasn't the catcher's mitt alone that prevented the window—i.e., it was probably a complex object such as the mitt, plus the hand, plus various other parts of the catcher, etc., that prevented the ball from shattering the window. The point we make in the over-simplified case of the mitt being the sole preventer can generalize to the more complex, realistic case.

collective *prevention* should be unproblematic as well.[30] However, it is plausible that for any ordinary, seemingly unproblematic case of prevention, where one object prevents some event, the one object admittedly has parts that are sufficient but not necessary for the prevention. Take the object minus one molecule, for example; or the catcher minus his fingernail, or the catcher minus one big toe, or the mitt minus one stitch, or the mitt minus a sliver of leather material, etc. In this way, any ordinary case of prevention can be shown to be parallel in structure with our puzzle, Prevention. So this means that either both cases are problematic, or neither of them is. And, as before, I'm going to suggest that neither of them is. What prevents us from seeing Prevention as an ordinary case is our inability to consider metrological sums as genuine objects—or our inability to consider the parts of mereological sums as some things (plural)—that can do lots of things, including preventing windows from being shattered.

Some might have agreed that in the case of Shadow, appealing to mereological sums was natural and intuitive. Indeed, what else could cast the shadow if the mereological sum didn't? And some might have thought that appealing to mereological sums in the case of Eclipse, while less obvious than in the case of Shadow, was still intuitive after some thinking about the puzzle in the right way (i.e., that Eclipse was Shadow considered from the shadow's perspective). But Prevention, some one might argue, is taking the idea of mereological sums too far!

[30] There are many who think that cases of causation and cases of prevention are importantly different, and this issue is usually tied up with, or seen as similar to the question about whether negative facts or events are the same as or reducible to positive facts or events. Is the fact that Pierre is not here, for example, just reducible to the positive facts of who *is* here? I don't want to commit myself one way or the other for now, and I hope the above point can be made without having to settle one way or the other.

We can have mereological sums of random objects, such as O_1 and O_2, someone might claim. And we might be able to consider mereological sums of inanimate planets, such as P_1 and P_2. But matters start to get fairly unintuitive if we have to consider mereological sums of persons and walls!

Moreover, someone might argue, Shadow and Eclipse are clearly cases of causation, whereas Prevention is a case of, well, prevention! And preventing something is importantly different from causing something. Or so one might argue.

As to the first point, if someone is going to object that mereological sums of inanimate objects are fine, but mereological sums of (e.g.) persons as walls are not, I will remind such an objector of all of the arguments for CI (and all of the defenses for any objections *against* CI) that I have presented throughout this thesis. Once we have embraced CI—especially as I have imagined her here in this present thesis—there should be no worry at all about embracing any mereological sums whatsoever. This includes mereological sums of animate, living organisms, such as persons, and any other random (perhaps inanimate) object you chose. If you have fully grasped the CI view being defended here, then you understand that mereological sums of objects that you have already countenanced in your ontology are literally *for free*: the mereological sums are literally identical to the objects you already accept. So there should be no resistance to the claim that there are indeed mereological sums of (e.g.) catchers and walls—especially if one has already granted me that there are mereological sums of (e.g.) opaque objects such as O_1 and O_2, and planets such as P_1 and P_2.

As to the second point, it may well be that prevention is something distinct from causation. As I mentioned previously in a footnote, I (unfortunately) do not have the space here to take on such a debate. But even if causation and prevention are distinct, I don't see what the issue of CI and mereological sums has to do with one and not the other. Once one admits that some object*s*—plural—can engage in activities collectively (e.g., carry a coffin, enter a three-legged race, meet for lunch, cast shadows, etc.), then even if preventing something is an activity distinct from causing something, it is still admittedly an *activity*. And it seems that there are very few (if any) activities that cannot be done by some thing*s* collectively. So the same reasoning that we used above to convince the reader that some things could collectively cause things (e.g., casting shadows, eclipses, etc.) would apply to cases of prevention. And this would be true even if prevention and causation are distinct activities.

So, as with Shadow and Eclipse, Prevention is seemingly problematic, until you accept CI, and allow that mereological sums (e.g., the mereological sum of the catcher and the wall) can be preventers (e.g., preventing a window from being shattered). So, yet again, we see how an appeal to mereological sums—and, indirectly, an appeal to CI—can solve (yet another) philosophical problem.

iv. Perception[31]

Let us look at one more puzzle in detail that might—at first—seem quite a bit different than the puzzles discussed previously. Imagine that Adam is looking at an apple. We can suppose that conditions are normal: there is good lighting, Adam is of

[31] This puzzle is borrowed and modified from Neta (2007).

sound mind, and that his eyes are working properly, etc. We can represent such a situation by Figure 4:

Adam Apple

Figure 4

Yet, intuitively, one does not have to see all of an object in order for us to say truly that one sees an object. Adam, for example, does not need to see the back of the apple, the inside of the apple, all around the right and left sides, or the very top or bottom of the apple, for us to say truly “Adam sees an apple.” Indeed, Adam only sees the facing surface of the apple in front of him. Following Ram Neta (2007), let us then demarcate the facing surface of the apple that Adam sees in its entirety, from the rest of the apple which Adam, admittedly, does not see. We can even ‘pull apart’ the bits of the apple that Adam does see (let’s call this ‘Facing Surface’) from the bits that he does not (let’s call this ‘the Rest’) to exaggerate the point, which we can illustrate by Figure 5:

Figure 5

Some might argue that when we pull Facing Surface away from the Rest, so that Facing Surface occludes the Rest by being some distance in front of it, we would *not* be able to truly say “Adam sees an apple.”[32]

