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The contingency of composition

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Abstract There is widespread disagreement as to what the facts are concerning just when a collection of objects composes some further object; but there is widespread agreement that, whatever those facts are, they are necessary. I am unhappy to simply assume this, and in this paper I ask whether there is reason to think that the facts concerning when composition occurs hold necessarily. I consider various reasons to think so, but find fault with each of them. I examine the theory of composition as identity, but argue that the version of this doctrine that entails universalism is unwarranted. I consider the claim that the a priority of such facts leads to their necessity, but give a defence of substantial contingent a priori truths. I ask whether the contingency of such facts would lead to unwelcome possibilities, but argue that it does not. Next, I argue against the thought that the Lewis–Sider argument against restricted composition might give us reason to accept the necessity of universalism. Lastly, I respond to two objections from the 2006 BSPC. I conclude in favour of the contingency of the facts concerning when some things compose some thing.

Keywords Composition · Modality

1 Introduction

Under what circumstances do a collection of objects compose some further object? This is Peter van Inwagen's special composition question.[1] Some answer never,[2]

[1] See (van Inwagen 1990).

[2] See (Rosen and Dorr 2002).

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some say always,[3] some say sometimes, but only sometimes.[4] But even though there is widespread disagreement as to what the answer to that question is, there is widespread agreement that whatever the answer is, it is a necessary truth.

Markosian holds that the truth about composition is a brute matter: that the world simply draws some difference between those collections of objects that compose and those that don't, and that that is the end of the matter; there is no finite and informative (true) statement about when collections of objects compose. But nevertheless, he holds that whatever boundary the world draws, it couldn't have been drawn elsewhere. He says that we "probably should" hold that it is "impossible for two worlds to be duplicates with respect to non-mereological universals but differ with respect to composition."[5] Ted Sider disagrees with Markosian as to when collections of objects compose, but agrees that it is necessary that they compose if they meet the conditions in which they actually compose. He says "What are [the] synthetic necessary truths? Many would cite mathematical examples. I would cite also the laws of mereology, whatever those are. There are some conditions, C, such that it is necessarily true that whenever objects satisfy conditions C, there exists an object that is composed of those objects."[6] Likewise with Armstrong, who allows unrestricted mereology on the grounds that, since the existence of the parts necessitates the existence of the whole, complex objects are an "ontological free lunch", and hence we should be maximally permissive as to what complex objects there are.[7] Alan Sidelle argues that there is no fact of the matter as to which bundle of views concerning persistence and composition is correct; and one of his arguments is that if one were correct it would be necessary, but that we have no reason to deny the possibility of one bundle of views in favour of the necessity of another: therefore no bundle of views is correct. And instead of taking this as a reason to rethink the necessitarianism assumption, Sidelle adopts a non-factualism about such claims.[8] And the compositional facts are tacitly taken to be necessary by most writers on the subject, even if they do not make explicit this claim.

But while it is the orthodoxy that the facts concerning composition are necessary, there are dissenters. Daniel Nolan is one; he says

> Lewis thinks this "unrestricted composition"—that any objects whatsoever go to make up a whole—is a necessary truth. . . [But even if the part-whole relation behaves a certain way] why should it behave this way necessarily? . . . Why suppose that unrestricted composition is a necessary truth? Why suppose it is impossible for the world to have different principles governing the part-whole relation?

[3] See (Lewis 1986, 1991; Sider 2001; David 1997).

[4] See (van Inwagen 1990; Merricks 2001; Markosian 1998; Simons 1987).

[5] (Markosian 1998), pp. 216–217.

[6] (Sider 2001), pp. 202–203.

[7] (Armstrong 1997), pp. 12–13.

[8] (Sidelle 2002), pp. 136–138.

And it is possible[9] that Gideon Rosen and Cian Dorr mean to appeal to the contingency of the compositional facts when discussing what status sentences aiming to talk about complex objects have, on the assumption that there are not really any complex objects. They say[10]

> There are in fact many different statuses short of strict and literal truth which one might claim for sentences about composite objects whose strict and literal truth is cast in doubt. One such status is that of *atomistic adequacy* . . . a sentence is *atomistically adequate* iff it is true, *or would be true if the facts about composition were different*.

I want to add my name to this small band of dissenters. I am not happy to take it on faith that the truth about composition is a necessary truth; if there is necessity here, I want to be given a reason for thinking so, and I want to be told the source of this necessity. Given that we are not saying *what it is* for composition to occur,[11] but merely saying when it occurs, it seems to me strange to suppose that a true answer must be necessarily true, and so the burden of proof seems to me to lie with the necessitarian. In this paper I examine the case for the necessity of compositional facts and find it wanting.

Why should you care if I am right? Well, aside from the intrinsic interest to applied modality, if there is no principled reason to accept that the compositional facts are necessary this may have an impact for what claims concerning composition we can happily accept as true. Consider, for example, Sider's complaint[12] against van Inwagen's organicism: the claim that a collection of objects composes some object just in case those objects participate in a life. It follows from organicism that every object is either a mereological simple or alive. But, Sider asks us, surely a gunky world—a world in which there are no mereological simples, and every object has infinitely proper parts each of which have infinitely many proper parts—is possible. And surely it is not necessary that everything be alive in a gunky world. Hence there must be possible complex objects which are not alive, and hence organicism is false. The relevance of the current topic must be obvious: I accept Sider's argument as an argument against the *necessity* of organicism, since I am not willing to rule out the possibility of non-living objects which are gunky; but if it is an option to accept organicism as a contingent truth then we would need to be given

[9] It is merely possible, for Rosen and Dorr may intend the italicised sentence at the end of this quotation to be a non-vacuously true counterpossible (i.e. a counterfactual with an impossible antecedent) instead. While the orthodoxy is that counterpossibles are vacuously true (see (Lewis 1973)), it is becoming more and more popular to use impossible worlds to give a treatment of them according to which some are true and some false (see (Vander Laan 2004) and (Nolan 1997a). If this is what Rosen and Dorr intend, then they can consistently hold on to the necessity of compositional nihilism if they wish.

[10] (Rosen and Dorr 2002), p. 170.

[11] That would be to answer van Inwagen's general composition question. I grant that an answer to SCQ that was entailed by an answer to GCQ would be a necessary truth, since GCQ cannot be answered by a contingent truth; but no one has attempted to answer SCQ that route because they have agreed with van Inwagen that an informative answer to GCQ cannot be given.

