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CONSTITUTION AND SIMILARITY

ABSTRACT. Whenever an object constitutes, makes up or composes another object, the objects in question share a striking number of properties. This paper is addressed to the question of what might account for the intimate relation and striking similarity between constitutionally related objects. According to my account, the similarities between constitutionally related objects are captured at least in part by means of a principle akin to that of strong supervenience. My paper addresses two main issues. First, I propose independently plausible principles by means of which to delineate, in a non-ad-hoc, non-stipulative and non-circular fashion, those properties which can be expected to be shared among constitutionally related objects in virtue of their being so related from those which in general cannot be expected to be shared, or which are shared for other reasons. Secondly, I spell out in detail the nature of the supervenience-principle at work in this context. My account thus aims at isolating, in a methodologically responsible fashion, the particular sort of restricted indiscernibility principle which is a component of the constitution-relation.

I.

Whenever an object constitutes, makes up or composes another object, then the objects in question share a striking number of properties. For example, consider a particular statue and a piece of clay. If the piece of clay constitutes the statue, then the two objects occupy the same space at the same time, consist of the same fundamental constituents (particles, molecules, etc.), have the same weight, shape, color, texture, chemical composition and so forth.

Given the striking number of properties shared between the statue and the piece of clay which constitutes it, it is tempting simply to identify the objects in question.[1] (I will henceforth refer to all versions of this view indiscriminately either as the *'constitution-is-identity'* view or as the *'identity-theory'*.) If constitution is identity, no further explanation for the striking similarity between the statue and the piece of clay is called for: by Leibniz's Law, an object, x, and an object, y, which are numerically identical, must share all of

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their properties. The difficulty, in this case, is not so much to account for the fact that the objects in question are so similar, but to explain how there can be apparent differences between them. For whenever two objects are constitutionally related,[2] there are also some properties with respect to which they appear to differ; e.g., certain modal properties (such as the property of being essentially a statue) and, typically, certain temporal properties (such as the property of having come into existence after the piece of clay came into existence). Among the characteristics apparently not shared by the statue and the piece of clay is also the property of being constituted by a piece of clay, which, intuitively, is a property had by the statue but not the piece of clay. In the course of accounting for the apparent differences between the statue and the piece of clay, the identity-theorist must therefore also explain the powerful intuition that constitution, in the sense in which this notion is of interest to us, is an *asymmetric* relation, while identity is of course symmetric.[3]

If, on the other hand, the statue and the piece of clay constituting it are viewed as two distinct material objects which occupy the same space at the same time, then not only does the asymmetry of the constitution-relation need to be accounted for; the striking similarity between the objects in question now also stands in need of further explanation.[4] (In what follows, I shall refer to all versions of the view according to which constitutionally related objects are distinct as the *'distinctness-theory'*.) After all, since numerical identity is not a relation that admits of degrees, the statue and the piece of clay, according to the distinctness-theorist, are as distinct from one another as, say, the Eiffel Tower and the planet Jupiter. How, then, is it that two distinct objects can be so intimately related and share so many fundamental properties? Curiously, defenders of the distinctness-theory have been slow to provide a positive analysis of the constitution-relation which can account for both the striking similarities between constitutionally related objects and the asymmetry of the constitution-relation.

In what follows, I develop a novel account of what I will call the *'similarity-challenge'*, i.e., the project of accounting for the striking similarities between an object and that which constitutes it, which has so far been unduly neglected in the literature.[5] For the purposes of this discussion, I shall take it for granted that the

apparent differences between constitutionally related objects cited earlier are most plausibly interpreted to indicate that the objects in question are *in fact* distinct. (A defense of this component of my analysis of constitution is provided elsewhere; see Koslicki (2003)) The account given here is therefore primarily intended to provide a response to the similarity-challenge for the distinctness-theorist, although I will indicate below how my proposal may be of use to the identity-theorist as well.[6]

The response to the similarity-challenge developed below has the following attractive features. First, it makes explicit an idea that has been found attractive by many writers (e.g., Fine, 1982, pp. 100ff; Horgan, 1993, p. 569; Lowe, 1989, p. 81; McLaughlin, 1995, p. 19; Simons, 1987, p. 228; Zimmerman, 1995, pp. 88 ff), but which has not been developed elsewhere in any detail, viz., that the similarities between constitutionally related objects can be captured at least in part by means of a supervenience-like principle of some sort.[7] Secondly, unlike existing proposals (e.g., Baker, 1999; Fine, 1982; Yablo, 1987), my account attempts to delineate the family of properties over which the similarity-principle ranges in a systematic, non-circular and otherwise methodologically unobjectionable fashion, e.g., without having to exclude, purely by fiat, whole classes of properties (e.g., all modal and temporal properties, as well as those involving identity and constitution). As we shall see below, not only are such stipulative restrictions to the similarity-principle in question undesirable for methodological reasons; they are also in general too coarse-grained to yield the correct results. Thus, my account meets the demand discussed, for example, in Baker (1999), Deutsch (1998), Wiggins (1980), Yablo (1987) and Zimmerman (1995), for making explicit the sort of restricted indiscernibility-principle that appears to be a component of the constitution-relation: it seems plausible to think that any satisfying account of constitution should explain why constitutionally related objects are similar in so many, entirely predictable ways, i.e., why there appear to be law-like principles at work which account for the many similarities between constitutionally related objects. Finally, the proposal defended here provides one possible route towards accounting for an important and often ignored characteristic of the constitution-relation mentioned earlier: its asymmetry.

II.

Earlier on, I mentioned that the statue and the piece of clay which constitutes it are similar in the following respects: they occupy the same space at the same time, consist of the same fundamental constituents (particles, molecules, etc.), have the same weight, shape, color, texture, chemical composition, and so forth. As examples of properties with respect to which they differ, I cited the modal property of being essentially a statue; the temporal property of having come into existence after the piece of clay came into existence (in cases in which the statue and the piece of clay are not temporally coextensive); and the property of being constituted by a particular piece of clay.

But this characterization of the similarities and differences between the statue and the piece of clay leaves out some important categories of properties. The following table attempts to give a more complete characterization.

A few clarificatory remarks are in order. I label the properties in Rows 1 and 2 'unproblematic' to set them off from those in Rows 3 to 11, which of course also contain both intrinsic and relational properties, but ones which might seem to pose special complications. The properties in Rows 1 and 2 are those we typically have in mind when we say that the statue and the piece of clay are exactly alike in every 'ordinary' respect. As Figure 1 brings out, however, there are also many 'less ordinary' respects in which the statue and the piece of clay are alike. For example, while modal properties are usually cited primarily as examples of properties with respect to which the statue and the piece of clay differ, there are in fact, as brought out by Row 3, many modal properties which are shared between the statue and the piece of clay, such as fragility and the property of being essentially a material object.[9] The same goes for some of the temporal, causal, counterfactual, constitution-, identity- and kind-properties in Rows 4 to 9. (It is not clear whether there are any uncontroversial examples of causal properties with respect to which the statue and the piece of clay clearly differ; hence the question-marks in the 'Not Shared' Column of Row 5.)

A word about the column labeled '???'. This column contains properties of two kinds. First, it contains properties about which we have (as far as I have been able to determine) no decisive preth-

Properties of the statue	**Shared**	**Not shared**	**???**
(1) *'Unproblematic' Intrinsic*	Weight; Shape; Color; Texture; . . .		
(2) *'Unproblematic' Relational*	Location; . . .		
(3) *Modal*	Being essentially a material object; Being fragile; . . .	Being essentially a statue; . . .	
(4) *Temporal*	Existing at a certain time t*;[8] . . .	Coming into existence after the piece of clay; . . .	
(5) *Causal*	Causing a pedestal to crack; . . .	???	Causing admiration in museum visitors; . . .
(6) *Counterfactual*	Would not have existed had there never been any clay; Would melt if exposed to heat of 150 °C; . . .	Would not have existed had there never been intentional agents; . . .	
(7) *Identity*	Being self-identical; . . .		Being identical to the statue; . . .
(8) *Kind*	Being an artifact; . . .		Being a statue; . . .
(9) *Constitution*	Being constituted by a particular collection of particles; . . .	Being constituted by a particular piece of clay; . . .	
(10) *Aesthetic*			Being beautiful; . . .
(11) *Intentional*			Representing a certain model; . . .

Figure 1.

eoretic intuitions as to whether these are properties shared by the statue and the piece of clay or properties had only by one but not the other. The aesthetic and intentional properties in Rows 10 and 11 are of this kind. (The causal property of causing admiration in museum visitors in Row 5 of course has an aesthetic and intentional component as well.) The second group of properties included in this column are those whose status will depend on whether constitutionally related objects are viewed as numerically identical or distinct. The status of these properties cannot be settled independently of a commitment concerning this question. Examples of this last kind are

the Row 7 property of being identical to the statue and the Row 8 kind-property of being a statue. Although for different reasons, the two groups of properties in the '???' Column (i.e., the intentional and aesthetic ones, on the one hand, and the identity- and kind-properties, on the other) thus have the following characteristic in common: they are properties whose status is not dictated to us pretheoretically and with respect to which a given account of constitution therefore has a certain amount of leeway, at least concerning the question of whether they properly belong into Column 1 or 2.