Assuming that the apple survives the removal of Facing Surface, one reason some might claim that we would not be able to truly say “Adam sees the apple” is because, even though the apple survives, the surviving apple is the object *behind* Facing Surface. Adam doesn’t see the apple (according to this line of reasoning) because *the apple* is occluded by an opaque object—the slivered-off bit of what used to be the facing surface of the apple, Facing Surface. Indeed, if we were to remove the rest of the apple completely, Adam would be none the wiser; for what

[32] According to one line of reasoning, this is because there is no apple for Adam to *see*. Once we have removed Facing Surface from the Rest, one might claim that the object(s) that remain are no longer sufficiently intact to qualify *as an apple*. So Adam does not see an apple in Figure 5 because there is no apple for him to see. Let us assume, however, that the removal of Facing Surface is not enough to destroy the apple. We often tolerate the removal of small bits of an object, without thinking that the object has thereby been destroyed (e.g., you think that you still exist even though small bits of you have fallen off as you read this; you can survive the clipping of your fingernails; a mountain can survive the loss of sediment by erosion, etc.). So let us just stipulate that our usual tolerance for the removal of parts is in play here, and applies to the bit we’ve been calling ‘Facing Surface.’ (Of course, my own gloss on this tolerance involves thinking of objects as 5-dimensional, trans-world and trans-spatio-temporal mereological sums that don’t, strictly speaking, ‘lose’ any parts whatsoever. But let’s leave this issue aside for now; I addressed this extensively in chapter 4.)

we've been calling 'the Rest' is entirely inert as far as Adam's perceptual experience goes. So, this line of argument continues, Adam is only seeing what we've called "Facing Surface"[33]—but he is *not* seeing the apple—in Figure 5, while Adam *is* seeing the apple in Figure 4.

But once we grant these two points—that Adam sees an apple in Figure 4, but does not see an apple in Figure 5—then a puzzle emerges. For, following Neta, we can imagine that we take an instance where Adam does not see the apple, as illustrated by Figure 5, and move The Rest closer and closer to Facing Surface. At some point, once The Rest is touching Facing Surface, it seems that we should be inclined to say truly that Adam sees an apple. After all, we will eventually get to a case represented by Figure 4, which we've already admitted is a situation where we can say truly "Adam sees an apple."

In other words, we can (as we have previously) run a quick step-wise argument from a situation in which we think we cannot say truly "Adam sees an apple", e.g. Figure 5, to a situation in which we can say truly "Adam sees an apple", e.g. Figure 4. We keep bringing the Rest closer and closer to Facing Surface until we are right back at Figure 4. At some point, we will have to go from a situation in which Adam doesn't see the apple, to one in which he does (as admitted at the outset by our intuitions involving the ordinary case of Figure 4). But, as with all Sorites arguments, we admit of tolerance for slight variation: it shouldn't matter whether the Rest is just a smidge closer or farther from Facing Surface. It seems

[33] As Neta points out, it is a bit misleading at this point to call the object in Figure 2 (that is in Adam's direct line of vision) "Facing Surface" since it is no longer a surface of anything (except itself). But this shouldn't distract us from the puzzle ay hand.

odd to say that one tiny sliver of distance between Facing Surface and the Rest will make the difference between Adam seeing an apple and not seeing an apple. Yet that is what it seems we are being forced to do if we admit that Adam sees the apple in Figure 4, but not in Figure 5.

Now perhaps one might think that once The Rest has been separated from Facing Surface, then no amount of pushing these two together will result in our original situation, represented by Figure 4. There is a pure unity, one might claim, to organically intact objects.[34] If I carefully peel an apple, for example, and then stick the skin back on, the difference between my creation to an unpeeled apple will perhaps be slight (and indeed nearly imperceptible if I am careful enough) but the skin is still importantly *unattached* to the object I've created. Not so with the untarnished apple, one might argue. But this is a fact about our physical limitations. We could certainly imagine that we have a fuse gun, such that whenever we point this gun at some objects, it will fuse them together perfectly, seamlessly, so that there is no difference contact-wise between objects which have been organically fused and those which have been fuse-gun fused. And if so, then there would be no difference contact-wise between an apple which had once been separated as in Figure 5, and then fused together with our fuse-gun, and the untouched apple in Figure 4. Metaphysically, at least, a perfectly fused object is seemingly no different that one that was never separated to begin with.[35]

[34] Neta discusses this point about the *unity* of objects, p. 6.

[35] This isn't quite right. For if we are considering 'the objects' in question as 4-dimensional space-time worms (or lumpy, 5-dimensional objects, as I suggest in Chapter 4), then such mereological sums would include 'the history' of having once been separated or not—i.e., each would have different temporal parts. Then, metaphysically, they *would* be different. But even on such a view, such 4-dimensional (or 5-dimensional, lumpy) objects would be composed of spatial and temporal (and

Moreover, as Neta points out, if we require of the objects that we see that they have unity, then it will yield the unwelcome result that it is only *unitary* objects that we really see.[36] Neta claims that we can see (e.g.) pairs of tomatoes, and the Milky Way Galaxy. Indeed, we can see crowds of people and heaps of sand and scattered decks of cards and piles of trash and bodies of water and clouds and dust storms and flocks of birds and so on. As another example: if I slice an apple into eighths, and then spread the slices on the table, I might request that you bring me the apple, and you would presumably have no trouble gathering up the slices and bringing the apple to me, divided and detached though it may be.