[12] (Sider 1993).

reason to think that there are *in fact* non-living gunky objects if we are to have an argument against the *truth* of organicism.[13]

2 Compositional facts are non-trivial

The facts about composition are facts about when things compose some further thing. Now suppose universalism is in fact true, so that every collection of objects composes some further object. Consider the collection of objects a_1, a_2, a_3, ..., a_n and call the fusion of them b. The necessitarian claim is that while a_1, a_2, a_3, ..., a_n might have failed to compose b, they necessarily compose something: in every world in which a_1, a_2, a_3, ..., a_n exist, there exists some thing which is the fusion of a_1, a_2, a_3, ..., a_n. Isn't that, prima facie, an unexplained necessity? What is the source of this necessity? It is not analytic, seemingly, that if a_1 to a_n exist then there is an object that is their fusion. The synthetic status of this truth of mereology is conceded by Ted Sider, a necessitarian. He says that no matter what the conditions, C, are under which objects in C compose some further object it is "very difficult to see how the sentence 'If some objects are in conditions C, then there exists something that is composed of those objects' could be analytic, for it conditionally asserts the *existence* of a thing, and how could such a statement be analytic?"[14]

Indeed. The sentence in question conditionally asserts the existence of some thing on some conditions that do not mention the existence of that thing, and it does not seem that such a sentence could be analytic. Existence claims are, seemingly, never analytic; so it seems that a conditional whose consequent was an existence claim could be analytic only if the antecedent asserted the existence of the thing in question. But if the sentence 'If some objects are in conditions C, then there exists something that is composed of those objects' is informative then the antecedent does not assert the existence of the thing in question (namely, the sum of the objects in conditions C).[15] The sentence is synthetic, then; there is nothing in the concept of certain things meeting certain conditions that there is a fusion of those objects. As a result there is no incoherence in the thought that things meet those conditions but fail to compose anything. Whence then the necessity?

To be sure, not every metaphysically necessary truth is conceptually necessary, and so conceptual coherence does not entail metaphysical possibility; Kripke taught us that.[16] But when Kripke gives examples of metaphysical necessities which are

[13] Of course, one could still argue that it is epistemically possible that our world is gunky, whereas it is not epistemically possible that everything is alive, and try to cause trouble for van Inwagen this way. But this would be a far weaker argument: it is far less of a cost to close off the epistemic possibility of something being the case (every theory does that) than it is to rule out the metaphysical possibility of some intuitively possible situation.

[14] (Sider 2003), p. 203.

[15] If the conditional is uninformative (if, for example, being in C is understood as being in conditions sufficient for composing) then the sentence may well be analytic, but it won't then entail the necessity of any informative facts about when objects compose.

[16] (Kripke 1980).

not conceptually necessary he explains away the apparent possibility of their negation by showing us how we were confusing a genuinely possible situation (such as there being some watery stuff which is not H_2O) with the impossible situation in which the metaphysical necessity (such as that water is H_2O) is false. But what is the genuine possibility that we are confusing with the impossible situation in which some collection of things are in conditions C but fail to compose? Candidates are not forthcoming.

There is a school of thought according to which universalism *is* an analytic truth. This is the school of thought that claims that composition is identity:[17] that a thing is identical to its parts (as opposed to the *sum* of its parts).[18] The composition as identity theorist holds that there are true many-one identity statements; the composite object A that is composed of a, b, c and d is identical to a, b, c, d. It is not identical to a, nor to b, c or to d: each of A = a, A = b, A = c and A = d are false. What is true is simply that A = a, b, c, d.

If a thing is identical to its parts then it looks on the face of it that universalism is trivial: *of course* there is a sum of the Xs, no matter what the Xs are, because the sum just *is* the Xs. It is necessary that whenever the Xs exist the Xs exist, and since the Xs are identical to their sum, it is necessary that whenever the Xs exist the sum of the Xs exist.

Perhaps composition as identity does indeed entail universalism in which case, since I am happy to accept that composition as identity is a necessary truth if true at all, I will be happy to accept that the composition as identity theorists have reason to accept the necessity of universalism. This hardly explains the widespread acceptance of the claim that the answer to SCQ is necessary, however, since hardly anyone accepts composition as identity. So even if the entailment of universalism from composition as identity goes through, I still want to challenge the majority on their grounds for believing that the answer to SCQ is necessary. But I am also dubious that the entailment *does* go through.

All that we get immediately from composition as identity is that *when* there is a complex object, that complex object is identical to its parts. But this leaves it open that some collections of objects do not compose. What it is for a collection of complex objects to compose, says the composition as identity theorist, is for there to be some thing which those objects are identical to. But that leaves it open that they do not compose: that there is no thing that the collection of objects are identical to. So insofar as the composition as identity theorist is only making the claim that composite objects are identical to their parts, they leave open the claim that there are collections such that there is nothing that is identical to the objects in that collection:

[17] The primary defender of composition as identity is Donald Baxter. See his (Baxter 1988) and (1988). See also (Lewis 1991), p. 81, and Sider (2007). (The principle that entails the triviality of universalism is what Sider calls strong composition as identity, in contrast to the weaker claim he in fact endorses.) For arguments against composition as identity see (van Inwagen 1994) and (Yi 1999).

[18] Of course, one who holds that composition is identity will not deny that a composite object is identical to the sum of its parts; the composite object is identical to the sum, both of which are identical to the parts. I mean to point out just that the composition as identity theorist is not *merely* claiming that things are identical to the sums of their parts; they are claiming something far more radical.

hence they leave open the falsity of universalism. The central point here is simply that allowing many-one identity doesn't *by itself* entail that for every many there is a one that the many is identical to. When defending composition as identity Donald Baxter says that "the whole is the many parts counted as one thing".[19] But that doesn't entail that there *is* a whole in the first place, only that *if* there is, it is identical to the parts.

It's far from clear to me, then, that composition as identity is not compatible with restricted composition, or even nihilism. Let me briefly discuss an argument given by Trenton Merricks that attempts to rule this out.[20] Suppose, for reductio, that universalism is false. Then there is a collection of objects, x_1 to x_n, which do not compose. But they *could* compose, says Merricks. So consider a world, w, in which there is an object composed of x_1 to x_n, call it A. Composition as identity, if true, is a necessary truth, presumably, so in w A is identical to x_1, ..., x_n. Given the necessity of identity A is identical to x_1, ..., x_n in the actual world. But then, given that composition as identity is true at the actual world, there is an object in the actual world that is composed of x_1 to x_n, contrary to our initial assumption.

I don't find this argument compelling. My main source of disagreement with Merricks arises because I reject the necessity of identity. This is because I am a counterpart theorist, and the familiar Barcan/Kripke proof of the necessity of identity fails in counterpart theory. But even if counterpart theory is rejected, I think it is problematic to appeal to the necessity of identity in this context. Think about how the standard proof of the necessity of identity goes. We consider a thing A that is identical to B. We start by noticing that A is necessarily *self*-identical, and inferring from this that it has the property *being necessarily identical to A*. From which it follows, via Leibniz's law, that B has this property also; i.e. that B is necessarily identical to A.

Merricks argues that, because A is identical to x_1 to x_n in w, A is identical to x_1 to x_n in the actual world, and hence x_1 to x_n compose in the actual world. There are two ways you might try and use the Barcan/Kripke argument to argue for this.

Firstly, we could argue as follows. A is necessarily self-identical in w. So in w, A has the property *being necessarily identical to A*. So, since A is identical to x_1 to x_n in w, x_1 to x_n has the property *being necessarily identical to A*. Hence, in the actual world, x_1 to x_n has the property *being identical to A*. Hence, A is identical to x_1 to x_n in the actual world, and hence x_1 to x_n compose A in the actual world, contrary to the hypothesis that there is nothing that x_1 to x_n actually compose.