To illustrate, consider an example from Yablo (1987). Suppose that there is an object which was used to enshroud Jesus Christ. Call this object 'Shroud'. Furthermore, call the piece of cloth of which Shroud is made 'Cloth'. At times during which Cloth constitutes Shroud, does Cloth inspire reverence, if Shroud does? Is Cloth an object of religious importance as well? If we hold Shroud to be beautiful, would we say the same of Cloth? Is Cloth also a shroud? Does Cloth have the property of being identical to Shroud? These are precisely the kinds of questions to which different accounts of constitution can either be *expected* to give different answers (as in the case of identity-properties) or are at least be *permitted* to do so (as in the case of aesthetic, intentional and kind-properties). (In other words, the mere fact that a particular analysis of constitution assigns, say, the kind-property of being a shroud to the 'Shared', rather than the 'Not Shared', Column would not count as a persuasive complaint against this view, as long as this choice is otherwise well-motivated.)[10]

Now consider the properties in the 'Shared' Column. Does the presence of these properties in both the statue and the piece of clay have anything to do with the fact that these two objects are constitutionally related? Note, for instance, the marked contrast in this respect between the property of being self-identical, on the one hand, and that of being fragile, on the other. While the presence of fragility in the statue is plausibly explained by invoking the characteristics of the object which constitutes it, in the same manner as its weight, shape, chemical composition, and the like, a similar account seems much less appropriate in the case of self-identity: in fact, it seems absurd to suggest that the statue's having the property of being self-identical has anything to do with the piece of clay which

constitutes it. For ease of reference, let's call those properties (like fragility) whose presence in both members of a pair of constitutionally related objects plausibly derives from the fact that they are so related the *'constitutionally derived'* ones and those properties (like self-identity) for which an explanation of this sort seems misplaced the *'non-constitutionally derived'* ones. Is there a principled and systematic way of delineating the family of constitutionally derived properties from the non-constitutionally derived ones? Let's turn to this question next.

III.

An important desideratum for any approach to delineating the constitutionally derived properties from the non-constitutionally derived ones is that it not violate independently plausible methodological principles. For example, extant accounts, if they address this issue at all, typically do so in an entirely *stipulative* fashion. To illustrate, consider the account proposed in Fine (1982): to account for the similarities between constitutionally related objects, Fine proposes a principle he calls "Inheritance" (ibid., pp. 100ff). According to this principle, an object inherits all of its "normal" properties from the object which constitutes it, where "normal" properties are defined as those which are not "formal" and whose application concerns only the time and world in question. Although the notion of a "formal" property is not further elucidated by Fine, I assume that he takes it to include such properties as being self-identical or the property of being a bachelor or not being a bachelor, i.e., properties which any object whatsoever has and does so, intuitively, for purely logical reasons. In addition to its undesirably stipulative nature, Fine's restriction on property-inheritance between an object and that which constitutes it is also overly strong, since it mistakenly excludes such modal properties as being fragile, with respect to which the statue intuitively does seem to depend genuinely on the piece of clay constituting it. A similar approach is taken by Lynne Rudder Baker, who excludes from her response to the similarity-challenge, again purely by fiat, all modal properties, all identity- or constitution-properties and all properties that are "rooted outside" times at which they are had (Baker, 1999, 2000).

Independently plausible methodological principles are also violated by Yablo (1987), whose account is explicitly directed at explaining how constitutionally related objects can be so strikingly similar and yet distinct. The central technical notion by means of which this interesting and complex account proceeds is the distinction between *categorical* and *hypothetical* properties. Very roughly, categorical properties are those which concern only how matters stand in the *actual* world; hypothetical properties, on the other hand, concern also the distribution of categorical properties in *other* worlds. If an independent characterization of the notion of categoricity could be found, then, in Yablo's view, the striking similarity between constitutionally related objects could be explained as *sameness of categorical properties*. Since I take it that properties like fragility would be regarded as hypothetical on this account, Yablo's thesis already suffers from the weakness identified above with respect to Baker and Fine: it draws the line between constitutionally derived and non-constitutionally derived properties in the wrong place, since a property like fragility would be mis-classified as non-constitutionally derived. In addition, the account suffers from the further shortcoming that none of the strategies developed in the paper actually delivers a *non-circular* account of categoricity. (Yablo acknowledges this feature of his account in note 16.) Thus, Yablo's account in effect reduces to the stipulative strategy found in Baker and Fine.[11]

Clearly, then, in light of these weaknesses with existing accounts, an alternative approach, which does not rely on an overly coarse-grained, wholesale exclusion of entire classes of properties, is called for. The aim of such an account is to provide a non-ad-hoc response to the question of which properties can be expected to be shared by constitutionally related objects *in virtue of* being so related; a response to this question would in effect isolate the kind of restricted indiscernibility-principle which has been plausibly taken to be a component of the concept of constitution (see, for example, Baker, 1999; Deutsch, 1998; Wiggins, 1980; Yablo, 1987; Zimmerman, 1995).

In what follows, I shall follow Fine (1982), Simons (1987) and others in their assumption that the constitutionally derived properties are primarily passed from the constitut*ing* object to the

constitut*ed* object; in other words, the class of properties which we are currently aiming to delineate consists of properties whose presence in the statue is due to their presence in the piece of clay, and not vice versa. This assumption is not absolutely necessary for the purposes of distinguishing those similarities in pairs of objects which are constitutionally derived from those similarities which are derived in other ways; it is also not shared by everyone: Baker (1999), for example, proposes that properties are passed both ways between constitutionally related objects (see note 19 for further comment). For those properties which will be classified as constitutionally derived, however, the assumption that property-inheritance is primarily one-directional is, I think, plausible and will allow us to give an intuitively correct account of how the properties in Figure 1 should be divided up. Moreover, the assumption of 'bottom-up' inheritance also squares nicely with the possible route towards an asymmetric constitution-relation which I outline at the end of the paper.

To illustrate the asymmetric dependence which holds between constitutionally related objects with respect to their constitutionally derived properties, consider, for example, a piece of clay which weighs 500 kg and does not yet constitute a statue. Suppose that we now proceed to fashion a statue out of the piece of clay, but while we do so, we are careful not to add or lose any material, other than perhaps, unavoidably, a few molecules here and there. The weight of the piece of clay therefore has not been affected by the creation of the statue, since the only intrinsic change the piece of clay has undergone is a change in shape. Now, what would we expect the weight of the statue to be? The answer to this question seems so obvious that it is hardly worth asking. If the statue is fully constituted by the piece of clay (that is, no material other than the piece of clay went into the making of the statue), we would *of course* expect the statue to weigh 500 kg as well. Moreover, we have the overwhelming intuition that the statue weighs 500 kg precisely *because* the piece of clay of which it is made already weighed 500 kg before the statue came into existence. And the converse is not the case: it would be absurd to suggest that the piece of clay weighs 500 kg because the statue does so. The weight of the statue, therefore, seems

to be *asymmetrically dependent* on the weight of the piece of clay which constitutes it.[12-14]

Intuitively, the kinds of properties whose presence in the statue is constitutionally derived are (i) those which the statue has because it is constituted by a piece of *clay*, as opposed to, say, a piece of *copper*, and (ii) those which the statue has because it is constituted by *this particular* piece of clay, as opposed to some other piece of clay. In other words, the class of properties which, so to speak, 'trickle up' from the constituting object to the object which is being constituted include, first, features that are characteristic of the *type* of material in question and, secondly, *contingent* features of the particular constituting object under discussion.[15]

Some of the shared properties listed in Figure 1 are relatively easy to classify with respect to these two informal conditions. For example, the modal property of being fragile and the counterfactual property that the object in question would melt if it were exposed to heat of 150 °C clearly fall into the first group of properties that are characteristic of the *type* of material at issue. The 'unproblematic' intrinsic and relational properties, the causal property of causing a pedestal to crack, and the constitution-property of being constituted by a particular collection of particles, on the other hand, clearly fall into the second group of *contingent* features specific to the particular piece of clay in question. Thus, the shared properties in Figure 1 so far can be divided up as follows:[16]

Let's now consider the remainder of the shared properties in more detail. The first group of shared properties which clearly do *not* satisfy either of the two informal conditions just stated are the modal property of being essentially a material object, the identity-property of being self-identical and the kind-property of being an artifact. Since these are properties which are had by *any statue whatsoever*, no matter what the properties are of the object which constitutes it, their presence in a particular statue cannot derive either from the properties that are characteristic of the type of material of which the statue is made or from the contingent features of the particular object constituting it. This suggests the following first constraint on the family of shared properties (where the constituted object is assumed to be of kind, K_1):

Shared properties	**Constitutionally derived**	**???**
(1) *'Unproblematic' Intrinsic*	Weight; Shape; Color; Texture; . . .	
(2) *'Unproblematic' Relational*	Location; . . .	
(3) *Modal*	Being fragile; . . .	Being essentially a material object; . . .
(4) *Temporal*		Existing at a certain time t*; . . .
(5) *Causal*	Causing a pedestal to crack; . . .	
(6) *Counterfactual*	Would melt if exposed to heat of 150 °C; . . .	Would not have existed had there never been any clay; . . .
(7) *Identity*		Being self-identical; . . .
(8) *Kind*		Being an artifact; . . .
(9) *Constitution*	Being constituted by a particular collection of particles; . . .	