Now, true, an apple, one might claim, is not a scattered object like galaxies, crowds of people, heaps of sand, and scattered decks of cards are. Unity is important, one might continue, only when we are seeing unitary objects, such as apples.

This sort of objection seems incorrect for (at least) two reasons. First, if we are thinking of the world at the molecular level (as physicists are wont to do), or at the levels of mereological sums or gunk (as metaphysicians are wont to do), there will be no difference in principle between purported scattered objects such as galaxies and heaps of trash, and purported un-scattered objects such as apples. This is because apples, at rock bottom, are just a collection of small molecules, heaped together like a pile of trash (although composed of much smaller

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modal!) parts, one of which is an object at a certain time that has it's physical parts arranged in a certain way, and 'touching' in a particular way. And it is *this* object that is under discussion—an isolated temporal slice—that we can compare with another isolated temporal slice and ask ourselves if there is any significant metaphysical difference between them.

[36] Neta, p. 6.

components). Indeed, if we had microscopic eyes, rather than the ones we have now, the world would seem a much ‘heapier’ place than it does to us now, because all we would see would be small groups of molecules hovering around each other, much like we see galaxies and groups of people now. A feature such as ‘unity’ is supposed to be metaphysically robust, and wouldn’t dissipate due to a mere change in perspective or visual ability. Since purported ‘unitary’ objects would seemingly lose this property on closer, microscopic inspection, there must be no such property as ‘unity.’

Second, ‘seeing’ does not seem to be an ambiguous activity, whose necessary and sufficient conditions change depending on the object of sight. Seeing an apple, seeing a galaxy, and seeing a group of people or a pile of trash, in other words, are all involve the same activity—*seeing*. But it wouldn’t be if unity is required in some cases (e.g., seeing an apple) but not in others (e.g., seeing a galaxy, etc.).

Not to mention that this notion of ‘unity’ is somewhat obscure in any case, as Neta rightly points out. A principle of seeing that required the objects of perception to have ‘unity’ would have many more problems than the few cases it may account for.

One might think that there is an important difference between seeing an apple *as* an apple, and seeing an apple, period. Indeed, there is often a distinction is the literature made between non-epistemic seeing and epistemic seeing.[37] One might see an apple, for example, without seeing *that* it is an apple. Or one might see an apple, without seeing the apple *as* an apple. *Seeing that* is epistemic, whereas just plain *seeing* is not. And *seeing as* (at least) invokes an idea or a concept of

[37] See Dretske (1979).

something, whereas just plain *seeing* does not. You could see a cloud *as* an elephant, but you wouldn't be able to do so unless you already possessed the concept 'elephant.' So, one might think that one can't see an apple *as* an apple unless one already has a concept 'apple.' And this concept, one might argue, contains within it the notion of unity. And that is why apples need to be unified in order to see them (so one might argue).

But I am not concerned here with *seeing as*, or *seeing that*, or any kind of epistemic seeing. I am only concerned with the ordinary, *non-epistemic* notion of just plain seeing.[38] And unity does not seem to be a requirement of this ordinary, non-conceptual notion of just plain seeing.

So the puzzle before us is that while we all think that in Figure 4, we can say truly "Adam sees an apple," we don't think that we can say the same thing truly in Figure 5. But there does not seem to be any significant metaphysical difference between the two cases. It isn't a matter of attachment or contact (or detachment or non-contact); attachment or contact is neither necessary nor sufficient for object-hood. As said above, we can see galaxies and heaps of sand, both of which are objects whose parts are not attached. And we could fuse any objects we please—say, a cell phone, an apple, and a desk—but this fusion wouldn't thereby create a *new* object (if the mereological sum of the cell phone, the apple, and the desk is an object—which I of course think it is—then it is an object prior to the fusing. So fusion (or contact or attachment) is neither sufficient nor necessary for objecthood.

Moreover, as mentioned above, let us not forget principles of basic physics. The notions of 'contact' and 'fused-together' are folk notions, which we all have been

[38] As Neta (2007) himself seems to be doing. See also Dretske (1979).

taught are inappropriate when dealing with the microscopic or the molecular. Atoms and molecules—and if we dare go so far, mereological simples or gunk—are not the sorts of things that ‘touch’ or are attached in any accurate sense.

Neta calls the underlying principle at work here the **No Difference Principle**: it can make no difference to what someone sees that there just happens to be an occluded object behind, touching, or attached to the facing surface that s/he does see.[39] If we admit that Adam only sees Facing Surface in Figure 4 and Figure 5, and we admit that the Rest is causally inert, and seems to make no difference in what Adam sees, then according to the No Difference Principle, Adam does not see an apple in Figure 4 (or else he *does* see an apple in Figure 5).

I take it that the real point is that our verdict in each case—Figure 4 or Figure 5—must be symmetrical, given the No Difference Principle. Perhaps there’s a Moorean argument to be made here: since more people are more certain that Adam is *not* seeing an apple in Figure 5, than they are that Adam is seeing an apple in Figure 4, then given the No Difference Principle, Adam must not be seeing an apple in Figure 4.

And, of course, what goes for Adam and his apple goes for all of us everywhere. If we can’t explain why it is that Adam sees an apple in Figure 4, but not in Figure 5—if we are unable to split the difference metaphysically between what Adam sees in Figure 4 and what he sees (or doesn’t see) in Figure 5—then we may be forced to claim that Adam doesn’t see an apple in Figure 4 (or else we may be forced to say that he does see an apple in Figure 5, which is equally unintuitive). Then, generalizing, we will have to claim that none of us ever see the ordinary

[39] Neta p. 9; I’ve modified and generalized Neta’s definition for my purposes here.

objects that we take ourselves to see all of the time. And this would be quite devastating to our ordinary intuitions about what we do and do not see, generally.

