Methodological Separatism, Modal Pluralism and Metaphysical Nihilism

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In this paper, we aim to clarify the debate over whether there might have been nothing, in particular, and modality, in general, by introducing the concept of a Modal Theory and investigating its form. We begin by arguing that the question of whether there might have been nothing can be pursued independently of the question of the nature of possible worlds; that is, we can investigate what possibilities there are without having to investigate what possibilities are. The theory that governs what possibilities there are we call 'a modal theory'. We then draw attention to the fact that modal theorists, to date, have typically assumed that modal theories are single-criterion, that is, that they have the form: p iff <>q.[1] In response, we undermine the reasons we take for this assumption, and we then present an argument for modal theory being multiple-criteria, a view we dub 'modal pluralism'. We then investigate the forms of the axioms of such a multiple-criteria modal theory, and we conclude by drawing lessons for the debate over whether there might have been nothing.

Methodological Separatism

In earlier work (2005a, 2005b, 2006, and 2008), we have insisted on the distinctness of two philosophical questions one might ask about modality and, more importantly, on the methodological separability of the projects of answering each question.[2] In this section we further articulate this methodological thesis and defend it against a recent criticism by John Divers (forthcoming).

The two questions relate, respectively, to the extent of possibility, what possibilities *there are* – that is, what is possible – and the nature of (unactualized) possibility, what (unactualized) possibilities *are* – that is, what possibility is. Clearly the questions are logically distinct, so the substantive issue is whether the philosophical project of answering each is distinct or whether they can only be addressed together. Of course, one does not have a fully adequate philosophy of modality unless one has answered both questions, so, in a sense, they are parts of a single project, but, even so, it leaves open the issue of whether we should answer one question, at least in part, by answering the other, specifically, whether our account of the nature of possibility should partially determine the answer to the question of what is possible, or whether we should address them separately, though under the over-arching constraint that our answers be mutually consistent.

In our earlier work, we have described answers to these questions as 'theories' and the data which they draw upon as 'intuitions'. For these purposes, we can regard any assertion or belief which organizes some data, usually by categorizing it or deriving it from some variables, as theoretical with respect to that data (which may, in turn, be theoretical with respect to some other data). In this sense, any philosophical account of X is a theory of X. Thus, traditional philosophical analyses, such as the tri-partite account of knowledge, are theories (in

[1] Here and throughout we use 'p' and 'q' as schematic letters for well-formed formulae or grammatical sentences without any presumption that they are logically simple.
[2] We are not alone in this view, for methodological separatism is exploited in Cameron 2012 and encouraged in Gregory 2011.

this case, asserting that knowledge is a function of three variables – and the majority of responses to the Gettier counter-examples can be seen as attempting to find a fourth, 'hidden' variable), as are ontological reductions, such as the bundle theory of objects.

While any theory is theoretical only relative to some data, and thus some data are only data relative to some theory, we may reasonably think that there must be some data which are not theoretical relative to anything, on pain of regress.[3] These data are the ultimate subject matter for all theorizing and must include empirical data, such as observation and experience. But philosophical theorizing also draws upon other data, and that is what we have indicated with the term 'intuitions'. However, the nature of these data is highly controversial (see Williamson 2007 for a lengthy discussion), with some taking it to be concepts or conceptual schemes, others linguistic knowledge, others *a priori* knowledge. We intend to remain neutral on these issues, using 'intuitions' to refer to that body of beliefs about a subject matter upon which we can reach general, though rarely universal, agreement prior to philosophical theorizing. Determining exactly what falls into the class of intuitions is not easy, and we do not rule out the relevance of experimental philosophy (Alexander 2012), but nor do we think that pre-philosophical beliefs about X need to be unreflective beliefs about X, and thus we allow that on reflection there may be agreement on a belief which is different from that held by the majority prior to reflection (which is just to say that by 'agreement' we mean the product of a process of discussion rather than the summing of a set of independent opinions).[4] And because the process of agreement is reflective, it can also involve ensuring consistency with our knowledge in general, and especially our scientific knowledge.

With these definitions in hand, we can state the thesis of methodological separatism a little more clearly. The data for the theory of the extent of possibility, of what is possible, are intuitions about what is possible, intuitions about propositions of the form '<>p' (where an intuition about a proposition can be that it is true or that it is false).[5] Since the theory aims to establish the extent of what is possible, it will consist of a series of propositions of the form 'if p then <>q' (and perhaps also 'if p then ~<>q', though see below for discussion of this point). There is no reason to restrict p to non-modal propositions and in fact if we want some of the axioms of modal logics such as S4 to be part of this theory, then we will have to allow modal antecedents.