This argument doesn't work, however. A familiar complication with the Barcan/Kripke argument that we must bear in mind is that we are dealing with contingent existents. If A is not a necessary existent then it is not self-identical in *every* world; all we can say is that it is self-identical in every world in which it exists: that is, that it has the property *necessarily, being identical to A, if A exists*. So all we can say about x_1 to x_n in w is that it has *this* property; and so all we can conclude is that in the actual world x_1 to x_n has the property *being identical to A, if A exists*. But, of

[19] (Baxter 1988), p. 579.

[20] (Merricks 2005), p. 630.

course, proving that x_1 to x_n has this property in the actual world doesn't tell us *anything* about whether or not x_1 to x_n actually compose. All we can conclude is that they actually compose *if* A actually exists—but, of course, whether or not A exists is precisely what is up for debate.

The argument only has a hope at succeeding if we start not from the necessary self-identity of A but from the necessary self-identity of x_1 to x_n. In that case the contingent existence of x_1 to x_n is not a problem. We can argue as follows. In w, x_1 to x_n is necessarily self-identical, by which we mean that x_1 to x_n is self-identical in every world in which x_1 to x_n exist. Hence, x_1 to x_n has the property *necessarily, being identical to* x_1 *to* x_n*, if* x_1 *to* x_n *exist*. Hence, given Leibniz's law, A has the property *necessarily, being identical to* x_1 *to* x_n*, if* x_1 *to* x_n *exist* in w, and therefore has the property *being identical to* x_1 *to* x_n*, if* x_1 *to* x_n *exist* in the actual world. Since we know, ex hypothesi, that x_1 to x_n exist in the actual world, we can conclude that A is actually identical to x_1 to x_n, from which it follows, given composition as identity, that x_1 to x_n actually compose A, contrary to the hypothesis that they don't actually compose anything.

But while there is no problem in this version of the argument due to the contingent existence of the entities involved, there is a further problem that faces this version and not the earlier version. The problem is that, while I am happy to grant the assumption that A is necessarily self-identical in w, I am *not* happy to grant the assumption that x_1 to x_n are necessarily self-identical in w.

My claim is that it only makes sense to ascribe a property like *being self-identical* to a *plurality* of things if there is some one thing that the plurality is identical to; i.e. if there is a one that the many are identical to. (We can say that each of x_1 to x_n is necessarily self-identical, but that won't help: we need the strong claim that the many are self-identical, and that only seems to make sense if there is a one that the many are identical to.) One can only infer that x_1 to x_n have the property of being self-identical at a world if we know that x_1 to x_n are identical to some thing at that world—i.e. if we know that they *compose* at that world (since, we are assuming for the sake of argument, what it is for a collection to compose is for them to be identical to some thing). So one cannot simply assume that x_1 to x_n are necessarily self-identical; to make this claim we would need to have a reason for thinking that they are necessarily identical to some thing or other. But that is simply the claim that they necessarily compose, which just begs the question. My contention—the claim Merricks is attempting to argue against—is precisely that x_1 to x_n compose in w but not the actual world: that there is some thing in w that they are identical to but that there is no thing in the actual world that they are identical to. In that case I deny that x_1 to x_n has the property *being necessarily self-identical* in w. All that we can say is that in w x_1 to x_n has the property *being identical to* x_1 *to* x_n*, if identical to anything* as a matter of necessity; but all that will prove is that A actually has the property of being identical to x_1 to x_n if identical to anything. And as before, that won't tell us anything at all about whether A is composed of x_1 to x_n in the actual world, since whether or not A is identical to anything at the actual world depends on whether or not A actually exists, which is exactly what is up for dispute.

So I don't think there is any version of the Barcan/Kripke argument that can prove that A is actually identical to x_1 to x_n because A is identical to x_1 to x_n in w. We cannot start from the premise that x_1 to x_n is necessarily self-identical in w: that begs the question, because it assumes that there is necessarily a one that x_1 to x_n is identical to, which is just to assume that they necessarily compose. There is only something which is identical to x_1 to x_n if x_1 to x_n compose; so, since I take it to be contingent that x_1 to x_n compose, I also take it to be contingent that there is some thing that is identical to them, and hence I reject the first premise of the argument that they are necessarily identical to A. If Merricks appeals (on the assumption of composition as identity) to the necessity of the self-identity of x_1 to x_n in order to show that x_1 to x_n must actually compose then he assumes, I argue, that x_1 to x_n necessarily compose; and that is simply to beg the question against me. We *can* start from the assumption that A is necessarily self-identical—that is unproblematic provided we are careful to mean by this only that A is self-identical in every world in which it exists: but while the resulting argument has true premises, the conclusion is far from what Merricks wants—we cannot conclude that A is actually identical to x_1 to x_n, only that A is actually identical to x_1 to x_n *if* it (A) exists. Since the existence of A at the actual world is precisely the issue of disagreement between Merricks and myself, this argument obviously isn't going to persuade me.

So I think the case has yet to be made that composition as identity is incompatible with the denial of universalism. To get universalism, the composition as identity theorist has to claim not only that what it is to be composed of the Xs is to be identical to the Xs, but also that, for every collection of things, there is something that is identical to those things. And even if this extra claim is true, why think that it is *necessarily* true? Why might it not be merely a contingent fact about the world that whenever there are some things, there is some thing that is identical to those things? The necessity of universalism only follows from the necessity of the claim that for all collections of objects there is some thing that is identical to the objects in that collection, not its truth; so an appeal to the thesis that composition is identity is not going to satisfy my demand for a reason to think that the compositional facts hold necessarily: it is only going to shift that demand to what looks to me like another unwarranted claim of necessity.

If I am wrong about the compatibility of restricted composition and composition as identity then there is reason to believe in the analyticity of the answer to SCQ insofar as there is reason to believe in composition as identity. If I am right about the compatibility of those positions then there is no reason to believe in the analyticity of the answer to SCQ. Since, I maintain, there is little reason to believe in composition as identity, there is at best little reason, and at worst no reason, to hold that the answer to SCQ is an analytic truth.

3 Necessity from a priority

One reason it may be thought that the facts about composition are necessary is because they are a priori. Now in fact I am not convinced that the facts about when a

collection of objects composes some further object are a priori,[21] but let us grant it for the sake of argument. It is easy to come to the conclusion that what is a priori is necessary. If p is known a priori, then I need not appeal to empirical facts to come to know that p. So the way the world is plays no part in my coming to know that p. So I could come to know p in every possible world. Knowledge is factive, so any world in which I could come to know that p is a world in which p is true. So p is true in every possible world: p is a necessary truth. As Kripke says: "If [the truth of a proposition known a priori] depended on some contingent feature of the actual world, how could you know without looking? Maybe the actual world is one of the possible worlds in which it would have been false."[22]

Kripke, of course, is playing Devil's advocate, for he thinks that there are propositions which are a priori and yet contingent; and anyone who argues for the necessity of a proposition on the basis of its a priority has to deal with Kripke's purported examples of contingent a priori truths, such as 'Jack the Ripper committed the East End murders (if anyone did)'[23] or Evans' example 'Julius invented the zip (if anyone did)'.[24] That does not seem too hard however; these examples seem to turn on a linguistic trick. The reason behind the supposed a priority of 'Julius invented the zip (if anyone did)' is simply that the referent of the term 'Julius' is fixed by the definite description 'the person who invented the zip, if anyone did'. But all that is a priori, then, is that the term 'Julius' refers, if it refers, to the inventor of the zip; we certainly do not have a priori knowledge *of* Julius that he invented the zip if anyone did. We do not know de re of the person picked out by 'Julius' that that person invented the zip. But in that case, all that seems a priori is that the sentence 'Julius invented the zip (if anyone did)' *expresses* a truth; we do not, seemingly, know a priori the truth of what is in fact expressed by that sentence. To know the truth of what is expressed, I claim, we would have to have knowledge about what the term 'Julius' referred to, which is only available a posteriori. So all that is a priori is that the sentence expresses a truth, but this is also necessary. In any possible world, the proposition expressed by that sentence at that world is true, precisely because the reference of 'Julius' shifts from world to world as the facts concerning who invented the zip shift, so that it is always the zip inventor who is picked out by 'Julius' if anyone is.