Neta puts the argument as follows (I've modified it to suit my presentation):

1. Adam sees the same Facing Surface in Figure 4 and Figure 5.
2. There is no difference between what Adam sees in Figure 4 and Figure 5.
3. If Adam sees Facing Surface in figure 4, then he also sees an apple in Figure 4 only if the presence of the occluded part of the apple behind (touching, attached to) Facing Surface makes a difference to what she sees.
4. Therefore, Adam sees an apple in Figure 4 only if the presence of the occluded part of the apple ("the Rest") behind (touching, attached to) Facing Surface makes a difference to what she sees.
   No Difference Principle: If there happens to be an occluded object behind (touching, attached to) the facing surface that Adam sees, then it makes no difference to what Adam sees.

Adam does not see an apple in Figure 4 (from 4 and No Diff Principle).

As I mentioned before, Neta uses the above argument to argue for a subtle and interesting point about the contextual features of perceptual verbs such as 'sees'. He thinks that there is a kind of ambiguity or contextual shift in premises 1-4 that explains how we can go from true premises to a false conclusion. I am not interesting in investigating Neta's claims here. Instead, I would like to pursue an alternative solution to the perception puzzle, one that relates to Composition as Identity, as I've defended the view in this thesis.

In particular, I would like to draw out the parallel between Perception and the previous puzzle cases, Shadow, Eclipse, and Prevention. In each case, it seems we were given two symmetrical options: either each of the two relevant situations (e.g., Figure 4 and 5, or Figure 3 and a case where just the catcher prevents a window from shattering, or Figure 2 and a case where just one planet causes an eclipse, etc.) are problematic, or else both are *un*problematic. The typical move is to claim that the ordinary case is problematic. But, as we have seen, this is because many have underappreciated the value of turning to mereological sums to solve these kinds of puzzles. And, of course, if CI is true, then appealing to mereological sums will be ontologically free of charge.

This translates into a modus tollens of the above argument. Instead of concluding that Adam does not see an apple in Figure 4, because of our admission that Adam does not see an apple in Figure 5, I would like to maintain that, rather, Adam *does* see an apple in Figure 4, because he sees an apple in Figure 5 as well. The reason I think that we resist this move is because we fail to consider ordinary objects as mereological sums, and we fail to consider that mereological sums are ubiquitous (and the universality holds). And we fail to do these things, because we have failed to recognize that CI is true.

In regards to the argument above, this move amounts to a denial of the No Difference Principle. As explained above in (e.g.) the case of the Shadow Puzzle, I want to claim that neither O_1 nor O_2 individually cast the shadow. Instead, I want to claim that the mereological sum of O_1 and O_2 cast the shadow. And this conclusion is drawn in light of the reasoning that seemingly concludes that both O_1 and O_2 are *each* causally inert. I claim that running the counterfactuals individually on O_1 and O_2 to show that they are each causally irrelevant has no bearing on the claim that O_1 and O_2 *collectively* cast the shadow—i.e., the mereological sum of O_1 and O_2 cast the shadow. Similarly, in Figure 4 and 5, I want to maintain that Adam *does* see an apple, even if we think we can run counterfactuals on Facing Surface and the Rest to show that they are (individually) causally irrelevant, or rather, that each seemingly does not make a difference to what Adam sees. So, I want to claim that even though we may run a counterfactual on the Rest—i.e., if the Rest would have been removed (in either Figure 4 or Figure 5), then this would make no difference to Adam (i.e., his perceptual experience would be qualitatively identical in a situation in which the Rest was present, and a situation in which it was not)—this does *not* preclude the mereological sum of Facing Surface and the Rest from being an object that Adam sees.

So it is *not* the case that if there happens to be an occluded object behind (touching, attached to) the facing surface that Adam sees, then it makes no difference to what Adam sees—i.e., the No Difference Principle is false. This is because the counterfactuals that we run to see whether something *makes a difference to what Adam sees*, is similar to the counterfactuals that we run to show (e.g.) that each of O_1 and O_2 are causally irrelevant in the Shadow case. But just because (e.g.) O_1 and O_2 might be causally irrelevant in Shadow, this does not mean that the mereological sum of O_1 and O_2 is causally irrelevant. Likewise, just because the Rest might be causally irrelevant, this does not mean that the mereological sum of the Rest and (e.g.) Facing Surface is causally irrelevant. And, so, Adam can see the mereological sum of the Rest and Facing Surface, even if taken individually, the Rest makes no difference to what Adam sees.

This result may seem counterintuitive. It amounts to claiming that we see objects—e.g., apples—even when they are separated or detached, as in Figure 5. But in the background, recall, is my lump theory of objects. Ordinary objects, on my view, just *are* mereological sums of spatiotemporal and modal parts. Now, it may be that we have certain ideas of what can happen to an apple without compromising its survival. For example, we may think that an apple can survive being cut into eighths (e.g., as before if I cut the apple into eighths and put it on the table, you would not be confused if I were to then request that you bring me the apple: you would presumably gather up the slices and bring me the apple, sliced though it may be). But we may not believe that an apple survives being thrown into a blender (for then it is applesauce, e.g.). But on my lump theory of objects, this is no problem, since whenever we are seeing ordinary objects, we are seeing vast mereological sums of spatiotemporal and modal parts. As such, we are seeing many cases of overlap—in particular, many cases of world-overlap. Some apple molecules, for example, and the apple itself, are each lumpy, trans-world mereological sums that overlap in this world (perhaps for their entire spatiotemporal career here in this world, or perhaps not). Similarly, the (trans-world) mereological sum of Facing Surface and the Rest overlaps with the (trans-world) apple. Now just *where* it overlaps, and which spatiotemporal, this-worldly parts it shares is perhaps difficult to say. Perhaps the (trans-world) apple overlaps the trans-world mereological sum of Facing Surface and the Rest in Figure 5, and so perhaps apples (in general) can survive having their facing surfaces and the remainder separated for a bit. If so, then if someone sees such an object (such as Adam in Figure 5), then someone *is* seeing an apple. If not, then this isn't because there is something puzzling about what's going on in Figure 5, rather, it's just that apples don't survive being separated from their facing surfaces.