Strictly speaking, the data for the theory of the nature of (unactualized) possibility are just intuitions about what kind of thing (unactualized) possibilities are.[6] These are sparse, though the famous 'incredulous stare' which Lewis's Genuine Modal realism so often met (Lewis 1986, 133) suggests there are some implicit beliefs about these matters and Peter van Inwagen has articulated a specific intuition thus: 'How *could* one suppose that the (unactualized) possibility that the universe is thus-and-so is a thing that has a mass of 3.4×10^{57} grams and is rapidly expanding?' (1986/2001, 226). However, we can also include in the data for this theory intuitions about what sorts of thing there are or are not which have consequences about what

[3] Which is not to say that the data may not be theory-laden, merely that it is itself not theoretical in the sense defined above.

[4] A better term than 'intuition', and one which links the thought to its history, might be 'common notions'.

[5] Strictly speaking, this rests upon a prior philosophical theory, the duality of the modal operators, which takes as its data all modalized intuitions.

[6] Intuitions about what properties possibilities have, including such properties as being knowable, can be included here because they have consequences for what kinds of thing those possibilities are.

unactualized possibilities are, even if those consequences need careful drawing out (see e.g. the discussion of the null individual in our 2005b). While that exhausts the data proper to the theory, it is a general feature of a theory of the nature of Xs that it may have consequences for which Xs exist, if any. Furthermore, that may be one of the primary interests in constructing such a theory. This might lead one to think that intuitions about which Xs exist, in this case the intuitions which are the data for the theory of the extent of possibility, are data for the theory of the nature of Xs. However, the methodological separatist denies this, insisting instead that the only data for the theory of the nature of possibility are intuitions about the nature of unactualized possibilities and that intuitions about what is possible do not directly constrain that theory. They do, however, indirectly constrain the theory via the requirement that all our theories be mutually consistent and, consequently, that the theory of the nature of possibility be consistent with the theory of the extent of possibility. If the former has a consequence which is inconsistent with the latter, one or other will have to be modified.

We have pursued the separatist methodology through a series of papers on metaphysical nihilism, which is the claim that there might have been nothing concrete. To begin, we (2005a) argued for this claim on the basis of a theoretical claim in the theory of the extent of possibility, namely, that all contingent concreta possess the modal property of subtractability,[7] which was itself grounded in intuitions about what is possible. Then, we (2005b, 2006) argued that, despite claims to the contrary, metaphysical nihilism is, in fact, consistent with, respectively, Lewis's (1986) and Armstrong's () theories of the nature of unactualized possibility. Finally, we (2008) argued that the plenitude objection to Lewis's (1986) theory of the nature of unactualized possibility misconstrues the role of the Principle of Recombination, which is, in fact, part of the theory of the extent of possibility and not a proper part of Lewis's theory of the nature of unactualized possibility.

However, John Divers (forthcoming) has recently launched an important challenge to methodological separatism. He notes that separatism has consequences for what is and is not relevant to evaluating the success of a theory[8] of modality, such as Lewis's, but that evaluation of a theory is only possible once we have fully defined our conception of analysis, which involves specification of 'its intended components, structure, aims, methods and criteria of success' (1). Divers then presents a clear specification of Lewis's conception of analysis and argues that, on this conception, methodological separatism is mistaken. As he is well aware, this does not show that methodological separatism is, in fact, mistaken, for the result is only conditional, but it does pose a significant challenge to the separatist to offer an equally well-defined conception of her philosophical project which doesn't have the same consequence.

According to Divers, on the Lewisian conception, an analysis consists of three components: <Opinion, Analytic Hypotheses, Metaphysical Base>. Opinion is pre-philosophical belief, which includes and may be identical with the sum of all intuitions, as defined above. The Analytic Hypotheses give a 'sense' or 'truth-condition' (9) for the subset of Opinion, which is the target of the analysis, typically in the form of a bi-conditional, and the Metaphysical Base is an existential statement, which, given the Analytic Hypotheses, determines the truth-values of the target sentences and, quite

[7] This way of putting the point was intended to head off the objection to the argument in Lowe (this volume).

[8] Divers only talks of 'analysis', but that is a type of theory on our definition.

possibly, other sentences in the Opinion. Thus, in the case of the analysis of modality, we get the following (4):

(Opinion)	It is possible that there be [Fs, e.g.] talking donkeys
(Analytic Hypothesis)	It is an F-possibility iff there unrestrictedly exists an F*
(Metaphysical Base)	There (unrestrictedly) exist x, y .... such that .... H*x,y ...

where H* is a primitive expression of the kind that figures at the end of a chain of Definitions of the arbitrary non-modal predicate F*.