Figure 2.

(C_1) *First Constraint*:
The family of constitutionally derived properties may not include properties which are had by *any object of kind* K_1 *whatsoever*.

This constraint excludes from the scope of the constitutional indiscernibility principle (to which we will turn in the next section) the modal property of being essentially a material object, the identity-property of being self-identical and the kind-property of being an artifact.[17]

This leaves us with the counterfactual property that the object in question would not have existed had there never been any clay and the temporal property of existing at a certain time t*. Both of these properties are ruled out by the following independently plausible constraint:

(C_2) *Second Constraint*:
The family of constitutionally derived properties includes only properties, P, such that if P is shared among *some* pairs of constitutionally related objects, then P must be shared among *all* pairs of constitutionally related objects in which the property is instantiated at all.[18]

This constraint is intended to capture the *law-likeness* of property-inheritance in constitutionally related objects. Intuitively, whether an object inherits a property from another object depends only on the following two factors: (i) the kind of property at issue (i.e., whether it is one of the constitutionally derived ones); and (ii) the relation between the pair of objects in question (i.e., whether they are constitutionally related). Since nothing else seems to matter to property-inheritance besides these two factors, we would expect a property which 'trickles up' in *one* pair of constitutionally related objects to do the same in *all* such pairs (in which the property is instantiated at all). For example, if it is correct to say about any particular statue that it inherits the property of weighing 500 kg from the piece of clay that constitutes it, then it should be equally correct to say about any other object that it inherits its weight from the object which constitutes it.

But notice that both the counterfactual property and the temporal property under discussion violate the law-likeness of property-inheritance expressed in the second constraint above. For while it is of course an essential property of any piece of clay that it could not have existed had there not been any clay, it is not obviously true of any statue which is *now* made of clay that it could not have existed had there never been any clay: although the criteria of identity over time for artifacts are of course a matter of controversy, Ship-of-Theseus-like reasoning seems to suggest that artifacts can even survive changes in the *type* of material of which they are constituted, as long as the changes in question take place gradually and in small intervals. Moreover, since the temporal histories of a pair of constitutionally related objects may diverge, it will also not be the case that such temporal properties as existing at this time next year can always be expected to be shared among constitutionally related objects in which the property is instantiated at all.

This concludes our discussion of the shared properties listed in Figure 2. By means of the two constraints (C_1) and (C_2) proposed above, all of the properties which appear in the column labeled '???' have been excluded from the family of constitutionally derived shared properties. Moreover, the constraints I have offered are independently plausible and are not formulated in terms of the types of properties to be excluded. For example, the constraint, (C_1),

excludes some (but not all) modal properties along with some properties of other types, e.g., identity- and kind-properties; similarly for (C_2).

A final remark concerning the aesthetic and intentional properties listed in Figure 1 is in order. These properties have several special features. First, as noted earlier, these are properties whose status with respect to the 'Shared' versus 'Not Shared' Column is not entirely obvious; moreover, it seems that nothing *forces* us to classify them one way rather than the other in any particular case.[19] This, of course, makes it less pressing to offer an account of these properties in the present context, since my proposal is only required to treat properties which are shared among constitutionally related objects.

Secondly, it should be noted that these properties, in a sense, raise special concerns, which come with the particular example on which we have focused throughout, viz., a statue and the piece of clay which constitutes it. Statues, as artworks, have aesthetic and intentional properties and the question thus arises, first, whether the objects that constitute them share these properties and, secondly, whether their presence in the statue derives from their presence in the constituting object or vice versa. However, the constitution-relation applies to a wide range of objects, including ones which (arguably) lack any aesthetic and intentional properties, such as bricks, wooden sticks, rain drops and bits of seaweed. Thus, it is not clear that a response to the similarity-challenge (or perhaps even a complete solution to the problem of constitution) is obliged to account for the presence of these properties in the constituted object, since not all constituted objects will have properties of this kind. Strikingly, the same is not true of any of the other categories of properties treated so far: any material object whatsoever must have properties which fall into the general categories listed in Figure 1, with the exception of the aesthetic and intentional properties.

Thirdly, the kinds of properties which a statue derives from the piece of clay constituting it, according to my account, are roughly those which the piece of clay could have had whether or not it constituted this statue, or, for that matter, anything else (cf. Appendix). But pieces of clay presumably only acquire aesthetic and intentional properties, if they ever acquire them at all, in very special circum-

stances. Thus, we might say, following Michael Burke (especially Burke, 1994b), having properties of this type is not something which is entailed by satisfying the sortal concept, 'piece of clay'; having properties of the other broad categories represented in Figure 1, on the other hand, is.

Although, for these reasons, I do not take it to be necessary to give an account of these properties for our current purposes, it may be noted that these properties are presumably already ruled out from the family of constitutionally derived properties by means of constraint (C_2). For even if, for whatever reasons, these properties are to be classified as shared in some cases, it is unlikely that they are to be classified in this way in *all* cases in which one among a pair of constitutionally related objects has the property in question. For example, it may be the case that a particular sculpture is worth millions of dollars, even though the object which constitutes it continues to have a much lesser value even while it constitutes the statue.[20] Thus, properties of this kind appear to violate the law-like nature of property-inheritance.

IV.

The last section focused on developing some independently motivated, non-stipulative principles to constrain the *scope* of the dependence relation which holds between constitutionally related objects. We can now turn to the second question raised above: what is the precise *nature* of the particular dependence relation that holds between constitutionally related objects? Numerous dependence relations have been discerned in different areas of philosophy and in other disciplines, and many of them are clearly not applicable to the context at hand (e.g., the purely *logical* sort of dependence which holds between the premises of an argument and its conclusion; the *syntactic* dependence relation which holds, say, between a moved constituent in a phrase or sentence and the trace it leaves behind; or the *counterfactual* dependence which many take to be a core component of the notion of causation).

In what follows, I propose a principle which takes its inspiration from the concept of *strong supervenience*, which is typically defined as follows:

(SSV) *Strong Supervenience*:

> A family of properties, A, *strongly supervenes* on a family of properties, B, iff necessarily, (i) for any object, x, which has a property, F in A, there exists a property, G in B, such that x has G, and (ii) necessarily, anything which has G also has F.[21]

Consider, for example, the case of mental and physical properties. Informally speaking, the family of mental properties, A, supervenes strongly on the family of physical properties, B, in the sense just defined, just in case, necessarily, (i) any object which has a mental property, F in A, also has some physical property, G in B (where, intuitively, the physical property, G, *realizes* the mental property, F); and (ii) having the physical property, G, necessarily entails having the mental property, F.[22]

Many writers on the subject have expressed doubt as to whether any variety of supervenience is by itself strong enough to capture a relation of genuine dependence. There are several reasons for this skepticism. For one thing, relations of supervenience, without the addition of further principles, are *symmetric*; the dependence relations they are invoked to analyze, on the other hand, are typically asymmetric. Secondly, supervenience relations are purely *modal*: their entire content consists in the assertion of a necessary covariance between families of properties. As such, relations of supervenience by themselves say nothing about the *source* of the necessary covariance between the relevant families of properties; they merely state *that* the family of supervenient properties cannot vary independently of the family of subvenient properties. These sorts of considerations have prompted Jaegwon Kim, for example, to observe that "... the idea of dependence, whether causal or supervenient, is *metaphysically deeper and richer* than what can be captured by property covariance, even when the latter is supplemented by the usual modal notions" (Kim, 1990, pp. 146–147).[23]

Despite these shortcomings, I nevertheless consider it to be useful to offer a precise formulation of a supervenience-principle which applies to constitutionally related objects. I take the main virtue of such a principle to lie in its very *neutrality*. The supervenience-principle I propose in what follows is, as I see it, the most that can be said about the striking similarities between constitution-

ally related objects without entering into the details of any specific analysis of the constitution-relation (which will then also speak to the apparent *differences* between constitutionally related objects). As such, the supervenience-principle proposed below is compatible with any account of constitution that is on the market, since it makes no commitments concerning the source of the apparent differences between constitutionally related objects. As a further sign of its neutrality, I illustrate below how the principle can be turned into one that is asymmetric by adopting independently plausible supplementary principles. Moreover, while I do not dispute that the second worry cited above may be correct in noting that no purely modal principle is by itself sufficient to exhaust the content of a genuine dependence relation, it is nevertheless relatively uncontroversial that supervenience plays at least the role of a *necessary* condition for dependence. More can be certainly be said to explain *why* the families of properties are related in the way denoted by the supervenience-principle; but to do so in the case at hand would entail leaving the neutral territory.[24]

The definition of strong supervenience given above, for several reasons, cannot be applied directly to the case of constitutionally related objects. For one thing, we are, in this case, dealing with only a *single* family of properties, namely those that are shared between the statue and the piece of clay. The dependence at issue, therefore, cannot be a dependence between two distinct families of properties. And while (SSV) does not explicitly assume the two families of properties to be distinct, the principle would become trivial if they were identical. Secondly, (SSV) assumes that the object to which the supervening property applies is the *very same* object as that which bears the base-property. But whether the statue and the piece of clay are numerically identical is of course controversial. In fact, as noted earlier, I assume for the purposes of the present discussion that constitutionally related objects are numerically *distinct*, since the distinctness-theorist bears the burden of answering what I have called the similarity-challenge above (i.e., the challenge of accounting for the striking similarities between constitutionally related objects).