Yet whether one accepts this lump theory of objects is incidental. The central point is that once we allow that we can see mereological sums, then Perception no longer seems problematic. Because we can grant that Adam can see mereological sums of things (e.g. Facing Surface and the Rest), even if we seemingly have reason to think that each of the parts of this sum is causally irrelevant to what he does see. Of course, this may lead one to wonder whether we see *too many* things, all of the time. Aren't mereological sums ubiquitous, and hence, indistinctive?

If CI is true, and things are pretty much as we think they are[40], then, yes, we see mereological sums all of the time. Suppose (what is likely) that there is a mereological sum of my running shoe and the Eiffel Tower—call this Shoe+. And let us suppose that we are in a permissible context where seeing my running shoe is sufficient for saying truly, "Meg sees Shoe+" (much like seeing Facing Surface might be sufficient for saying truly "Adam sees the apple"). Then when I see my shoe, I also see Shoe+. And so on for any of the other myriad of mereological sums that I might be seeing when I look at my shoe (e.g., the mereological sum of my running shoe and this dissertation, the mereological sum of my running shoe and the taco I ate for dinner last night, the mereological sum of my running shoe and my pink motor scooter, etc.). But this is no problem at all, for a couple of reasons.

First and foremost, recall that I am only concerned here with non-epistemic seeing. So we may see a bunch of things all of the time, but this need not generate beliefs about all of the things that we are seeing. That is, if we are (non-epistemically) seeing a myriad of mereological sums, we need not see that we are

[40] That is, the Existence Assumption and the Parthood Assumption are both true, etc.

seeing all of these sums, nor need we see these sums as the sums that they are. Second, seeing these sums does not require that we can distinguish one from the other—i.e., it is irrelevant that we may be unable to tell whether we are seeing (e.g.) an apple, or the mereological sum of the apple and a dust mite. Indeed, most likely, if we are seeing one, we are also seeing the other. But it is an epistemic matter, as well as a bit of a practical worry, that we need to be able to tell whether we are seeing one (e.g., an apple) or the other (e.g., the mereological sum of the apple and a dust mite). So the ubiquity of mereological sums is not a problem.

Even so, someone might argue that there is yet another worry. In particular, someone might claim that there is a striking *dis*analogy between Perception and some of the previous puzzles I've discussed.[41] After all, in Shadow, for example, there were clearly four primary elements that generated the puzzle: the light source, the pair of opaque objects, O_1 and O_2, and the shadow. Similarly, for the Eclipse Puzzle: there was the light source, P_1 and P_2, and us on P_3. Finally, for the case of Prevention: there is the ball, the catcher and the wall, and the (unshattered) window. Yet in Perception, there seem to be only three key elements to generate the puzzle: an observer, the facing surface of the object involved, and the occluded bits of the object.

I have two points to make in response to such an objection. First, recall all of our discussion about counting in Chapter 2, and how it relates to CI. Saying that there are four elements to the puzzle assumes a method of counting that I reject, and is strictly speaking (on my view) incorrect. It also rejects the point I've been I impressing upon the reader through this entire chapter. One of the reasons we find

[41] Thanks to Dave Ripley for discussion here.

puzzles such as Shadow, Eclipse, Prevention, etc., so compelling is because we have failed to take seriously the idea that mereological sums are objects—objects that can cast shadows, cause eclipses, prevent windows from being shattered, etc. Once we grant that it is the mereological sum of O_1 and O_2 that cast a shadow in Shadow, for example, then we no longer see a puzzle at all. There is simply one object—a mereological sum, made of (at least) two parts—that is casting a shadow. Still, I do understand the spirit of the objection, even if it is not strictly speaking correct, given my diagnosis of mereological sums as active participants in each case, and given my notion of counting. But even the spirit of the objection can be shown to be misguided, if we reinterpret Perception in a slightly different way.

Instead of seeing Perception as an ordinary case of 'seeing an apple', let us consider it instead as a case of 'prevention from seeing.' Imagine that Adam is looking straight ahead, as he is represented as doing in Figure 4, and that there is a cat perfectly aligned behind the apple. We can represent this situation by Figure 6 (not drawn to scale):

