

## Composition as Identity and Leibniz's Law (Long Abstract)

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Leibniz's Law, as understood here, is a principle of the logic of identity:  $x$  is identical with  $y$  if and only if  $x$  and  $y$  have all of their properties in common. (Here  $x$  and  $y$  may be replaced by either singular or plural variables; and properties apply to pluralities collectively, not distributively.) My main concern will be with the left-to-right direction, the principle of the *indiscernibility of identicals*. This principle needs to be distinguished from the linguistic principle, the *substitutivity of identicals*, which can fail with respect to a language whose predicates (or open sentences) do not express genuine properties. But in a fundamental language that mirrors the structure of reality, the predicates all express genuine properties, and, given the indiscernibility of identicals, the substitutivity of identicals holds for that language.

According to the doctrine of *Composition as Identity*, in some sense, a whole is identical with its parts taken together. Different versions of the doctrine of *Composition as Identity* can be distinguished by how they relate to Leibniz's Law. *Strong* Composition as Identity holds that there is only one identity relation, that it satisfies Leibniz's Law, and that whenever some things  $xx$  compose a thing  $y$ ,  $xx$  are identical to  $y$ . *Weak* Composition as Identity also holds that there is only one identity relation and that it satisfies Leibniz's Law, but it denies that composition either is, or entails, identity; rather, composition is merely analogous to identity in striking and important ways. *Moderate* Composition as Identity, as I use the term, holds that there are multiple *kinds* of identity, only one of which – numerical identity – satisfies Leibniz's Law; there is also a generalized identity relation according to which, whenever the  $xx$  compose  $y$ , the  $xx$  are identical to  $y$ . The view is *moderate* because, without Leibniz's Law, it lacks many of the consequences of the strong version (some of which, within a framework of plural logic, seem clearly false, if not outright contradictory). But in another way, it is not moderate at all, since it allows that a genuine identity relation could fail to satisfy the indiscernibility of identicals. In this way, it shares at least some of the "strangeness" of Baxter's version of composition as identity.

In a previous paper, "Composition as a *Kind* of Identity", I argued against strong composition as identity on the grounds that it is incompatible with taking the framework of plural logic to be fundamental. For if plural logic is fundamental, there will be genuine properties, such as *being one* and *being many*, that provide counterexamples to Leibniz's Law (whenever there is more than one thing). In this paper, I am interested in asking whether there is a version of strong composition as identity that can evade this argument without rejecting plural logic. But I will approach this question from a different direction, by first considering a challenge to any attempt to defend a moderate version of composition as identity. The challenge is how, in the absence of Leibniz's Law, to characterize what counts as a kind of identity. Unless this challenge can be met, one might wonder whether moderate composition as identity just collapses into weak composition as identity. In my

earlier paper, I argued that moderate composition as identity *is* a distinct view, with the power to shape and inform our metaphysical conception of reality; but I despaired of providing an elucidation of the generalized notion of identity that would be of any assistance to someone who claimed not to understand it.

In that paper, I bypassed an obvious strategy: although generalized identity relations fail to satisfy Leibniz's Law, they satisfy a *restricted version* of Leibniz's Law; and it is in virtue of satisfying the restricted version that they are appropriately called genuine identity relations. It won't do just to say, however, that they satisfy Leibniz's Law restricted to properties that are not *slice-sensitive* (or *set-like*); for properties are called *slice-sensitive* in virtue of failing to satisfy Leibniz's Law, and we would be going in a circle. But perhaps there is a more informative way to capture the restriction, and thus to characterize what relations are genuinely kinds of identity.