One could think from this that there are no *real* examples of the contingent a priori. The purported counter-examples turn on a linguistic sleight-of-hand: they purport to be a priori when in fact all that is a priori is the (necessary) truth that the sentences in question express truths; the truths expressed are, to be sure, contingent—but they are also a posteriori. When the proposition itself is a priori,

[21] It is an empirical matter, for example, whether a collection of objects is fastened together, whether they contrast to their surroundings etc. And even if it is no part of *what it is* for a collection of objects to compose that the members of the collection be fastened together etc., such facts might still constitute *evidence* for the claim that they compose.

[22] (Kripke 1980), p. 38.

[23] (Kripke 1980), pp. 320–333, 56–60.

[24] (Evans 1985).

however, one might still think it has to be necessary.[25] Such reasoning could then lead us to the necessity of the compositional facts, for in that case (provided there is a priority at all) it looks like the proposition expressed by the sentence 'All (some/no) collections of objects compose a further object' is a priori, not just that it is a priori that the sentence expresses a truth.

Unfortunately for the necessitarian there are reasons to reject the argument from a priority to necessity other than the Kripke/Evans counter-examples. When we say that a proposition is a priori, this means that it can be known on the basis of justification which is not empirical. But justification does not entail truth; a proposition could be *justified* in every possible world but not knowable in every possible world, precisely because it is only knowable in the worlds in which it is true. So suppose the compositional facts are a priori. All that means is that the *justification* by which we come to know those facts is non-empirical. But the facts could still be contingent: it's simply that in the worlds in which they are false are worlds in which I could come to have non-empirical justification for some falsehood. I couldn't come to *know* the facts in those worlds, of course; I can only come to know those facts if the world cooperates to make my justification lead to knowledge, which only happens in worlds in which the facts are true. This is an externalist story then; because my justification is a priori, it is obtainable in every possible world. But my justified belief only counts as *knowledge* in worlds where the world cooperates: where the justified belief is true. So the argument from a priority to necessity fails because it assumes that the way the world is plays no part in my coming to know that p. What is true is just that it plays no part in my coming to have a *justified belief* that p; but it *does* play a part in my coming to know that p, because my justified belief only amounts to knowledge if p is in fact true.[26]

Consider another case where, I think, a similar story is required. We (most of us) take ourselves to be justified in believing the ontological posits of our best current science: we are justified, we think, in believing that what the physicists tell us about electrons, neutrinos etc is true; we think we have scientific knowledge here. But physicists are guided in their ontological posits by contingently reliable principles of methodology, such as Ockham's razor. Were these false, our trust in the ontology of physics would be misplaced. Our belief in the ontological claims of physics only

[25] This response to the purported contingent a priori has its origins in Donnellan (1966). It is also advocated by Blackburn (1984), p. 334, and has, I think, gone on to inspire the two-dimensionalist response to the contingent a priori: see in particular (Stalnaker 1999a, c), pp. 14–16.

[26] That account of how we can come to know some contingent proposition a priori grants that in the worlds in which the proposition in question is false, it can still be justified. But that may be doubted as well. A priority does not entail empirical indefeasability, so prima facie it seems that a proposition might be such that we can come to know it on the basis of non-empirical justification but it be such that were it false there would be empirical evidence for its falsity, such that overall the proposition would not be justified. The axioms of Euclidean geometry are perhaps an example. It seems to me not implausible to hold that there is a priori justification for these axioms, but that the axioms are not jointly justified because there is empirical evidence against them. But space could have been Euclidean, and had it been so we could have known a priori the axioms of Euclidean geometry. That would have been a case, then, in which we knew something a priori that was contingent, and which would not have been justified were it false.

amounts to knowledge, then, if it does, because the methodological principles scientists rely upon are in fact reliable. The world needs to cooperate for us to have scientific knowledge, in the same way it has to cooperate for us to have knowledge of the compositional facts according to the line of thought above. That's not to say we would not be justified in believing the scientists' claims in an anti-Ockhamistic world. We would be; but our belief would sadly fail to amount to knowledge in such a world, since the belief would be false.

Consider a particular example.[27] Physicists tell us that in Beta decay, when an electron is emitted from the nucleus of a radioactive particle, a neutrino is emitted along with the electron. We take ourselves to be justified in believing this; in fact, it seems that we know it to be true. Why do physicists think a neutrino is also emitted? Because the energy of the electron that is emitted is less than the drop of energy in the nucleus. The neutrino was postulated to make up the difference in energy. If the neutrino is emitted along with the electron, then the combined energy of the electron and neutrino can explain the drop in energy in the nucleus. However, this fact would also be explained by the hypothesis that *two* neutrinos are emitted with the electron, with the 'missing' energy shared between them, or three neutrinos, or any finite number of neutrinos. And yet Pauli and Fermi, the founders of neutrino theory, did not consider these hypotheses. Why not? Presumably because the 17 neutrino hypothesis and the others are *ontologically extravagant*. So principle of (quantitative) parsimony inform the theory that a neutrino is emitted in Beta decay. But such a principle is surely not necessarily reliable. The world could have been such that ontologically extravagant hypotheses were true. Nevertheless, we trust that the actual world is not like this. We trust that the principle of quantitative parsimony is in fact reliable, and that in relying on it we will not be led astray. Just as we rely our data concerning the facts of composition; such data *could* have guided us astray, but we trust that it does not in fact do so.

4 Mixed worlds

One reason to object to the contingency of many metaphysical facts would be the thought that their contingency leads to the possibility of 'mixed-worlds', which should be resisted. For example, one might think that the truth concerning properties—whether they be universals or tropes—must be necessary in order to avoid the possibility of worlds in which there are both universals and tropes. Why should you want to avoid the possibility of such worlds? Well, if there are both universals and tropes, might there be something which instantiates a blueness trope and the redness universal? Is that thing then red and blue all over—the paradigm example of conceptual impossibility? Can tropes themselves instantiate universals? If not, why not? But if so, can a blueness trope be red? That sounds odd, to say the least. Such considerations might lead you to wish to avoid the possibility of such a

[27] This example is used by Nolan (1997b), pp. 332–335, but for a different purpose.

world, in which case you might want well wish to hold that if properties are tropes they are necessarily tropes and not universals, and vice-versa.