However, a relation which is in certain crucial respects *like* that defined in (SSV) does obtain in cases of constitution. For,

returning again to our earlier example of a statue which weighs 500 kg, it is similarly the case that (i) for any statue which has the property of weighing 500 kg and which is constituted by a piece of clay, the piece of clay constituting the statue must have some corresponding property, G (where, intuitively, the piece of clay's having the property G 'realizes' the statue's having the property of weighing 500 kg); and (ii) any statue which is constituted by a piece of clay which has the property, G, must have the property of weighing 500 kg. (An obvious candidate for the property, G, in question is of course just the property of weighing 500 kg itself, though other possible choices are available as well, e.g., the micro-physical property which underlies the macro-property of weighing 500 kg.) It is in this sense that the weight of a statue supervenes on the weight of whatever constitutes it.[25] In what follows, we shall refer to the particular variety of supervenience just illustrated as *constitutional supervenience*.

The relation of constitutional supervenience is similar to that characterized in (SSV), in that the instantiation of a certain property in a certain object is linked up in both cases in an analogous manner with the instantiation of some (possibly distinct) property in some (possibly distinct) object. The only difference between the two cases is that (SSV) explicitly assumes the objects in question to be identical and requires the families of properties to be distinct (to prevent triviality), while the relation of constitutional supervenience leaves open whether the objects and the properties in question are identical. (Of course, if both the objects and the properties are identical, then the simple principle stated in (CS), as opposed to the more complex one developed in the Appendix, will also come out trivial.) In the mental/physical case, for example, the supervenience-intuition has often been summarized in the form of the slogan "once the physical facts are fixed, so are the mental facts". Much the same intuition applies in cases of constitution: once the facts concerning the relevant class of properties are fixed in the constituting object, they are thereby automatically fixed in the constituted object as well (e.g., once the weight of the piece of clay is fixed, so is the weight of the statue constituted by it). This is the central intuition the relation of constitutional supervenience is intended to capture.

In order to give a more precise and general formulation of the relation of constitutional supervenience, which I have just stated informally and by means of a particular example, the following pieces of apparatus are needed. First, we shall require a relation, which I shall call 'R', whose purpose is to insure that the objects between which the relation of constitutional supervenience is said to hold are intimately connected in the right sort of way. When I illustrated informally just now how the weight of a statue supervenes on the weight of what constitutes it, I appealed to the constitution-relation in order to pick out the appropriate object on whose weight the weight of a statue is said to depend (viz., the object which *constitutes* the statue in question). However, other interpretations of 'R' are available as well; most prominently, the relation 'occupies the same space at the same time'. Thus, the weight of a statue will be said to supervene on the weight of an object with which it shares a region of space-time.

Next, to obtain the requisite level of generality, the relation of constitutional supervenience must be defined in such a way that it applies not only to statues which are R-related to pieces of clay, but to constitutionally related objects generally. To this end, the definitions below are formulated using a set of variables, 'K_1', . . . , 'K_n', ranging over *kinds*. It is not necessary for current purposes to commit ourselves to any particular conception of the nature of kinds. I shall, however, have a few more things to say concerning the topic of kinds below.

Finally, we must specify the family of properties over which the supervenience-claim is intended to range. Given the constraints proposed above in Section III, the family of properties in question ought to include just those properties which I have called 'constitutionally derived' above, i.e., those that are (i) shared between constitutionally related objects and (ii) satisfy constraints (C_1) and (C_2). Thus, I define the three-place relation of *'being an S-property'*, which takes as arguments a property and a pair of objects that are R-related and belong to certain kinds, K_1 and K_2, in the following manner (where 'S' is intended to evoke 'similarity'):

(SP) *Definition of 'S-property'*:
For any objects, x and y, such that y is R-related to x, x is of kind K_1 and y is of kind K_2, a property, P, is an *S-property* of x

and y iff$_{def}$ x has P and y has P and P satisfies constraints (C_1) and (C_2).

Thus, a property, P, is an S-property of a pair of objects, x and y, which occupy the same region of space-time just in case it is a property shared by x and y, and the property qualifies as 'constitutionally derived' by the standards imposed above.

With this apparatus in place, we can now proceed to define the relation of constitutional supervenience. Constitutional supervenience is a three-place relation which again takes as arguments pairs of objects which are R-related and belong to certain kinds, K_1 and K_2, and a family, A, of constitutionally derived properties shared by them:

(CS) *Constitutional Supervenience*:
For any objects, x and y, such that x is of kind K_1 and y is of kind K_2, and x and y are R-related, x *constitutionally supervenes* on y with respect to the family, A, of x's and y's S-properties iff$_{def}$ necessarily

(i) for any property, F, in A, if x has F, then there is a property, G, in A, such that y has G; and
(ii) necessarily, for any objects, w and z, such that w is of kind K_2 and z is of kind K_1, and w and z are R-related, if w has G, then z has F.[26]

Given the definition of constitutional supervenience in (CS), we can now offer the following partial analysis of the concept of constitution:

(C) *Partial Analysis of Constitution*:
For any objects, x and y, and any kinds, K_1 and K_2, such that x is of kind K_1 and y is of kind K_2, y *constitutes* x only if x is *constitutionally supervenient* on y with respect to the family, A, of x's and y's S-properties.

To illustrate, suppose we pick a particular pair of objects, *a* and *b*, such that *a* is a statue and *b* is a piece of clay and *b* constitutes *a*; thus, the kind-variables, 'K_1' and 'K_2', in this particular example, are instantiated to the kinds, *Statue* and *Piece of Clay*, respectively. The partial analysis of constitution given in (C) now requires, as a *necessary condition* for the piece of clay, *b*, to constitute the statue,

a, that *a* be constitutionally supervenient, in the sense defined in (CS) on *b*, with respect to the family, A, of S-properties shared by *a* and *b*.[27] What does it take for *a* to supervene constitutionally on *b* with respect to their family of S-properties? The definition of constitutional supervenience in (CS) holds just in case the following is satisfied. It must be the case that (i) for any property, F in A, had by a statue (i.e., *any* statue) that is R-related to a piece of clay, there must be some property, G in A, which is had by the piece of clay, such that the following necessary entailment holds between F and G: (ii) the presence of G in any piece of clay must entail the presence of F in any statue R-related to it.

Notice that in stating the two conditions in (i) and (ii), we are no longer talking just about the original statue/clay pair, *a* and *b*, since the relation of constitutional supervenience is defined for *any* pair of R-related objects of the kind to which 'K_1' and 'K_2' were instantiated. However, what does remain constant throughout (C) and (CS) is the instantiation of 'K_1' to the kind, *Statue*, and 'K_2' to the kind, *Piece of Clay*, which came with the original statue/clay pair, *a* and *b*, as well as the family of S-properties, A, which was specified in reference to this particular statue/clay pair. Once the family of properties, A, has been thus specified, however, these properties can now be divorced from their original 'base' in *a* and *b*, and considered in other possible circumstances in which other statues and pieces of clay R-related to them instantiate *these very* properties which were initially specified with reference to *a* and *b*.