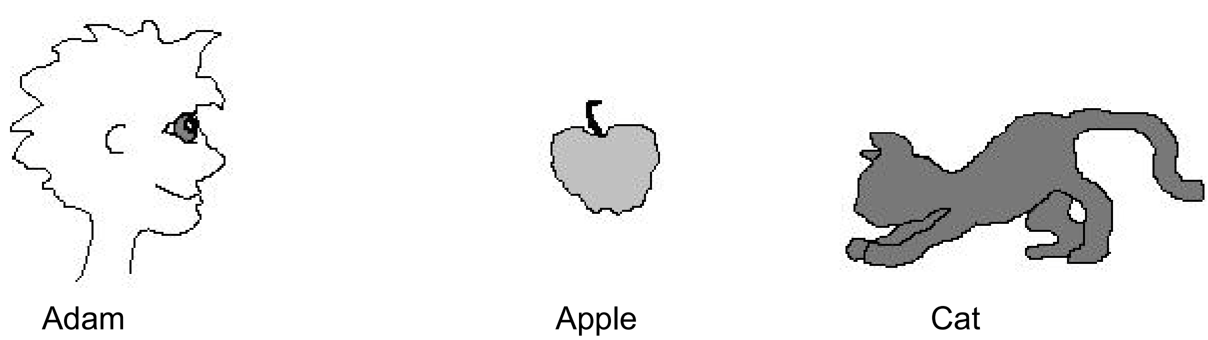

Figure 6

We might say that the apple is preventing Adam from seeing the cat, much like a catcher might prevent a ball from shattering a window. If the apple were not there, Adam would see the cat. But then we could remove the facing surface of the apple away from the rest of the apple, as we did in Figure 5, and then we would have a case of prevention (a case where Adam is prevented from seeing the cat), much like we did in our puzzle case, Prevention. We could represent such a situation by Figure 7:

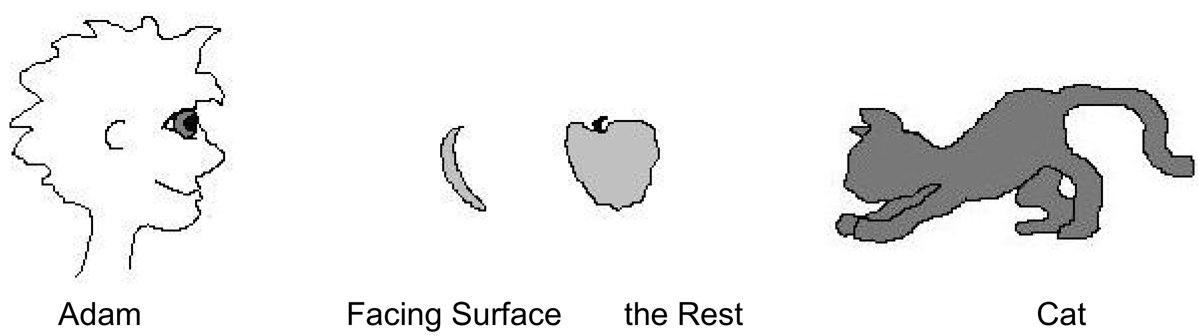

Figure 7

Figure 7 parallels the structure of the puzzle cases Shadow, Eclipse, and Prevention. We have four elements involved: Adam, the two parts of the apple (Facing Surface and the Rest), and the cat. The apple (both Facing Surface and the Rest) seems to be the (one!) thing that is preventing Adam from seeing the cat.

If we think of ordinary cases of seeing as situations where one is *prevented* from seeing whatever is behind the object in our line of sight, then we can mirror the structure of the previous puzzles. In cases where there is not a further object to be seen—e.g., the cat in Figure 7—we can think of cases of seeing as cases of prevention from seeing through the object. For even if there is a world with just Adam and an apple, if Adam is seeing the apple, then he is not seeing what is on the other side of the apple—i.e., nothing. We might say: the apple is preventing Adam from seeing the empty space beyond the apple. So even in cases where there isn't an object to be seen, we could still think of *seeing* as *prevention from seeing* something else (or nothing at all).

Of course, we might wonder whether such a substitution merited. Why should we think that cases of seeing are just cases of being prevented from seeing something else? And does it matter? Do we, for example, have to think that all cases of causation can be recast as cases of prevention in order to pursue this line? Unfortunately, I do not have the space here to argue for this particular point. Rather, this is merely a suggestion—just one line of argument that might be available as a response to an objector who claims that Perception is not parallel to Shadow, Eclipse, and Prevention. Whether such a response will be ultimately satisfactory will have to be pursued another time.

The main point of this section is simply to push our understanding of CI, and the application of mereological sums to various puzzles throughout the literature. We've seen how mereological sums might be able to help us in solving puzzles such as Shadow, Eclipse, and Prevention. Perhaps mereological sums may also be able to aid us in solving Perception as well. Of course, a complete treatment of Perception by appeal to mereological sums will require a bit more time and attention. But I hope the reader can at least get a feel for how such a response will go. Whether such a response is ultimately accepted will have to wait for another time, when my goals are less directed at showing the breadth of application of mereological sums, and can focus more carefully on the details of this particular puzzle. For now, I hope it suffices to have shown the reader several ways an appeal to mereological sums will be beneficial—in philosophical areas such as causation, prevention, and perception.

4. Concluding Thoughts: Broader Application and Overdetermination in General

As has been suggested above, there is a general form or template to the above four puzzle cases. In each case we deviate from the ordinary case by introducing a pair of elements, which are seemingly doing the work that one object usually accomplishes. In Shadow, for example, there were clearly four primary elements that generated the puzzle: the light source, the pair of opaque objects, O_1 and O_2, and the shadow. Similarly, for Eclipse: there was the light source, P_1 and P_2, and us on P_3. And so on. Once we have such a structure available, however, we will be able to see that there is broader application of CI than I have discussed here.