Is there a similar 'mixed world' objection to the contingency of compositional facts? Will accepting that objects could compose in circumstances different from those in which they actually compose lead to the possibility of a world whose possibility we would (without begging questions)[28] wish to deny? Well in one sense a compositional mixed world is incoherent (and hence impossible): it cannot be that at one region of a world it is true that every collection of objects composes some object and at another region that only some collections of objects compose, for the second truth entails the existence of a collection of objects that do not compose, which contradicts the first truth. But the possibility of such a world is obviously not entailed by the contingency of compositional facts: if we attempt to construct a world by putting together a world in which universalism is true and a world in which restricted composition is true we will be left not with a world in which universalism is true at one point and restricted composition true at another, but merely a world in which restricted composition is true.

What we might get, however, is a world in which there is no intra-world supervenience of the compositional facts on the non-compositional facts. Suppose there are objects in conditions C that compose. If the compositional facts are contingent, there could have been objects in conditions C that do not compose. It seems, then, that we can construct a third world pieced together from these two worlds in which some objects meet conditions C and compose, and some objects meet conditions C and do not compose. Such a possibility might be thought to be uncomfortable: the thought being, I take it, that if composition occurs sometimes but not always then it should not be an arbitrary matter.

The worry echoes Blackburn's famous supervenience argument against (non-naturalist)[29] moral realism.[30] Blackburn wants to hold on to two claims: (i) the way a world is morally is not necessitated by how it is naturally, and (ii) necessarily, the ethical supervenes upon the natural. The notion of supervenience in (ii) is intra-world. Blackburn thinks that given any world w, if some thing α is wrong (permitted/obligatory) in w, then any thing in w that is not wrong (permitted/obligatory) in w must differ in its natural properties from α, even though there are things not in w that are identical in their natural properties to α and yet not wrong (permitted/obligatory). That is, within a world there can be no difference in the moral properties of things without there being a difference in their natural properties, even if between worlds there can be things which are identical

[28] Obviously the necessitarian will think that acceptance of the contingency of compositional facts commits you to acknowledge situations as possible that are not; the question is whether the contingency theorist is committed to the possibility of situations which by her own lights look impossible.

[29] Blackburn's argument doesn't seem directed against naturalist realisms, even though he doesn't say this, because the naturalist will most likely hold the inter-world supervenience claim that Blackburn wants to deny (see below). If moral properties simply *are* natural properties then, given the necessity of identity, once we have fixed the natural properties of a world we have thereby fixed its moral properties.

[30] Blackburn (1984), pp. 182–184.

naturalistically but different morally. There is intra-world supervenience of the moral on the natural, but no inter-world supervenience.

So Blackburn wants to lay claim to 1 below, which is the intra-world supervenience claim, but not 2, which is the inter-world supervenience claim, where N is a complete description of the natural properties of an object, and M is a complete description of the moral properties.

$$\Box(\forall x \forall y(Nx \rightarrow (Ny \rightarrow (Mx \rightarrow My)))) \quad (1)$$

$$\exists x(Nx \wedge Mx) \rightarrow \Box \forall x(Nx \rightarrow Mx) \quad (2)$$

The problem for the moral realist, thinks Blackburn, is that the moral realist has no right to hold (1) given the denial of (2). If moral properties are properties a thing has as a matter of mind-independent objective fact, and if it is possible that some thing with natural properties N have moral properties M and possible that some thing with natural properties N have moral properties M*, such that $M \neq M^*$, then there appears to be no good reason to deny the possibility that some thing be N and M and some thing be N and M*. What could prevent such a possibility, given that the two components are separately possible? Likewise, if a collection of simples can in one world compose a composite object and an identical collection in another world fail to compose anything, what stands in the way of the possibility of there being two such collections one of which composes an object and one of which does not compose anything?

I must admit to not thinking commitment to such a possibility very worrying. We are not forced, after all, into thinking that *our world* is like this, only that some world is. It may well actually be the case that there are no two collections of objects one of which composes and one of which doesn't without there being some difference in the non-mereological facts concerning those collections. But isn't this exactly the kind of fact that someone who thinks that the compositional facts are contingent is going to take to be a contingent fact about our world? What is meant to be worrying about such a possibility to the contingency theorist?

Perhaps the thought is that whether or not composition occurs should be internal to the collection of objects; that it is just metaphysically impossible for there to be a case of composition and a case of non-composition without some relevant difference in the non-compositional facts to explain *why* the objects composed in one case and not in the other. After all, it would be very strange if, for example, a collection of simples composed some object if and only if those simples participate in the life of Aristotle (say). Why on Earth should Aristotle be so privileged? What would explain why his parts compose and not the things that are arranged, say, Plato-wise?

Well I agree that such a world sounds bizarre, but I'm not sure why I should think that it is *impossible*: there just are some really weird possible worlds out there! I don't think *our* world is populated with some living people and some mere collections of objects arranged person-wise; why should I care if other worlds are? There are worlds where objects are composed of microscopic bunnies; worlds where perception is a terrible guide to reality; worlds where p is true if and only if George

Bush says it is. Those worlds are weird, but admitting their possibility does not in the slightest shake my confidence in my belief that our world is not like that. Likewise, I am happy to proclaim the truth of the intra-world supervenience of the compositional on the non-compositional; my confidence of the truth of this claim is not shaken by my admission of its contingency. It seems to me that the burden of proof is on the necessitarian to tell me what is meant to be wrong about admitting the mere possibility of these mixed-worlds; I am not going to be retreat from the contingency view just because there are some odd possible worlds.

The contingency theorist *could* avoid the possibility of such mixed-worlds if she really wanted, but it would come at a price. The view would be that there are laws of mereology: laws which determine how objects have to be arranged in order to compose, but which are themselves contingent. So while there is a world in which objects in conditions C compose and a world in which objects in conditions C do not compose, the laws of mereology are different in both worlds. There can be no mixed-worlds, because such a world would be a world with inconsistent mereological laws.[31]

No matter whether or not one is a universalist, restricted composition theorist, or compositional nihilist, one must face the question: is universalism (restricted composition/nihilism) true *because* every (only some/no) collection of objects composes a further object, or does every (only some/no) collection of objects compose some further object because universalism (restricted composition/nihilism) is true? The mereological laws theorist answers the latter. Facts about what composite objects there are, on this view, hold in virtue of the laws of mereology and the arrangement of objects, whereas on the opposing view claims such as 'universalism is true' are merely a reflection of what composite objects there in fact are.