Now, let's return once more to our original example of the statue, *a*, which weighs 500 kg, and is constituted by a piece of clay, *b*. Since the statue's weight is one of the properties it shares with the piece of clay, *b*, to which it is R-related, the property of weighing 500 kg is included in the particular family of S-properties, A, under consideration. So let's instantiate 'F' to this property (keeping in mind, of course, that in order for (CS) to be satisfied, the following exercise must work for *any* of the constitutionally derived properties shared by *a* and *b*). In order for (CS) to be satisfied, it must be the case that (i), for any statue which is R-related to a piece of clay and has the property of weighing 500 kg, there is some property, G in A, which is had by the R-related piece of clay, such that intuitively the piece of clay's having G 'realizes' the statue's having the prop-

erty of weighing 500 kg. An obvious candidate for the property, G, in question, as noted earlier, is of course just the property of weighing 500 kg itself, as applied to the R-related piece of clay. So let's instantiate 'G' to the property of weighing 500 kg as well. (CS) is now satisfied under these conditions, since it is true that (i) for any statue which weighs 500 kg and is R-related to a piece of clay, the piece of clay must have the same weight as the statue to which it is R-related; moreover, the necessary entailment stated in the second clause of the definition holds as well in this case: (ii) it is equally true that any statue which is R-related to a piece of clay which weighs 500 kg must itself have the same weight. Thus, (CS) holds for objects which are in fact constitutionally related.

The relation of constitutional supervenience as defined in (CS) has a feature which it shares with other supervenience-principles and which was already brought up in discussion earlier: it is by itself, i.e., without the addition of further conditions, not an asymmetric principle. For notice that (CS) is also satisfied when we reverse the instantiation of the kind-variables, 'K_1' and 'K_2'. It is similarly true that (i) for any piece of clay which is R-related to a statue and has the property of weighing 500 kg, there is some property, G, had by the R-related statue (e.g., the property of weighing 500 kg itself) for which the following necessary entailment holds: (ii) any piece of clay which is R-related to a statue which has the property G must itself have the property of weighing 500 kg.

This lack of asymmetry is perhaps only to be expected from a principle which promises to serve as an analysis of a similarity-relation, since similarity itself is of course a symmetric relation. We do, however, have the powerful intuition, cited earlier on, that in a pair of constitutionally related objects, the constituted object *asymmetrically* inherits certain shared properties from the constituting object. This intuitive datum has, as of yet, not been captured by the definition of constitutional supervenience in its current formulation. (CS) does, however, have the attractive feature that it is compatible with a wide range of supplementary principles which can be used to turn constitutional supervenience into an asymmetric relation. As mentioned earlier, any satisfying solution to the problem of constitution must include two components, to account for both the striking similarities between constitutionally related objects and

the apparent differences between them. Depending on the details of the analysis of constitution in question, features of this second component may in some cases (such as my own) be imported into the first to turn (CS) into an asymmetric principle. But there are many different ways to enforce the requisite asymmetry. I briefly outline one possible route towards asymmetry, which is entirely independent of the details of my own account.[28]

This route towards asymmetry turns on making certain intuitively plausible assumptions concerning *kinds*, which are, I think, implicit in our ordinary understanding of the constitution-relation (or the relation of 'being made of'). Constitution, according to our ordinary conception, is an *asymmetric, transitive* relation which applies to objects of *different kinds*.[29] Moreover, our ordinary conception of the constitution-relation also seems to warrant the assumption that the kinds to which constitutionally related objects belong can be grouped into certain *hierarchies*, governed by *ordering-relations* of a certain sort.[30] Consider, again, a particular statue which is constituted by a piece of clay: the piece of clay constitutes the statue, but the statue does not also constitute the piece of clay (and nothing constitutes itself); the piece of clay, in turn, is constituted by a collection of molecules, which also constitutes the statue; the collection of molecules is itself constituted by more fundamental constituents, and so on down, until we reach a level of entities which are not themselves constituted of anything further (if there in fact are such entities).

The ordering-relation among kinds suggested by the directionality of the concept of constitution could of course be characterized straightforwardly in terms of the constitution-relation itself. For example, one way to define the ordering-relation 'lies below in a hierarchy of kinds' is as follows: a kind, K_2, lies *below* a kind, K_1, in a hierarchy of kinds, if it is possible for an object, y, which belongs to kind, K_2, to constitute an object, x, which belongs to kind, K_1. The relations 'lies at the same level in a hierarchy of kinds' or 'lies above in a hierarchy of kinds' can then be defined in terms of the relation 'lies below in a hierarchy of kinds'. To illustrate, the kind, *Statue*, on this conception, lies above all the kinds to which objects which can constitute statues belong, e.g., the kinds, *Piece of Clay*, *Collection of Molecules*, *Collection of Subatomic Particles*, etc. The

kind, *Piece of Marble*, on the other hand, lies at the same level in the ordering of kinds as *Piece of Clay*, since statues can be made of both clay and marble. Moreover, the kind, *Pillar*, lies at the same level as the kind, *Statue*, since pillars and statues can both be made of some of the same sorts of materials.

An alternative way to proceed – one which does not make explicit reference to the concept of constitution – is suggested by Michael Burke's notion of a *"dominant kind"* (see especially Burke, 1994b).[31] A sortal concept, according to Burke, plays the role of specifying an object's *dominant kind* just in case satisfaction of it entails the possession of the *widest range of properties*. More precisely, a kind, K_1, is dominant with respect to a kind, K_2, just in case the types of properties common to all objects of kind K_1 *exceed in range* the types of properties common to all objects of kind K_2 (where by 'type of property' I have in mind the sort of classification exhibited in Figures 1 and 2 above). To illustrate, although some pieces of clay, according to some theories of constitution, will share with the statue they currently constitute properties which include an intentional or aesthetic component (such as being an artwork, being beautiful, representing a certain model or causing admiration in museum visitors), these properties are not of a type common to all pieces of clay, since not all pieces of clay constitute objects which have the requisite aesthetic or intentional nature; they are, however, of a type common to all statues, since all statues must have aesthetic or intentional properties of some kind. On the other hand, all those types of properties that are common to all pieces of clay are common to all statues as well: for example, both statues and pieces of clay have a certain weight, shape, color, texture, chemical composition, and so forth; they furthermore have certain modal properties concerning their essential nature; as well as certain temporal properties concerning the times at which they exist. But there is no general type of property such that satisfying the sortal, 'piece of clay', entails having an instance of this type of property, but satisfying the sortal, 'statue', does not. For our current purposes, we shall thus say that a kind, K_1, which is *dominant* with respect to a kind, K_2, in Burke's sense, *lies above* K_2 in a hierarchy of kinds, in our sense.[32,33]

Using this notion of a hierarchy or ordering-relation among kinds, the definition of (CS) stated above can now be reformulated in such a way that it entails the desired asymmetry. (I defer the details of this reformulation to the Appendix.) Informally stated, what accounts for the asymmetry of the new notion of constitutional supervenience is the fact that a 'mere' piece of clay (i.e., a piece of clay which does not constitute a statue or, for that matter, anything else that lies above it in the hierarchy of kinds) can instantiate many of the properties in the family of constitutionally derived properties, while the same is not true of statues.[34]

This particular route towards asymmetry also has the attractive feature that it can be adopted by identity-theorists and distinctness-theorists alike, since (i) nothing in the definitions stated above, (SP), (CS) and (C), explicitly requires the constitutionally related objects in question to be numerically distinct; and (ii) the apparent differences among constitutionally related objects with respect to their kind-properties pose no special difficulties to the identity-theorist over and above those that already arise in the context of their other apparent differences (e.g., of the temporal and modal variety). Thus, whatever machinery the identity-theorist invokes to address other apparent violations of Leibniz' Law will presumably also extend to kind-properties.[35,36]

VI.

To conclude, my aim in this paper has been to develop a response to what I have termed 'the similarity-challenge', i.e., the project of accounting for the striking similarities and intimate relation between the statue and the piece of clay that constitutes it. In particular, I have been concerned to spell out in more detail in what sense two objects share a sizeable subclass of their properties precisely in virtue of being constitutionally related, i.e., why property-inheritance in constitutionally related objects is governed by a certain kind of dependence-relation. As it turns out, some care is needed in delineating the class of properties with respect to which the statue depends on the piece of clay constituting it, since not all of the properties that are shared between them are of this kind. My first task in this paper was to propose independently plausible

constraints by means of which the constitutionally derived properties can be marked off from the non-constitutionally derived ones in a principled, non-stipulative and non-circular manner.

My second aim was to go at least part of the way towards providing a detailed analysis of the specific dependence-relation that is at work in this context. According to the present analysis, the dependence-relation which governs property-inheritance in constitutionally related objects can be at least partly elucidated by means of a relation akin to that of *strong supervenience*; I call this relation *'constitutional supervenience'*. And while the relation of constitutional supervenience, in its barest formulation, itself incurs no commitment with respect to asymmetry, I have outlined one among many possible routes towards an asymmetric conception of constitutional supervenience.

In order to give a complete analysis of the concept of constitution, it remains of course to account for the apparent *differences* between the statue and the piece of clay constituting it, but my response to this challenge must await a separate occasion (see Koslicki (2003)). In the meantime, however, I hope the present account has succeeded in throwing some light on one of the most understudied topics in metaphysics: how to formulate the sorts of restricted indiscernibility- principles that are constitutive of many identity-like relations (such as constitution) in a non-circular and non-stipulative manner.