To see what I have in mind, consider how David Lewis describes the failure of Leibniz's Law. He writes:

Even though the many and the one are the same portion of Reality, and the character of that portion is given once and for all whether we take it as many or take it as one, still we do not really have a generalized principle of the indiscernibility of identicals. It does matter how you slice it – *not to the character of what's described, of course, but to the form of the description.* (*Parts of Classes*, p. 87, my italics)

This suggests two things. First, it suggests that the sought-after restricted version of Leibniz's Law quantifies only over properties that ascribe "character". I take it that the character of a portion of reality supervenes on the fundamental properties and relations had by that portion of reality and its parts. In particular, then, we have the following consequence. Suppose that *xx* and *yy* are many-many identical in virtue of picking out the same portion of reality, but that they slice that portion of reality differently. *No fundamental property applies to xx but not to yy.* For if it did, then the character of a portion of reality would depend on how you slice it.

The second thing suggested by the passage from Lewis is this: failures of Leibniz's Law are due to differences in our ways of describing or representing reality, not to differences in reality itself. In my earlier paper, I argued against strong composition as identity on the grounds that the framework of plural logic is fundamental, and so failures of Leibniz's Law that result from logical properties definable from the fundamental relation of plural logic, 'is one of', show that Leibniz's Law fails at the fundamental level. But perhaps there are two different notions of "fundamental" at play here that my argument conflates. Perhaps we need to distinguish between what is fundamental at the level of our representations of reality from what is fundamental to reality itself, at the level of being. (Compare Jenann Ismael, "How to be Humean", where this distinction is made in connection with Humean accounts of laws and chance.) This distinction will have broad application; but it applies first and foremost to logic. For example, our representations of reality involve content with Boolean and quantificational structure; and that structure is fundamental at the level of our representations. But,

as I see it, there is no Boolean or quantificational structure at the level of being. At the level of being, there is only a pattern of instantiation of fundamental properties and relations. Boolean and quantificational propositions are made true by that pattern. To think that one must posit fundamental Boolean or quantificational structure in reality itself is to hold to a naïve picture account of representation. (See my “The General and the Particular: Supervenience Vs. Entailment” for how this plays out with respect to general propositions.)

The passage from Lewis suggests that something similar should be said about the distinction between plural and singular that is fundamental to plural logic. Even if we grant that the framework of plural logic is fundamental at the level of our representations, we need not grant that there is plural structure at the level of being. Propositions that we formulate within a framework of plural logic are made true, somehow, by what is fundamental at the level of being; but the plural structure inherent in those propositions is not mirrored by any corresponding plural structure at the level of being. If this is so, then we have a neat way of characterizing a moderate version of composition of identity that is clearly distinct from weak composition as identity. We can say that a relation taking plural or singular arguments is a *kind of identity* just in case it satisfies Leibniz’s Law restricted to properties that supervene on the pattern of instantiation of properties and relations that are fundamental at the level of being. On the view being considered, composition is a kind of identity.

But this version of moderate CAI, it seems to me, is best thought of as a version of strong CAI in disguise. Let me explain. We are now supposing there is a clear distinction between those features that are fundamental at the level of reality, the features that give rise to character, and those features that arise from our representations of reality, features that depend on our slicing reality in different ways. To get at fundamental ontology, the entities that are fundamental to reality, we need to factor out the slice-sensitive features, and posit that the fundamental entities have only the features that give rise to character. These fundamental entities (the “portions of reality”) will be neither singular nor plural in themselves; they are singular or plural only relative to how we represent them. (Since I am describing this theory in English, where all reference is singular or plural, what I say must be taken with a proverbial grain of salt.) These fundamental entities satisfy an *unrestricted* Leibniz’s Law at the level of being, since, at the level of being, the properties that are putative counterexamples to Leibniz’s Law simply do not exist. And so strong composition as identity is now vindicated as, in some sense, holding at the fundamental level of reality. Although at the level of representation, there are multiple kinds of identity, at the level of being there is just the one relation of identity that every portion of reality bears to itself. What makes this version of composition as identity distinctive – and sort of a cross between moderate and strong versions – is the concession that the view cannot be stated in purely fundamental terms. Composition as identity is a truth that can only be expressed using a representational apparatus that does not accurately mirror the fundamental level of reality.