The laws of mereology view lets you avoid the compositional mixed world, but is it tenable? One worry is that it seems to violate the supervenience of truth on being. For it looks like there could be a world w_1 in which there are three simple objects—a, b and c—but no complex objects due to the fact that a, b and c are too far apart and some version of restricted composition is true at w_1, and a world w_2 which is qualitatively indistinguishable from w_1 (in particular it contains exactly the same (simple and complex) objects in exactly the same configuration), but in this case there are no complex objects because compositional nihilism is true. Or consider a world w_3 which contains the three simples a, b and c which are arranged so that each is in contact with the other, and is such that each of the complex objects a + b, a + c, b + c and a + b + c exists because restricted composition is true, and each collection meets the restrictions, and compare this world to w_4 which is qualitatively

[31] Compare the case to the case of laws of nature. There are worlds where massive things attract every other massive thing according to the inverse square law, and there are worlds where massive things attract every other massive thing according to the inverse cube law. This does not immediately, however, commit us to thinking that there are mixed-worlds where some massive things attract other massive things according to the inverse square law and other massive things attract other massive things according to the inverse cube law. What powers things have in virtue of being massive is determined by the contingently obtaining laws of nature, and we needn't admit the possibility of laws of nature that lead to different massive things (in the same world) having different powers in virtue of being massive.

identical to w_3 but in which the complex objects exist because unrestricted composition is true in w_4. w_1 and w_2, and w_3 and w_4, look like counter-examples to the supervenience of truth on being in some sense. Each pair is identical in what exists there, seemingly, and the things that exist are identical in their intrinsic properties, and yet each pair is such that there is a difference in what is true at them. Not only are the compositional facts different in each member, but some counterfactual facts are as well. For just as the nomic laws are counterfactual sustaining, so will the mereological laws be. And so 'were there another simple, there might be some complex object' is true at w_1 (since the simple might be close enough to one of the existing simples to fuse with it) but not at w_2 (since no collection of simples would fuse, given compositional nihilism). Similarly, 'were there another simple there would be another complex object' is false at w_3 (since it might be too far removed from the existing simples to fuse with any of them) but true at w_4 (since all collections of simples would fuse, given compositional nihilism, and so there would be, among others, the new complex object which is the fusion of a and this new simple).

Should the mereological laws theorist be worried about this apparent failure of the supervenience of truth on being? I think not: let us simply say whatever we say in the nomic case. Given the contingency of the laws of nature it looks as though there are two worlds, w_5 and w_6, in which all there is some billiard ball heading towards another but where time runs out before they collide. These worlds appear identical in being in the same sense in which w_1 and w_2, and w_3 and w_4, are identical in being. But different things might be true at w_5 and w_6: in w_5 it might be true that were the balls to have collided they would have reacted as predicted by Newton's laws, whereas in w_6 it might be true that were the balls to have collided the first would have disappeared and the second would have turned into a small vase of daffodils. Is this a violation of the supervenience of truth on being? Some will say that there must be a difference in what exists between w_5 and w_6 because the law of nature that exists at w_5 is not the law of nature that exists at w_6. This is a view, championed by Armstrong and others[32], according to which laws of nature are entities. If that is correct, then perhaps we should also posit entities to be laws of mereology, and claim that w_1 and w_2, and w_3 and w_4, differ in what exists there because they differ in their mereological laws.[33] Or alternatively we should abandon the claim that a different in truth between worlds entails a difference in what exists at those worlds in preference for the claim that a difference in truth entails a difference in what there is and how those things are in fundamental respects.[34] If that is to make w_5 and w_6 unproblematic then 'fundamental respects' must include

[32] See in particular (Armstrong 1983).

[33] This is what we should say if we incline to Bigelow's reading of the supervenience principle: "If something is true, then *there must be*, that is to say there must *exist*, something which makes the actual world different from how it would have been if this had not been true." (Bigelow 1988), p. 126.

[34] This is more in line with the Lewisian position. Lewis' supervenience principle is: "For any proposition P and any worlds W and V, if P is true in W but not in V, then either something exists in one of the worlds but not in the other, or else some n-tuple of things stands in some fundamental relation in one of the worlds but not in the other" (Lewis 2001).

the laws of nature that govern those things, in which case there should be no objection to including in the fundamental respects the laws of mereology that govern those things. Either way, then, the contingency of the laws of mereology does not get us into worse problems than the contingency of the laws of nature has committed us to already.

So the contingency theorist can, if she wishes, appeal to mereological laws to block the possibility of mixed-worlds. But, as I said, it comes at a price.[35] For it is not enough to simply claim that there *are* laws of mereology; to block the *possibility* of mixed-worlds one has to accept that there are *necessarily* mereological laws. Given that the contingency theorist is motivated by an aversion to brute necessities this is a severe cost, unless she can tell us in virtue of what this claim is necessary. Also, one must, to secure the necessity of intra-world supervenience, hold that there can be no indeterministic laws of mereology, such as 'objects have a 50% chance of composing if they participate in a life'. Again, in the absence of an explanation to the contrary, this looks like exactly the kind of unmotivated necessity the contingency theorist wished to avoid.[36]

That is why I prefer to simply concede the possibility of mixed-worlds. Such a concession does not seem to me to be a cost, so I see no motivation for incurring the cost needed to block such a possibility. Nevertheless, I think the laws of mereology view deserves investigation; for even if it is only a contingent fact that there are laws of mereology, this still affords some benefits to the contingency theorist. Firstly, we can sustain counterfactuals of the form 'if there were another simple there would be another complex object' without accepting necessitarianism. And secondly, it lets us define a notion of 'mereological necessity': a restricted modality, such that something is mereologically necessary iff it is true in every world in which the actual laws of mereology hold. This may prove useful because it lets us hold that the intra-world supervenience claim, while metaphysically contingent, is mereologically necessary, and this might go some way to defusing the intuitions against the possibility of the mixed-worlds. Sure, there is a sense in which they are impossible: but they are only mereologically impossible, not metaphysically impossible.

5 The Lewis–Sider argument

Let me briefly discuss the Lewis–Sider argument against restricted composition.[37] You might take this argument to show that restricted composition views are impossible. That, of course, won't get you immediately to the conclusion that the

[35] I thank Cody Gilmore and Karen Bennett for making the cost clear to me. The first point that follows is due to Bennett, the second to Gilmore.

[36] There are things the contingency theorist tempted by the mereological laws response could say. Perhaps the existence of the parthood relation is ontologically dependent on the existence of some (deterministic) mereological law, so that a world without mereological laws is not a world where the mereological facts are random—it is a world where there are no mereological facts. But this seems a bit desperate.

[37] See (Lewis 1986), pp. 211–212 and (Sider 2001), pp. 121–132.

compositional facts are necessary, since it leaves it open that every collection of objects in fact composes some object but that there is a world identical to ours as to what simples there are and how they are arranged, but in which there are no complex objects; but in combination with other metaphysical principles which you might accept the impossibility of restricted composition would entail the necessity of universalism. Suppose, for example, that you think the world is necessarily gunky: that is, that as a matter of necessity every object has infinitely many proper parts, and so that there are no mereological simples in any possible world. In that case, given the impossibility of restricted composition, universalism comes out necessary; at least if universalism is taken simply as the claim that every collection of objects composes, rather than the stronger claim concerning the laws of mereology that entails that weaker claim. For in every possible world, either there is something or there is nothing. Consider a world in which there is nothing: then there are no collections of objects at that world, in which case, vacuously, every collection of objects composes some thing. And so, if there is nothing, universalism (in the weaker sense[38]) is true. Consider now a world in which there is something. Since there can be no simples there must be complex objects at this world. There can only be complex objects if restricted composition is true or if universalism is true; so if restricted composition is impossible, universalism must be true. So universalism is true whether or not there is something, so it is necessarily true.