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APPENDIX

The aim of this appendix is to illustrate briefly how the relation of constitutional supervenience can be turned into an asymmetric relation, utilizing certain intuitively plausible assumptions about *kinds*. This route towards asymmetry invokes some machinery borrowed from Michael Burke (especially his (1994b)), which helps us to make sense of the idea that there are certain *hierarchies* or *ordering-relations* among kinds, such as 'lies below in a hierarchy of kinds', 'lies above in a hierarchy of kinds', 'lies on the same level as in a hierarchy of kinds'. With the help of this machinery, then, the relation of constitutional supervenience can be reformulated in the following slightly more elaborate manner.

The relation of constitutional supervenience is now conceived of as a five-place relation which takes as arguments a pair of objects which are R-related, the kinds to which they belong and the family of constitutionally derived properties shared by them. Thus, we shall say that, for any objects, x and y, and for any kinds, K_1 and K_2, such that x is of kind K_1 and y is of kind K_2, where K_2 *lies below* K_1 in the hierarchy of kinds, and x and y are R-related, x is *constitutionally supervenient* on y with respect to the family of properties, A, where A is the family of x's and y's S-properties, just in case the following holds:

(CS') *Asymmetric Constitutional Supervenience*:
Necessarily,

(i) for any object, u, and any property, F in A, **if** u is of kind K_1 and u has F, **then** there is an object, v, and a property, G in A, such that v is R-related to u, and v has G, and there is a third kind,

K_3, such that K_3 is on the same level in the ordering of kinds as K_2, and v is of kind K_3; and

(ii) necessarily, for any objects, w and z, and for any kind, K_3, **if** K_3 is on the same level in the ordering of kinds as K_2, w is of kind K_3, z is of kind K_1, w is R-related to z, and w has G, **then** z has F.[37]

To illustrate (CS') in informal terms, the new definition of constitutional supervenience is satisfied just in case the following holds: it must be the case that (i) for any property, F in A, had by (say) a statue, there is *some* object R-related to the statue which is of a kind on the same level in the hierarchy of kinds as *Piece of Clay* (e.g., *Piece of Bronze, Piece of Wood*, etc.) and which has a corresponding property G in A (where, intuitively, the latter object's having G 'realizes' the former object's having F); and (ii) the presence of G in an object of such a kind necessarily results in the presence of F in any statue R-related to it.

Notice that (CS') is now in fact asymmetric, in the sense that its negation is true when the kind-variables are appropriately reversed: for it is not the case that necessarily (i) for every property G in A had by a piece of clay, there is an object R-related to it, which has a corresponding property F in A, and which is of a kind 'adjacent' to the kind, *Statue*; and (ii) the presence of F in an object of a kind 'adjacent' to the kind, *Statue*, necessarily results in the presence of G in any piece of clay which is R-related to this object. What accounts for the truth of this negated principle is the possibility of there being 'mere' pieces of clay, i.e., pieces of clay not R-related to anything 'higher up' in the hierarchy of kinds, which have some of the properties in the family of constitutionally derived properties specified by A (see also Baker (1999), for an account of constitution which emphasizes this asymmetry). Thus, a 'mere' piece of clay can perfectly well weigh 500 kg, without constituting a statue or anything else higher up in the hierarchy of kinds, but a statue cannot weigh 500 kg without being constituted by something with the same weight.

This principle, paradoxical though this may seem, may be used even by the identity-theorist to account for the asymmetry of the constitution-relation. For once the identity-theorist has told a story of some sort about the apparent differences between constitutionally related objects, he can then help himself to the difference between kinds appealed to in (CS'), even though there will be, according to him, only one object which belongs to these distinct kinds. Since I have made no commitments above as to what kinds are, it is conceivable that they could be construed in a way which is congenial to the broader theoretical commitments of the identity-theorist.

NOTES

[1] Prominent versions of the view that constitution is identity include the following: eliminativism (Unger, 1979; van Inwagen, 1990); identity relativized to time (Gallois, 1990, 1998; Myro, 1986); identity relativized to sort (Deutsch, 1998; Geach 1962, 1967; Griffin, 1977; Gupta, 1980); four-dimensionalism (Cartwright, 1975; Forbes, 1987; Heller, 1984, 1990; Lewis, 1976; Perry, 1972; Quine, 1950; Sider, 1997, 2001); contingent identity (Gibbard, 1975; Lewis, 1968, 1986); and dominant kinds (Burke, 1992, 1994a, b).

[2] An object, x, and an object, y, are *constitutionally related* just in case either x constitutes y or y constitutes x.

[3] Some identity-theorists may wish to dispute what I take to be a pretheoretic datum, to be accounted for by any credible analysis of constitution, viz., that the relation in question is in fact asymmetric. However, even if constitution is viewed as a technical notion to which our ordinary intuitions do not apply, surely there is a non-technical relation in the vicinity which is indisputably asymmetric, viz., the relation of *being made of*. In response to this observation, the identity-theorist may wish to argue that the *relata* of the being-made-of relation are distinct from those of the constitution-relation and that the asymmetry of the former can be accounted for by taking this difference into account. For example, instead of taking as arguments pairs of *objects*, the identity-theorist might suggest that the being-made-of relation relates objects either to *kinds* (i.e., the statue is made of the *kind* of material, clay) or to *stuff* (i.e., the statue is made of a portion of the stuff, clay). While I am skeptical that either of these accounts will ultimately prove to be successful, I will not pursue this issue further here; to my knowledge, no actual identity-theorist in the literature has attempted to account for the asymmetry of the relation at issue in this manner. In fact, identity-theorists do not generally worry at all about adding an asymmetric component to their analysis of constitution.

[4] Prominent defenders of this approach include the following: Baker (1997, 1999, 2000), Doepke (1982), Fine (1982), Johnston (1992), Locke (1975), Lowe (1989, 1995), Oderberg (1996), Simons (1987), Stone (1987), Thomson (1983, 1998), Wiggins (1968, 1980), and Yablo (1987).

[5] Notable exceptions to this charge are Yablo (1987), Baker (1999) and Deutsch (1998), which do provide an explicit account of the striking similarities between constitutionally related objects; I comment below on what I take to be the main weaknesses of these alternative views and their differences from my own account. Some suggestive remarks concerning the similarity-challenge (but no explicit account) can also be found in Fine (1982), Simons (1987) and Zimmerman (1995).

[6] Since most existing accounts of constitution address themselves exclusively to the question of how to account for the differences between the statue and the piece of clay, I will not comment on these views here; but see Rea (1997) for a helpful anthology and an extensive bibliography on this topic.

[7] A (weak global) supervenience-principle which is intended to apply to constitutionally related objects is also proposed in Sider (1999); however, Sider in this context is mostly concerned to address the so-called *'grounding problem'*, the

problem of how to avoid objectionably ungrounded *differences* between constitutionally related objects. See Baker (2000), Bennett (2003a, b), Burke (1992), Heller (1990), Oderberg (1996), Simons (1987), Sosa (1987) and Zimmerman (1995), for discussion of the grounding problem.

[8] Note that this property can only be expected to be shared between constitutionally related objects if the temporal variable, 't*', is instantiated to times during which the objects in question are in fact constitutionally related.

[9] Some may object to the example of fragility as a shared modal property on the grounds that the question of whether an object has this feature has to do not only with the nature of the material of which it is made, but also with the way in which the object is constructed. For example, plastic is a material which we would not normally consider to be fragile. However, it might be possible to construct a statue out of plastic in such a way that the statue comes out to be fragile (e.g., would break if dropped), perhaps because the layer of plastic used in constructing it is exceedingly thin and the statue is hollow on the inside. It is not obvious, however, that fragility, in this case, would count as a *shared* property of both the statue and the piece of plastic which constitutes it. Moreover, complications of this sort will not arise in the case of other shared dispositional properties, such as the property of conducting electricity.

[10] One might object to my classification of properties in Figure 1 on the following grounds. If the identity-theory turns out to be correct, will it not be the case that all the properties in the 'Not Shared' column should in fact be assigned to the 'Shared' column, when all is said and done? For, by Leibniz's Law, if the statue and the piece of clay are the very same object, they must share *all* of their properties, including, it would appear, those in the 'Not Shared' column. In fact, however, no self-respecting identity-theorist would propose that the items listed in the 'Not Shared' apply to both the statue and the piece of clay in the same straightforward manner in which those listed in the 'Shared' column do so, and simply leave matters at that. Clearly, more creativity is called for in order to respect our forceful pretheoretic intuition that these items are precisely not properties that are shared between the statue and the piece of clay. Different identity-theorists will respond in different ways. For example, Gibbard (1975) argues that linguistic contexts corresponding to some of the items listed in the 'Not Shared' column in fact *fail to express* genuine properties. Thus, according to Gibbard, there is no *property* determined by the expression 'being essentially a statue' which applies directly to the single concrete object variously known as either Lumpl or Goliath. (Similarly for the counterfactual context 'would not have existed had there never been any intentional agents'.) The context 'coming into existence after the piece of clay came into existence', on the other hand, does determine a genuine property, but not one, in Gibbard's view, which would ever be classified as shared between the statue and the piece of clay. If this property applies to a statue at all, it does so only in cases in which the statue and the piece of clay are not temporally coextensive; but these are cases in which they are distinct. Nothing Gibbard actually says prevents the property of being constituted by a particular piece of clay from being assigned to the 'Shared' column, but this of course only illustrates my complaint against most extant versions of the identity-

theory voiced earlier, viz., that such theories fail to account for the *asymmetry* of the constitution-relation. The analysis proposed in this paper can be used to fix this problem.