Take, for example, the Exclusion Problem in philosophy of mind.[42] Imagine that you are an Epiphenomenalist and you think that mental properties are distinct from physical properties. However, you also think that whenever you have a mental property, there is also a corresponding physical property, which the mental property is somehow dependent on. But let's imagine that the physical property causes some event, and that is sufficient for the event coming about. But then it seems that there is nothing left for the mental property to *do*; the mental event is seemingly causally

[42] See Malcolm (1968), Kim (1989), (1993), etc.

irrelevant. To claim that there are both mental causes and physical causes for a certain (physical or mental) event, and yet to maintain that the physical causes are sufficient for the event coming about, is to posit rampant overdetermination with respect to mental causes. To avoid such rampant, inelegant overdetermination, some argue, we should simply deny that there are such mental properties, events or causes in the first place.

Of course, in defense of the dualist or Epiphenomenalist, I would suggest that she consider appealing to mereological sums as causes. Like our puzzle cases, we could maintain that mereological sums can (unproblematically) cause an event, even if one or more of the parts of the mereological sum is sufficient for bringing about the event. In the mental case, the Epiphenomenalist could claim that the mental event or property is seemingly irrelevant in the same way that (e.g.) O_2 is irrelevant in casting a shadow in Shadow, or P_2 is seemingly irrelevant in Eclipse, or the Wall is seemingly irrelevant in Prevention, or the Rest is seemingly irrelevant in Perception, etc. But just because there is a line of reasoning (a counterfactual) that seemingly shows the causal irrelevance of one part of a mereological sum, this does not then mean that the mereological sum as a whole is causally irrelevant. So, in this case, the Epiphenomenalist could claim that it is the mereological sum of the (relevant) mental event and the physical event that causes thus-and-so. In this way, appealing to mereological sums (and, indirectly, CI) could aid the Epiphenomenalist against the Exclusion Problem.[43]

[43] I should note that I do not think that Epiphenomenalism is correct—nor any mind/body dualist view for that matter. But I do not think that the Exclusion Problem is an effective argument against the view, for the reasons I've delineated above.

As another example, let us consider Merricks' argument for his Eliminativist view of ordinary objects (e.g., tables and chairs), which he launches in order to avoid rampant overdetermination.[44] Merricks claims that if composite wholes existed, they would overdetermine events which are sufficiently caused by the composite's parts—e.g., the parts of a baseball cause a window to shatter, and are sufficient for the shattering, so it would be causally redundant to claim that the (whole) baseball causes the shattering as well. Since the baseball example generalizes to all cases of part/whole causation, Merricks claims that we should deny that there are any wholes. Such rampant causal redundancy, or overdetermination, in other words, should be avoided at all costs, and we would do better to deny that there are (e.g.) baseballs and running shoes than that overdetermination is ubiquitous.

My response to such a worry is three-fold. First, if CI is true, then the parts of the baseball are just *identical* to the baseball, so the overdetermination charge doesn't even get off the ground. Second, if my lump theory of objects is correct, then while the (trans-world) baseball and the (trans-world) baseball-particles are *not* identical, they are partially overlapped in this world (i.e., they share a world-chunk, and perhaps some spatiotemporal parts as well). And while it has been assumed that overdetermination of distinct casual events is problematic, it has not been shown that overdetermination with respect to overlapped objects is problematic. If Slim and Jim, who are Siamese twins joined by one hand, decide to use this hand to press a red button and detonate a bomb, I take it that we do not think that the pressing of the button was overdetermined. There was only one hand involved! It's

[44] Merricks (2001).

just that both Slim and Jim happen to share it. Likewise, if the intersection of Columbia and Franklin is treacherous because of potholes, and because of this, an accident occurs, I take it that this is also not a case of overdetermination. There is just one treacherous bit of road—where Columbia and Franklin intersect—and it is this (one!) part that caused the accident. Likewise, if the (trans-world) baseball and the (trans-world) baseball-particles happen to overlap (in (at least) one of their world-parts), then there is likewise no issue of overdetermination. There is just the (one!) world-part that causes (e.g.) the window to shatter. So, if my lump theory of objects is true, then Merricks' argument does not go through because causation by an overlapped part of something(s) is simply *not* problematic in the way that he assumes overdetermination in general is.

Third, even if we discount my lump theory of objects, and even if the baseball is not identical to its parts, it is still the case that Merricks' worry is parallel to the cases above—i.e., Shadow, Eclipse, Prevention, and Perception—and parallel to the Exclusion Problem as well. Merricks mistakenly concludes that just because some elements involved—e.g., the parts of the baseball and the baseball—are individually seemingly causally irrelevant, then both of them (taken together or collectively) are casually irrelevant. But if one embraces mereological sums, then one might be able to consider the mereological sum of the baseball and the parts of the baseball and claim that this (one!) thing is what caused the window to shatter. Again, I myself would not claim as much, since I will embrace the lump theory of objects. But this is nonetheless a move one could make once one embraces mereological sums, and embraces them as objects that can be causally efficacious. So this is the third way an appeal to mereological sums could dodge Merricks' arguments for the Eliminativism of composite objects such as tables, chairs, and baseballs.

Finally, consider Frankfurt cases. Imagine that Rob wants to rob a bank. Todd, an evil genius wants Rob to rob the bank, too. However, since Rob is often fickle, and changes his mind at the last minute, Todd devises a plan. Todd will place a chip in Rob's head, which can be controlled remotely. If Todd thinks that Rob might hesitate and not rob the bank, then Todd will flip on the switch and make Rob rob the bank. The big day comes, and Rob robs the bank. Todd never has to flip on the switch because Rob never once hesitates to rob the bank. Here's what seems true of Rod: if he had wanted to *not* rob the bank, he wouldn't have been able to (not rob the bank). For if Rob had decided against robbing the bank, then Todd would have flipped the chip on, and the chip would have made Rob to rob the bank. This kind of example is used as a counterexample to counterfactual accounts of free will. Such an account claims that an agent, *x*, is free with respect to an action, *a*, iff *x* could have not done *a*, if *x* had wanted to. Yet in the bank robbery case, intuitively Rob did freely rob the bank—at least, most of us would hold him morally responsible if he was caught and brought to court. But he fails the left side of the bi-conditional: Rob couldn't have *not* robbed the bank, if he had wanted to (because (e.g.) Todd would have then flipped the chip on).