I don't think it is necessary that the world is gunky,[39] but even accepting that I think this would be a bad reason to hold that universalism is a necessary truth, because I don't think the Lewis–Sider argument establishes the impossibility of restricted composition. The argument against restricted composition is that any restriction on composition that coheres with our intuitions to the extent that it would be reasonable to postulate such a restriction will admit of borderline cases of composition. If there are borderline cases of composition there will be some sentence of the form 'there are n things' which is indeterminate. But since (we shall suppose) there is no vagueness in the idioms of quantification and identity such indeterminacy could only be the result of a genuine (worldly) indeterminacy in what there is, which is (it is assumed) impossible. But even if it is impossible that the world be indeterminate with respect to what there is (which I'll grant for the sake of argument, although I'm not convinced)[40] I don't think we should think it impossible that there be a sharp cut-off between cases of composition and cases of non-composition. Sider rejects the possibility of such sharp cut-off points because[41]

[38] For all that has been said there could be worlds in which there is nothing in which nihilism is true and worlds in which there is nothing in which universalism is true, the difference between them being what counterfactuals hold concerning what complex objects there would be were there something rather than nothing.

[39] I take the decompositional facts about the actual world to be contingent as well, for all the same reasons I give in this paper for the answer to SCQ being contingent. Some possible worlds are gunky, some have point sized simples, some have extended simples: let a million flowers bloom!

[40] I have been persuaded by Elizabeth Barnes that ontic vagueness is far from the incoherent nightmare that many take it to be. See especially her (Barnes 2005) and her 'What is ontic vagueness?' (manuscript).

[41] (Sider 2001], p. 124.

> [T]here would seem to be something 'metaphysically arbitrary' about a sharp cut-off in a continuous series of cases of composition. Why is the cut-off here, rather than there? Granted, everyone must admit *some* metaphysically 'brute' facts . . . [but] *this* brute fact seems particularly hard to stomach.

But this is unconvincing. There seems to me to be no sense in which the world drawing a line to include some but not all collections of objects as composers is any more metaphysically arbitrary than the world drawing such a line to include all collections as composers. As Nolan says, "Unrestricted composition seems to be as much a 'brute fact' (unanalysed, not given a causal or teleological explanation) as the kind of fact Sider criticises."[42] The most that the Lewis–Sider argument establishes is that we should not *posit* there to be a sharp cut-off point, since such a postulation would not serve to capture the intuitions that motivate in favour of restricting composition in the first place. But even if it is necessary that we should not posit a sharp cut-off point, that doesn't mean that such cut-off points are impossible. The rule not to posit sharp cut-off points might be like Ockham's razor: we are necessarily justified in relying on such a rule, but in some worlds reliance on such a rule would not take us to the truth.[43] So the Lewis–Sider principle that we (necessarily) shouldn't posit a sharp cut-off is perfectly consistent with the possibility of restricted composition.

The best argument for universalism, to my mind, is not the Lewis–Sider argument but simply the claim that it is simpler to accept universalism and hold that in most everyday contexts our quantifiers are restricted to range over only the familiar objects that the restricted composition theorist thinks are all the objects.[44,45] But this should definitely not be thought to give any weight at all to the claim that universalism is a necessary truth, any more than Ockhamist considerations against ectoplasm give us reason to hold that ectoplasm is impossible. Considerations of parsimony/simplicity govern what we should admit into our ontology, but they say nothing about how the world could have been. It is good methodological practice to assume that the world is simple when aiming to discover what there is; but we have absolutely no right to assume that the world is *necessarily* simple: applying Ockham's razor could have taken us wildly wrong, but we live in hope that it does not in fact do so. And so even if considerations of simplicity tempt us towards universalism, we should leave open the possibility of worlds in which some collections of objects do not compose. As Nolan says[46]

[42] Nolan (2006).

[43] It's worth pointing out that it's doubtful that the Lewis–Sider argument establishes even this much. Nolan (2006) argues, to my mind convincingly, vague intuitions concerning composition could be served by the positing of a sharp boundary.

[44] This is Lewis' story: "Restrict quantifiers, not composition." Lewis (1986), p. 213.

[45] I do not claim this would be a *good* argument for universalism. I am not sure how to balance the simplicity of universalism against the parsimony of restricted composition.

[46] Nolan (2005), p. 36.

> If we believe in unrestricted composition on the grounds of simplicity . . . we might be hesitant to generalise it to a necessary truth. When we believe the simplest or most parsimonious option elsewhere in our theorizing, it is not usually because we think that it is *impossible* for things to be more complicated or arbitrary than they seem.

6 Objections

In this section I answer a couple of objections.

6.1 The argument from intrinsicality

Cody Gilmore put to me the following objection when he responded to my paper at the 2006 BSPC. If the compositional facts are contingent then it seems there should be a world in which the following is a true answer to SCQ:

(L) Some things, the Xs, compose something if and only if either: (1) the Xs are arranged organism-wise (with the result that the Xs compose a living organism), or (2) the Xs are arranged artifact-wise, where this involves external facts about the intentions and causal input of some outside agent.

But the possibility of (L) is incompatible with the following two premises, which Gilmore thinks are plausible.

Premise 1 If the Xs (in w1) exactly match the Ys (in w2) with respect to intrinsic properties and non-compositional facts about internal arrangement, and if (in w1) the Xs compose something that has the intrinsic, qualitative, non-emergent property F, then, if (in w2) the Ys compose O, then (in w2) O has F.

Premise 2 If property F is intrinsic, qualitative, and non-emergent, then so is the property having a part that has F.[47]

We can see the incompatibility as follows.[48] Take two groups of simples, the Xs and the Ys, which exactly match with respect to intrinsic, qualitative, non-emergent properties and with respect to internal arrangement, and which are both arranged person wise, thus composing two entities: Mr X and Mr Y. Let's suppose no proper sub-plurality of either the Xs or the Ys is arranged organism-wise. Let's suppose further that no sub-plurality of the Xs is arranged artifact-wise, but that there is exactly one sub-plurality of the Ys that are arranged artifact-wise: Mr Y has a prosthetic nose; the sub-plurality of the Ys that are arranged nose-wise compose a complex object.[49]

[47] This premise is adapted from Sider's 'Inheritance of Intrinsicality' principle; see Sider (2007).

[48] I'll present the argument a little differently from Gilmore's presentation, but the essentials are the same.

[49] Don't be confused into thinking that Mr Y's nose is plastic or anything: Mr Y's nose is not prosthetic in the Michael Jackson sense—only in the sense that it is an artifact: the result of external design. Remember that the sub-plurality of the Ys that make up Mr Y's nose are intrinsically identical, and have the same internal arrangement, as the sub-plurality of the Xs that are arranged nose-wise. The difference is just that some designer(s) planned that sub-plurality of the Ys to form a nose, whereas there was no such intention for the sub-plurality of the Xs.