[11] My remarks above only make reference to *methodological* worries that arise with respect to Yablo's account. In addition to these, the account raises serious *ontological* concerns due to the surprising denseness with which its universe is populated (a feature it shares with Fine's account). For a very illuminating discussion of Yablo (1987) and Fine (1982), see Ray (2000a, b).

[12] Of course, in cases in which the statue and the piece of clay come into and go out of existence at exactly the same time (Gibbard, 1975), I cannot appeal to the fact that the piece of clay in question already had a certain weight before the statue came into existence or continues to have the weight after the statue has gone out of existence, in order to illustrate how the weight of the statue asymmetrically depends on that of the piece of clay. However, in such cases it is still true that the piece of clay *could have* existed before the statue came into existence or after it has gone out of existence and had this particular weight at times at which it did not constitute the statue. Moreover, in such cases, it will also be true to say that the weight of both the statue and the piece of clay depends asymmetrically on what lies further below them in the constitutional hierarchy, i.e., the collection of particles, molecules, etc. of which both are made.

[13] When I say that it is absurd to suggest that the piece of clay has its weight *because* of the statue, I do not mean to rule out that there are senses of 'because' different from the one at issue here, according to which it does make sense to say that the piece of clay has a certain property because the statue does. For example, in order to explain why anyone cared to give the piece of clay the particular shape it now has, we might plausibly appeal to the fact that the artist in question was planning to create a statue of Caesar. However, the sense of 'because' at work in this context (viz., one which concerns the artist's reasons for acting) is different from that appealed to above. The analysis offered in this paper is certainly not intended to capture all the various 'because'-claims we might ordinarily make concerning the statue and the piece of clay which constitutes it; for example, I will have nothing to say about causal, epistemic or temporal senses of 'because'. Without entering too far into the murky business of trying to tease apart the various senses of 'because', the one with which we are currently concerned can be roughly characterized as *explanatory* and as involving properties had by pairs of objects at a *single* time. Thus, the sense of 'because' currently at issue is similar to that in use when we explain why, say, a hand cannot pass through a table by appealing to the characteristics of the subatomic particles constituting the table.

[14] I understand the 'because of' locution just utilized as an intuitive way of getting at the asymmetric dependence exhibited by the constitutionally derived properties. In what follows, I develop a modal account of the similarities between constitutionally related objects (i.e., a supervenience-like principle stating necessary covariance between the relevant class of properties), which is intended to provide at least a *necessary* condition governing the dependence relation in question. Whether any modal condition is strong enough to capture a genuine dependence relation (and, therefore, strong enough to capture the force of the

intuitive 'because of' locution I utilized above) is a legitimate and (I take it) open question. See below for further remarks concerning the explicit aim of the supervenience-like principle proposed in what follows (especially note 27).

[15] One may worry that the properties derived in the way indicated by clause (ii) were just characterized in two non-equivalent ways: I characterized them, first, as properties the statue has because it is constituted by *this particular* piece of clay; and, secondly, as properties the statue has because of *contingent* features of the piece of clay constituting it. The first characterization may give the impression that I have in mind *non-qualitative*, identity-related features of the piece of clay (e.g., haecceitistic features, if there are such), which of course would then fail to be contingent, as required by the second characterization. To clarify, the properties under discussion are those which, for one thing, are *shared* between constitutionally related objects and, secondly, those which fall into the class of *constitutionally derived* ones. Since any possible particular, non-qualitative, essential, identity-related features the piece of clay may have would presumably not be shared, I see no problem in taking the two characterizations above to be equivalent. (Those that are general enough to be shared, on the other hand, would have to be ruled out by means of constraints (C_1) and (C_2).)

[16] To clarify, the purpose of Figure 2 is to bring out which of the properties listed in the 'Shared' Column of Figure 1 can be straightforwardly classified by means of the informally stated conditions in (i) and (ii). I take it that the properties listed in the 'Constitutionally Derived' Column of Figure 2 clearly satisfy conditions (i) or (ii) and, therefore, should be unproblematically classified as constitutionally derived properties. Therefore, they should be included under the scope of any restricted-indiscernibility principle that is proposed in order to account for the striking similarities between constitutionally related objects. The properties listed in the '???' Column of Figure 2, on the other hand, will turn out not to be constitutionally derived properties; but to classify them as such is precisely the job of the sorts of independently plausible, non-ad-hoc principles to which I will turn now.

[17] The first constraint also excludes from the family of constitutionally derived properties such general properties as the property of having weight (i.e., some weight or other) or the property of having shape (i.e., some shape or other). This, in my view, is a welcome consequence; for since any material object whatsoever has these properties (simply in virtue of being *material*), their presence in a particular statue cannot be due either to the type of material of which it is constituted or to the particular contingent features of the constituting object; rather, properties of this sort strike me as some sort of conceptual pre-condition on being a material object.

[18] This constraint provides an alternative way of excluding the kind-property of being an artifact from the constitutionally derived properties, on the assumption that a statue could be constituted by a found object (e.g., a piece of interestingly shaped driftwood or some such object), which comes to constitute the statue without undergoing any intrinsic changes, merely by acquiring certain relational properties. Such an object (arguably) would not itself be an artifact, even though it constitutes an artifact. Thus, if a scenario of this sort is possible, it would show that

the property of being an artifact is not always shared by pairs of constitutionally related objects one of whose members is an artifact.

[19] Aesthetic and intentional properties are Baker's main example of properties with respect to which the dependence-relation between the statue and the piece of clay is supposed to be reversed (see Baker, 1999). According to Baker, these are properties which the piece of clay inherits from the statue it constitutes, rather than the other way around. Thus, on Baker's account, there is a two-way dependence between constitutionally related objects, in that some properties are inherited 'top-down' and others 'bottom-up'. However, this presupposes that the piece of clay in fact shares these properties with the statue. As far as I can see, there are no pressing reasons to agree to this assumption and Baker provides no arguments to make us think otherwise.

[20] It is not obvious to me that a distinctness-theorist would have to hold that the constituting object automatically inherits the monetary (or other) worth of the object it currently constitutes. For example, consider again the possibility of a found object which comes to constitute a statue without undergoing any intrinsic changes. It seems to me that the distinctness-theorist could consistently maintain that the constituting object retains its (negligible) worth, even while it constitutes a valuable object (if, for example, there are independently motivated reasons to link change in value with intrinsic changes in the object).

[21] Or, more formally:

(SSV') $\Box(\mathbf{i})(\forall x)(\forall F_{\in A})[F(x) \rightarrow (\exists G_{\in B})[G(x)\&(\mathbf{ii})\Box(\forall y)[G(y) \rightarrow F(y)]]]$.

[22] For helpful discussion concerning the topic of supervenience, see, e.g., Teller (1983), Horgan (1993), Kim (1993) and McLaughlin (1995), and the citations included therein.

[23] See also Schiffer (1987), Kim (1993), Horgan (1993), Nagel (1998) and Wilson (2003), for further expressions of skepticism concerning the utility of discerning a supervenience-relation between families of properties.

[24] As mentioned above, several writers have noted, briefly and in passing, that the concept of supervenience may be useful for an analysis of the constitution relation (e.g., Fine, 1982, pp. 100ff; Horgan, 1993, p. 569; Lowe, 1989, p. 81; McLaughlin, 1995, p. 19; Simons, 1987, p. 228; Zimmerman, 1995, pp. 88ff). Though with different issues in mind, the relation between constitution and supervenience is also discussed in Baker (2000), Bennett (2003a, b), Burke (1992), Heller (1990), Oderberg (1996), Sider (1999) and Sosa (1987). However, I know of no treatment in the literature which develops in detail a supervenience-principle governing specifically the *similarities* between constitutionally related objects.

[25] The reader may have noticed that the *particular* dependence claim with which we began (viz., the weight of a *particular* statue depends on the weight of the *particular* piece of clay which constitutes it) has just been spelled out in terms of a claim concerning statues and the objects constituting them *in general*. However, this seems intuitively right, since we have already pointed out (in the form of the two constraints proposed above) that the family of constitutionally derived properties contains precisely those which can be expected to be shared by *any* pair of constitutionally related objects, and which are so shared solely in virtue

of the fact that the objects are constitutionally related and in virtue of the fact that the property in question is of the right kind to be expected to be shared by constitutionally related objects. In other words, there is nothing peculiar in the nature of any particular statue or piece of clay which accounts for the fact that the weight of *this* statue depends on the weight of *this* piece of clay. Rather, it is a general feature of statues (and constituted objects across the board) that they inherit their weight from the objects which constitute them.