Given my diagnosis in the preceding cases, I will repeat the same strategy here. I will claim that just because a counterfactual is run on an individual (e.g., Rob), this does not mean that there isn't something else that might be free, or responsible for robbing the bank, even given the counterfactual analysis of free will.

For example, consider the mereological sum of Rob and the chip (and maybe even Todd, depending on how involved he is in the chip's activation component). Could this thing—this mereological sum—have done otherwise, if it had wanted to? Well, you might think, this is a particularly strange question. First, we don't tend to think of mereological sums as agents who have wants and desires. Second, and for similar reasons, we tend to think that such things are not the sorts of thing that could be *free*, and so it is strange to talk about such a thing *being able to do otherwise*.

Fair enough. Nonetheless, we can imagine that someone might pursue this line. Perhaps they might suggest that mereological sums of objects inherit their 'agent-hood' from the parts—e.g., if we consider the agent-hood of Slim, Jim, and Tim, maybe this is just the combined agent-hood of each individual. Such considerations aren't too far-fetched, as people are often inclined to attribute agent-hood to corporations, governments, states, countries, bands, teachers' unions, etc. If groups of people can be held responsible, or be attributed agent-hood, then why not the mereological sum of Rod, Todd, and an implanted chip?[45] Thus, while Rod himself may not be morally responsible for robbing the bank, perhaps the mereological sum of Rob, Todd and the chip *is*. And maybe when agents are part of a mereological sum that is morally responsible for an action, then the agents that compose the sum should be held responsible for the action. So Rob—much like many individuals who compose a corporation—would be held morally accountable for robbing the bank, even though it was strictly speaking the mereological sum (not Rob himself) who freely robbed the bank. In this way, we could save our intuitions

[45] Admittedly the chip may not add to the agent-hood, but then adding it wouldn't detract from the agent-hood we might bequeath to such a mereological sum.

that Rob was *sort of* free (he is free in virtue of being part of a mereological sum that is free). But it is not the case that Rob himself freely robs the bank, and so it does not matter that he fails the bi-conditional of the counterfactual account of free will.

I do not expect this diagnosis to be obviously right; no doubt such an account needs some fleshing out. The point, however, is that armed with a straightforward access to mereological sums (via CI), the defender of a counterfactual account of free will now has recourse to solutions to Frankfurt cases that were heretofore simply not considered, or dismissed out of hand. Now, true, there may be other reasons not to endorse a counterfactual account of free will. But Frankfurt cases *per se* may not be the counterexample some have thought, if someone embraces mereological sums, and takes a line such as the one I was suggesting above (e.g., where mereological sums of agents can have agent-hood, free will, and can percolate moral responsibility down to the sum's parts).

Whether you are ultimately convinced by any of these applications of mereological sums (and CI) to puzzle cases throughout various different topics in philosophy is neither here nor there. The underlying point is that CI allows us *carte blanche* access to mereological sums. And once we have mereological sums on board, then we will be able to recast old dilemmas in new light. This is just one remarkable benefit of adopting CI. If such applications are carried out, and if the benefits proliferate, then this will be some reason to think that CI is true (assuming, again, that the overall utility of a view is some reason to think that it is true).

Moreover, as we hopefully have seen, overdetermination should no longer be a worry *across the board*. If CI is correct, and if universality is correct (i.e., the idea that for any two (or more) things, there is a mereological sums of those things[46]), then whenever we have two (or more) competing causes, we can think of the situation as involving the (one!) mereological sum of these causes, rather than the individual causes. If the (purportedly) competing causes are subsumed under (one!) mereological sum (of which those causes are mere parts), then our overdetermination worries will thereby dissipate. We seem to begin with the assumption that one cause is unproblematic. But, like the puzzle cases above, I maintain that there is a parallel between any (purportedly) unproblematic single cause, and a case where there is more than one sufficient cause—i.e., a case of overdetermination. For a single cause is almost always composed of parts (e.g., the single object casting a shadow has a front half and a back half, the single planet causing an eclipse has a front half and a back half, the catcher has a front half and a back half, etc.), yet we ignore this in our assessment of the single cause. Likewise, we should ignore the parts of a purported case of overdetermination, and think of it instead as an unproblematic case of singular causation—it's just that the object that is causally relevant in this case is a mereological sum (of the purportedly causally problematic parts).

Again, I do not claim that all of these puzzles should be solved by appeal to mereological sums, or that the solutions that I've gestured to above will ultimately deliver a satisfactory answer. Indeed, there might be many other considerations in each case that would lean towards an alternative solution. But the point is twofold: (i) that mereological sums are no longer to be avoided as solutions because (e.g.) they

[46] Recall that I discussed and assumed this principle in Chapter 1, section 5. I also discussed it in Chapter 4.

are too ontologically costly; on the contrary, if we accept CI, we get access to mereological sums for free, and (ii) that the application of mereological sums is impressively broad—they can be appealed to in philosophical areas such as causation, prevention, perception, moral responsibility, etc. Every sub-field in philosophy that can benefit from the adoption of CI provides more theoretical evidence that CI is not only a coherent view, but gives us great reason to think that it is true.

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