Such an analysis is evaluated against the dual virtues of Conservativeness (of Opinion) and Economy (of Metaphysical Base) in the following manner (10): we hold the Analytic Hypotheses constant and consider the various pairings of Opinion and Metaphysical Base which result from their co-variation established in the Analytic Hypotheses. If some such pairing is adequate with respect to both Conservativeness and Economy, then the analysis is accepted, but if none is, the analysis is rejected.

Since Opinion includes beliefs about what is and is not possible, beliefs which have a direct bearing on the extent of possibility, considerations of Economy in the Metaphysical Base have direct consequences for the extent of possibility. Thus, to take a well-known example, Opinion includes, or at least is committed to, the possibility of 'island universes', that is, possible universes with spatio-temporally unconnected parts. But the Analytic Hypothesis requires that all possibilities are parts of worlds and the Metaphysical Base tells us that worlds are maximally spatio-temporally interconnected mereological sums. Thus, Lewis (1986, 71) is faced with the choice of modifying the Metaphysical Base or rejecting an aspect of Opinion, and he takes the latter course. This seems a clear violation of methodological separatism, justified by the conception of analysis.

Divers' challenge to the separatist is to give an equally well-defined and clear conception of analysis which doesn't have this consequence. Given what was said above, the Separatist could perfectly well adopt the Lewisian conception of analysis as an account of the theory of the nature of X, with one change, namely, that 'Opinion' be restricted to intuitions about the nature of X or about what kind of thing there is or is not, that is, to proper data for the theory.[9] This move immediately blocks the consequence that the evaluation of an analysis such as Lewis's involves making a judgement about the extent of possibility. In fact, we can grant that intuitions about what unactualized possibilities are is entirely neutral on the question of island universes and thus that the saving in Economy provided by a Metaphysical Base in which all worlds are maximally spatio-temporally interconnected mereological sums has no cost to Conservativeness at all. However, given the Analytic Hypotheses, it does entail that island universes are not possible. But even if we grant that intuition about what is possible includes island universes, we do not yet have a loss of Conservativeness, for we do not know whether the best theory of the extent of possibility captures or rejects that intuition. Suppose Modal Theory does capture that intuition. Then our best theory of the extent of possibility is inconsistent with Lewis's theory of the nature of unactualized possibility, and we have a hard

[9] Is the intuition that island universes are possible an intuition about the nature of unactualized possibility? Well, it is an oddity of the Lewisian metaphysics that unactualized possibilities have the properties that are said to be possible, so every claim about what is possible entails a claim about the nature of an unactualized possibility. But since that entailment is mediated by the very theory we are evaluating, the consequence cannot be regarded as data for the theory.

theory choice to make, comparing not merely the virtues of each theory but also those of the next best theory. Suppose, instead, that Modal Theory does not capture the intuition. Then, in our overall account of modality, there is a loss of Conservativeness. But, crucially, this is held against Modal theory, the theory of what is possible, not the Lewisian theory of what possibilities are. So, should there be some inconsistency discovered with some third theory, we can properly evaluate which part of our overall account of modality has that particular weakness.[10]

However, this is not an adequate separatist response to Divers' challenge, for there is as yet no well-defined conception of the components, structure, aims, methods and criteria of success for a separate theory of the extent of possibility. Without such a conception, it remains open that the only adequate way to address the question of extent is by an analysis of the nature of possibility and its consequences for the extent of possibility.

From what was said above, an account of the extent of possibility, of what is possible, appears to have two parts corresponding, respectively, to data and to theory, namely <Intuition, Principles>. The intuitions will be those about propositions of the form '<>p'. The principles will be conditionals of the form 'if p then <>q' and perhaps also 'if p then ~<>q'. In order to count as a theory of the intuitive data, the principles must non-trivially entail that data (i.e. not because they have the form 'if <>p then <>q'). Furthermore, the theory is interesting or useful or explanatory in virtue of having principles which each generate significant numbers of data points.