[26] Or, more formally: for any objects, x and y, such that x is of kind K_1 and y is of kind K_2, and x and y are R-related, x is *constitutionally supervenient* on y, with respect to the family, A, of x's and y's S-properties, iff:

(CS') $\Box(\mathbf{i})(\forall F_{\in A})[F(x) \rightarrow (\exists G_{\in A})[G(y)\&(\mathbf{ii})\Box(\forall w)(\forall z)[(K_2(w)\&K_1(z)\& R(w, z)\&G(w)) \rightarrow F(z)]]]$.

[27] My current aim is only to address the similarities which hold between constitutionally related objects; hence, (C) states only a necessary condition on constitution. A complete analysis of the constitution relation would of course also need to address the apparent differences between constitutionally related objects. Thus, to test the adequacy of the current proposal, we must consider only the following two questions. First, (CS) must be satisfied by all objects which satisfy (C) (i.e., all those objects which are in fact constitutionally related must stand in the appropriate constitutional supervenience relation with respect to the properties shared by them). Secondly, by contraposition, we must assess whether all those object which *fail* to satisfy the necessary condition in (CS) are also rightfully classified as *not* constitutionally related, as the analysis would predict (i.e., cases in which x is *not* constitutionally supervenient on y with respect to the properties they share must be classified as cases in which y does *not* constitute x). What is as of yet not ruled out by the analysis given in (C), however, is the possibility that constitutional supervenience might be satisfied by object-pairs which are not constitutionally related (as long as the objects in question are R-related). Cases of this kind could arise, for example, by means of the species/genus relation: every region of spacetime which contains a statue also contains an artifact (numerically identical with it). There is, however, as far as I can see, no harm done by the possibility that such cases of non-constitution also satisfy (CS), since they will presumably be excluded by the additional component that is to be added to (CS) by a complete analysis of the constitution-relation.

[28] Since my own account traces the asymmetry of the constitution-relation to a different source, I should not be read as endorsing any of the potentially controversial assumptions contained in what is to follow. Even if these assumptions are found to be intuitively plausible, they of course stand in need of a much more detailed discussion and defense than I can offer in the current context.

[29] Is it possible, e.g., for one sculpture to constitute another sculpture? Of course, according to the identity-theorist, there would be just a single object, and hence just a single sculpture, in the region of space-time in question; thus, whatever reasons we have for believing that this region is occupied by two sculptures would need to be accounted for in a different way. And while distinctness-theorists are typically happy to admit the coincidence of objects belonging to *different* kinds,

most find same-kind coincidence disturbing. For unless we are convinced that the (putative) sculptures in question have (or could have had) different beginnings or endings in time, what else is there to distinguish them, since they seem to coincide with respect to all of their other modal and non-modal properties (given that they belong to the same kind)? However, whatever reason there is for thinking that the (putative) sculptures in question have different (possible or actual) histories might just as well be accounted for by saying that a single sculpture has acquired, say, a new set of representational properties, since the properties attributed to one sculpture will presumably not be *incompatible* with those attributed to the other (e.g., one and the same object can represent, say, both a duck and a rabbit). In any case, even if there is reason to distinguish the sculptures in question, it is difficult to see what could tempt us to say that one of the (putatively coinciding) sculptures constitutes the other, but not the second the first (i.e., why is it the *duck* that constitutes the rabbit, and not the rabbit the duck?). In other words, the case in question seems to violate the *asymmetry* of the constitution-relation. (For interesting discussion concerning the topic of same-kind coincidence, see, e.g., Locke (1975), Oderberg (1996), Rea (1997, pp. xixff), Simons (1987), Wiggins (1968).)

Can *several* sculptures constitute another sculpture? This case seems, on the face of it, more plausible. However, we have so far only considered cases of constitution between one single object and another single object. If the present case is to be of that sort, then it does not present us with a case of same-kind constitution, since the constituting object would be some kind of *collection* of sculptures. In this case, there would be a difference in kind between the constituting and the constituted object.

[30] There are of course many different sorts of ordering-relations among kinds, only a small minority of which are relevant to discussions of constitution. For example, kinds may be ordered by means of biological relations such as those of species, genus, family, etc. According to this ordering, the kind, *Tree*, would be related to the kinds, *Birch, Oak, Acorn,* etc., on the one hand, and the kinds, *Plant*, *Living Thing*, and so on, on the other. The existence of a multiplicity of ordering-relations among kinds, however, does not constitute a threat to this current route towards asymmetry (see note 27 for further comments on this question).

[31] Burke puts his notion of a dominant kind to a very different use from that of the present discussion. According to Burke, the statue and the piece of clay which currently constitutes it are identical, but the sortal concept, 'statue', plays the role of determining the object's dominant kind; this means, among other things, that the single object in question has the persistence conditions associated with the dominant sortal, 'statue', despite the fact that the object *is* both a statue and a piece of clay. Although I am borrowing Burke's notion of a dominant kind for the purposes of the current discussion, I do not thereby mean to endorse any of the commitments of his account.

[32] The appeal to the notion of a *type* or *category* of property, which might be found to be problematic, can, I think, be avoided by making use instead of the *determinate/determinable* distinction, which some philosophers (e.g., Deutsch, 1998; Yablo, 1987) find more congenial: there are some determinables, such that

all statues but not all pieces of clay must have a determinate of the determinable in question, while the reverse appears not to be the case.

[33] The following worry might appear to arise with respect to this characterization of the ordering-relation among kinds. Depending on how finely the notion of a type or category of property is individuated, it might appear that kinds which, intuitively, lie below other kinds in the hierarchy of kinds are not classified as such by the definition given above. For example, consider the kind, *Collection of Subatomic Particles*. Subatomic particles have properties such as valence which do not apply to such macroscopic objects as statues. Does this mean that the types of properties common to all statues do not necessarily exceed in range the types of properties common to all collections of subatomic particles? In this particular case, the worry can be laid to rest by noting that the property in question applies only to the individual members of the collection, but not to the collection itself. However, this reply may not be available in all such cases. A more general reply would be to follow Michael Burke in adopting a sufficiently coarse-grained conception of a type or category of property (e.g., physical, chemical, biological, functional, etc.), according to which statues do have properties of the same type to which the property of valence belongs.

[34] The ability of the constitut*ing* object to have properties in the family of constitutionally derived properties independently of its being constitutionally related to anything higher up in the hierarchy of kinds is also emphasized in Lynne Rudder Baker's account of constitution in Baker (1999) (see especially her notion of 'property-borrowing'). There are, however, significant differences between our two accounts. As noted earlier, Baker is unusual among distinctness-theorists in the close attention she pays to the similarity-challenge; however, her overall aim is to give a complete analysis of constitution in terms of part-sharing, spatio-temporal coincidence and modal notions. My current aim, on the other hand, is only to formulate a modal account which goes at least part of the way towards an analysis of the similarities between constitutionally related objects; I have said nothing about the source of the apparent *differences* between constitutionally related objects. We further differ in that Baker does not believe that supervenience is a component of the constitution relation (see Baker, 2000, pp. 185ff), since supervenience, in her view, is a relation between families of properties, while constitution is a relation between objects. Given my formulation, however, constitutional supervenience comes out to be a relation between objects and properties. Finally, as brought out earlier in the paper, I disagree with Baker's overly stipulative and coarse-grained method of delineating the family of constitutionally derived properties.

[35] As mentioned in the beginning of the paper, the account outlined here might be of interest to the identity-theorist, since even the identity-theorist must tell a story of some sort about the *asymmetry* which we feel intuitively to be present in the relation of constitution (or its less technical correlate, the relation of being made of).

[36] I should note the (CS) can easily be temporalized in order to reflect the intuition that the statue is constitutionally supervenient on *whatever constitutes it at the time* with respect to its constitutionally derived properties. Of course,

the statue, *a*, could have weighed 500 kg by being constitutionally related to an object other than, *b*; but it must be constitutionally related to *something* that weights 500 kg in order to have this weight. I will not go through the exercise of relativizing the principles state above to time, since the details are straightforward. [37] Or, more formally (where '$\approx$' stands for the relation 'being on the same level in the ordering of kinds as'):

(CS') $\Box(\mathbf{i})(\forall u)(\forall F_{\in A})[(K_1(u)\&F(u)) \rightarrow (\exists v)(\exists G_{\in A})[(R(v, u)\&G(v)\&$
$(\exists K_3)((K_3 \approx K_2)\&K_3(v)))\&(\mathbf{ii})\Box(\forall w)(\forall z)(\forall K_3)[(K_3 \approx K_2)\&K_3(w)\&$
$K_1(z)\&R(w, z)\&G(w)) \rightarrow F(z))]]]$.

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