For those sympathetic to the intuitions behind composition as identity, there is a lot to like in this moderate-cum-strong version. It seems to be a reasonable

interpretation of Lewis's remarks (even though Lewis is often taken, wrongly I think, to hold a much weaker view). It seems to be close to the view of some strong composition as identity theorists, such as Einar Bohn, who want to attribute all violations of Leibniz's Law to our ways of representing reality, and not to reality itself. Indeed, it provides a way for them to endorse a version of strong composition as identity without being committed to Collapse, because the principle of substitutivity that leads to Collapse does not hold in the plural framework within which the theory is expressed. (Collapse is the principle that  $x$  is one of the  $yy$  iff  $x$  is part of the fusion of  $yy$ ; see Byeong-uk Yi's "Is Mereology Ontologically Innocent" and Ted Sider's "Parthood".) Indeed, this is more or less the view that I myself held, somewhat confusedly, from the time I first read Lewis's *Parts of Classes* up until about five years ago. But I ultimately rejected it because the deflationary notion of composition, and part-whole, that I accept is essentially intertwined with the notion of plurality, and is-one-of; and so to hold that reality is composite at the fundamental level, as I do, is just to hold that reality has plural structure through and through. That is not an argument, of course. The bulk of my paper is devoted to attempting to provide an argument against moderate-cum-strong composition as identity that might have some force against its proponent.

The best, and perhaps only, way to argue against moderate-cum-strong composition as identity is to argue that slice-sensitive fundamental properties are possible. For that entails that the composite structure of reality, as characterized within the framework of plural logic, is fundamental to reality itself, not just to our representations of reality. And it entails that the relation between a whole and its parts, though (I claim) a genuine kind of identity, cannot in any way be reduced to the one-one identity that portions of reality bear to themselves. But why think that fundamental properties can be slice-sensitive? One sort of plausible example involves directional properties, since a direction corresponds with a slicing of reality orthogonal to the direction. Consider the 3-D block letters, made famous by the book *Gödel, Escher, Bach*, that present as three different letters when viewed from three different directions. For example, the letter on the cover of the book is a 'G', an 'E', or a 'B' depending on the direction that it is viewed. The block is a portion of reality, then, that can be said to have three different properties depending on how that portion is sliced: one slicing makes it a 'G', one an 'E', and one a 'B'. Of course, in this case the properties can be reduced to the geometric relations between the points that compose the block. But I believe that a case can be made that slice-sensitive fundamental properties are possible, both such directional properties and others. In the core section of my paper, I present and discuss some examples. I then consider whether the possibilities in question follow from general principles of modal plenitude, or must rest instead on the shakier grounds of modal intuition.

My argument against strong composition as identity is similar in spirit to Kris McDaniel's well-known argument from the possibility of strongly emergent properties (in "Against Composition as Identity"). But McDaniel's argument, as he presented it, has no force against the version of strong composition as identity here under review because strongly emergent properties need not be slice-sensitive. (Sider has argued, in "Consequences of Collapse", that it also has no force against versions of strong composition as identity that accept Collapse.) Thus, if xx

instantiate some fundamental emergent property, the strong theorist can simply hold that *yy* also instantiate that property, for any *yy* that are the same portion of reality as *xx*. This response works perfectly well for run-of-the-mill emergent properties, since run-of-the-mill emergent properties are not essentially slice-sensitive. True, this response must reject McDaniel's Plural Duplication Principle. But there isn't any cost in that: for one thing, McDaniel's argument for the Plural Duplication Principle made use of an unrestricted Leibniz's Law that the view under discussion rejects; and, in any case, rejection of the Plural Duplication Principle and the acceptance of strongly emergent properties go hand in hand. There is only a cost if the strongly emergent properties are slice-sensitive; for then the character of a portion of reality depends on how you slice it. Only then do we have an effective argument against the version of strong composition as identity here in question.