Now consider the property *having a volume of between* 2 cm^3 and 500 cm^3. Each of the Xs and the Ys, we can suppose, are too small to have this property, and Mr X and Mr Y are both too big to have it. The only thing that has this property in the above example is Mr Y's prosthetic nose. This is an intrinsic property, so by premise 2 Mr Y has the property *having a part that has a volume of between* 2 cm^3 and 500 cm^3. And so, by premise 1, does Mr X. But Mr X does not have this property. Contradiction. Something has to go: either the possibility of (L), premise 1 or premise 2.

The contingency theorist is certainly not forced into accepting the possibility of (L): to think that there is more than one possible answer to the SCQ does not commit one to thinking that any consistent answer could be a correct answer. In particular, one might well balk at the thought that whether or not a collection of objects composes could have anything to do with external factors such as the intentions of designers. An answer to the SCQ says 'the Xs compose iff ...'; and perhaps, even if a different condition fills in the blank from one world to another, any possible answer must only concern the intrinsic properties and internal arrangement of the Xs. If so, there will be no possible answer to the SCQ that will conflict with Gilmore's two premises.

But even if you think the contingency theorist should accept the possibility of (L)—or if you don't think she should rule it out—I think Gilmore's problem can be avoided, because I don't think we are forced to accept premise 1.

Compare premise 1 with the following principle (Aristotelianism about universals):

> (*) No world contains an uninstantiated universal.
>
> (*) and premise 1 are of a kind in the sense that they both impose a constraint on the space of possible worlds. But premise 1 and (*) seem importantly different to me in the following respect: that while it would be appropriate to appeal to (*) to inform our beliefs about the space of possible worlds, it is not appropriate to appeal to premise 1 to so inform our beliefs; rather, we should accept or reject premise 1 depending on what our beliefs are concerning the space of possible worlds.

Why the difference between the two principles? (*) is a principle concerning the nature of universals, and their relationship to particulars. We would not expect to determine the truth or falsity of (*) by consulting our modal intuitions and trying to see if there's a counter-example; rather, we would determine the truth or falsity of (*) by asking ourselves such questions as 'are universals ontologically dependent on particulars (as Aristotle thought), or are particulars dependent on universals (as Plato thought)?' If investigation of the nature of universals inclines us towards (*) then we should adopt a theory of what is possible that respects the constraint made by (*). By contrast, the method of determining the truth or falsity of premise 1 seems to be precisely that we investigate whether it is true or false given what situations could obtain according to our best theory of modality. There seems to be no other way to settle whether or not premise 1 is true: reflection on the nature of intrinsicality, parthood or the nature of properties will not determine it. That is why it is different from (*): there is no way to discover its truth-value independently of

discovering what is possible. That is why we should decide what is possible *first*, and then ask ourselves whether or not premise 1 is true; we should *not* accept premise 1 and then tailor our modal beliefs in accord with it, like we do with (*). So I should settle the issue of whether or not claims like (L) are possible first, and then see whether premise 1 is true; I should not assume premise 1 to be true and then work out what counts as a possible answer to SCQ.

I can't see why the contingency theorist could end up in trouble, then. If reflection on the concepts of intrinsicality of parthood won't provide justification for premise 1—and it won't—then the way to decide on its truth-value is to first determine what kinds of complex objects there are across the space of possible worlds, and see if there is a counter-example to it. If she finds no counter-examples then there is no problem: she will have reason to accept premise 1 but no reason to accept the possibility of anything like (L). But there is no problem if she *does* find a counter-example, either, because then she will have every reason to reject premise 1 and no reason to accept it. Either way, then, she will not have a problem.

6.2 But it's *metaphysical* necessity

The next objection claims that I am simply talking past my opponents.

6.2.1 Objection

Look, you can define a notion of necessity according to which the compositional facts are not necessary, but it won't be *metaphysical* necessity. The compositional facts are metaphysical facts, so of course they're metaphysically necessary. You can *call* the modal notion you're interested in 'metaphysical necessity' if you want, but you're just talking past your opponents.

6.2.2 Reply

There are two views in the metaphysics of modality; the complaint is valid if one of them is right, but I am assuming the truth of the opposing view in this paper.

The view that I take my objector to be presupposing is that modality is a matter of convention. The best way to understand conventionalism is, I think, as follows.[50] There are very many worlds; one for every way for the world to be. Now, there was no mention of possibility there; I didn't say there was a world for every way the world *could* be. Modality comes into the picture as follows. We draw a division between the worlds, so that every world falls on one side of the division and no world falls on both sides of the division, and we use the terms 'possible' and 'necessary' to refer to those propositions that are true according to[51] some/every world on one side of the division. We are not tracking any special metaphysical property that some worlds have and others lack when we divide them into the

[50] See Sider (2003) for something very similar.

[51] And we tell a story about what truth according to a world is that doesn't involve modality.

possible and the impossible worlds: there is no 'glow' of possibility that some worlds have and some don't. We are simply drawing an arbitrary[52] distinction between the worlds, and choosing to let our modal language reflect that distinction.

If that is the true metaphysics of modality then there is no genuine disagreement between myself and the necessitarian: we will simply be talking past one another. I will be using the term 'metaphysical necessity' to carve one distinction amongst the worlds, she will be using the term to carve a different distinction, and there is no question as to who is correct.

I am working on the assumption that this is not the true metaphysics of modality: that there is more to necessity than convention. It is a presupposition of this paper that there is a genuine, metaphysical, distinction between the possible worlds and the impossible worlds, and our term 'metaphysical necessity' latches onto this distinction. If that is correct then it is an open question whether or not the worlds that are metaphysically possible include any with different compositional facts to our own, and I cannot be accused of changing the subject by claiming that the compositional facts are metaphysically contingent.

7 Conclusion

I have looked at a number of potential justifications for the necessity of the facts concerning when collections of objects compose some object and found each wanting. Are there any other reasons to think that the compositional facts are necessary? I have no argument that there are not, but cannot see any; and unless some new argument is given I think we should deny their necessity. Is there positive reason to think that such facts are contingent? Well, I alluded to some conceivability considerations in Sect. 1 which I think give some support to their contingency. One might also think that we have positive reason to think them contingent insofar as we lack reason to think them necessary.[53] At the end of the day, however, I am not so concerned to argue for the contingency of compositional facts as I am to argue that we have no good reason to hold them to be necessary. If I have turned you into an agnostic as to their modal status I will have done my job.[54]

[52] Maybe 'arbitrary' isn't the right word. It needn't be *random* that the line is drawn where it is; it could be drawn there as a result of our interests. What matters is just that it *isn't* drawn there because that division marks some natural distinction between the worlds.

[53] The idea here is that there should be a presumption of possibility. For a defence of this view see Hale (2003).

[54] A final caveat. There is one group who I grant should hold that the facts about composition are necessary: namely, the nihilist who thinks that the mereological discourse is not in good standing. If my reason for holding that composition never occurs is that there is no relation I refer to when I use the term 'parthood' then I should not hold that composition occurs in any possible world, since my term 'parthood' will not refer to any relation at those worlds either. Such nihilists are not my target here. I am concerned rather with the nihilist who thinks that the discourse is in good standing: that there is a parthood relation, but that it is in fact coextensive with the identity relation. Those nihilists should, I claim, be open to the possibility of a thing's having proper parts.

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