# Chapter 2

## <u>Counting and Composition</u>[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<br>
1 computer<br>
1 office chair<br>
1 couch<br>
2 pillows<br>
2 bookcases<br>
122 books<br>
1 garbage can<br>
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 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

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

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 '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

[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.)

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 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

[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.

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 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,

[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.

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

> 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 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')":

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[8] Van Inwagen, Peter 1994: 213.

[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.

(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 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 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]

[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.

[11] Van Inwagen (1994), 213.

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)?

(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]:

$$(4)\ \exists x \exists y \exists z\ (Sz \ \&\ xMz \ \&\ yMz \ \&\ x \neq y \ \&\ x \neq z \ \&\ y \neq z) \ \&\ \forall x \forall y \forall z \forall w\ ((Sz \ \&\ xMz \ \&\ yMz \ \&\ x \neq y \ \&\ wMz) \rightarrow ((w = x) \vee (w = y))).$$

(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 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.

[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.

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 $\alpha$ and $\beta$ 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 ($2_h$):

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

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]:

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

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

(i) $\alpha = \beta \equiv_{df} \alpha =_h \beta$, where $\alpha$ and $\beta$ 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 ($1_h$):

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

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) $\exists x \exists y \exists z(\mathrm{P}x \ \&\ \mathrm{P}y \ \&\ \mathrm{P}z \ \&\ x \neq_h y \ \&\ x \neq_h z \ \&\ y \neq_h z \ \&\ \boldsymbol{z =_h x, y})$[17]

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[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.

[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.

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 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]

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

[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.

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.

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

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

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]

[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

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 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

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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.

[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.

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 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

[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.

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 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

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

[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.

‘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 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,

[29] Thanks to Bill Lycan for discussion here.

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] 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

[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.

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

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' 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.

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

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

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 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 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

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

(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 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.

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

[36] In principle, at least.

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

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 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

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

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 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: $z =_{\mathrm{h}} x,y$.

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

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

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:

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

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

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

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.

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):

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[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.

(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**: $\exists x \exists y \exists z \exists w \exists v \exists u \, (V_R x \; \& \; V_R y \; \& V_R z \; \& \; V_R w \; V_R v \; \& \; V_R u \; \& \; x \neq y \; \& \; x \neq_h z \; \& \; x \neq_h w \; \& \; x \neq_h v \; \& \; x \neq_h u \; \& \; y \neq_h z \; \& \; y \neq_h w \; \& \; y \neq_h v \; \& \; y \neq_h u \; \& \; z \neq_h w \; \& \; z \neq_h v \; \& \; z \neq_h u \; \& \; w \neq_h v \; \& \; w \neq_h u \; \& \; v \neq_h u) \; \& \; \forall x \forall y \forall z \forall w \forall v \forall u \forall s (V_R x \; \& \; V_R y \; \& \; V_R z \; \& \; V_R w \; \& \; V_R v \; V_R u \; \& \; V_R s \rightarrow (s =_h y) \lor (s =_h x) \lor (s =_h z) \lor (s =_h w) \lor (s =_h v) \lor (s =_h u))$

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.

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

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

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).