However, in order for the principles to generate any possibilities at all, we need a third element in the theory, corresponding structurally to the Metaphysical Base. Now, if there are a small number of principles with a limited variety of antecedents, then this third element can be quite small, but we cannot know that in advance. So, it is best if the third element contains all the antecedents of all the possible Principles. Since we are only interested in true antecedents, let's call this 'Fact'. Fact includes all of Intuition and all consequences of the conjunction of Fact and Principle, for the antecedents of Principles can be modal. So we have the following structure: <Intuition, Principles, Fact>. Which we can spell out schematically:

Intuitions:	$\Diamond p_1, \Diamond p_2, \ldots, \Diamond p_n$
Principles:	if p^*_i then $\Diamond p_j$
Facts:	$p^*_1, p^*_2, \ldots, p^*_m$

The Principles are not analytic, for their consequents contain information not in their antecedents. Rather, they are meant to explain the Intuitions (in conjunction with the Facts). So how do we evaluate such a theory? There seem to be four criteria of evaluation:

1. Consistency

If Intuition contains ~<>q and Facts contains p and Principles contains if p then <>q, revision of something is required. It might be thought that Facts will never be subject to revision on the basis of conflict with modal Intuitions and Principles, but (i) Facts include modal propositions, and (ii) Facts may include analyses of what unactualized possibilities are, so they do not have any clear priority over the other two elements.

[10] This paragraph is a more abstract version of the argument at Efird and Stoneham (2008, 484).

2. Fit to data
If we have two theories which are both consistent, we can evaluate their relative merits by considering which has a better fit to the data, that is, which captures more of the Intuitions. However, if the Principles only generate possibilities, that is, propositions of the form '<>p' (see below for discussion of this issue), we need to take care to distinguish between a theory which fails to fit the Intuition that ~<>p by generating <>p, and one which fails to fit the Intuition that <>p by failing to generate <>p. In the former case, this is clearly a theoretical vice, but the latter case may not be such unless we know independently that the theory is complete. If we allow the possibility of multiple Principles, we may be able to rectify the latter failure to fit the data by adding more Principles. As we see in the next section, many philosophers seem to assume that there can only be one Principle generating possibilities.

3. Simplicity
If we have two theories which are both consistent, we can evaluate their merits by how well they organize the data. Simplicity is very hard to make precise, but it is a widely accepted theoretical virtue in many fields, so the issue of assessing it is a general problem in the account of theory choice and not one specific to this area.

4. Power
If we have two theories which are both consistent and roughly equal in their balance of fit to data and simplicity, then we can evaluate their merits by their ability to extrapolate or interpolate new data points. For example, suppose Intuition is silent on whether talking fleas are possible or not. If theory A has the consequence that talking fleas are possible (or not) but theory B has no such consequence, then – ceteris paribus – we have a reason to prefer theory A over B in virtue of its being more powerful.

Clearly more detail can be given, but from this sketch, it should be clear that there can be a well-defined conception of the separate account of the extent of possibility, so Divers' challenge is met.

Single-criterion modal theories against metaphysical nihilism

Michael Dummett (1959, 169) poses the 'philosophical problem' of necessity thus: 'what is its source, and how do we recognise it?' Posing the problem in this way presupposes that modal claims, if true, are not 'barely true', in terminology Dummett (1991, 328) develops later, that is, they are true in virtue of some other class or classes of statements. Whether modal claims are true in virtue of a single class of statements or multiple classes of statements has, to date, not been investigated. It has simply been assumed that, following a certain reading of Dummett's posing of the philosophical problem of necessity, necessity has a single source rather than multiple sources. Through investigating the nature of modal theory, we aim to go some way towards opening up space for necessity having multiple sources as opposed to a single source.

A Modal Theory is a theory which tells us which propositions are and which are not possible. Such a theory has the form

(P) <>p iff …

where a single-criterion modal theory fills in the ellipsis in (P) with just one clause, while a multiple-criterion modal theory fills in the ellipsis with a disjunction of clauses. That is, the single-criterion theory has one Principle of the form ‘ if p then <>q’ whereas the multiple-criterion theory has several such Principles. According to a single-criterion modal theory, there is only one way for a proposition to be determined possible; according to a multiple-criterion modal theory, there are multiple ways for a proposition to be determined possible. That modal theory is, or should be, single-criterion is typically assumed in arguments of the form: state of affairs S does not meet criterion C, so p, the proposition describing S, is not possible. For this argument to be valid, it must be that criterion C gives the only criterion for a proposition describing a state of affairs to be possible. Thus, the argument relies on modal theory being single-criterion. But this assumption has not been articulated, let alone defended. In what follows, we draw attention to this unarticulated and undefended assumption and the role it plays in two recent arguments against the possibility of nothing.[11]

One of the most prominent single-criterion modal theories is

(Con) <p> is possible iff it is conceivable that p.

Such a theory is described by Tamar Szabó Gendler and John Hawthorne thus:

> We have, it seems, a capacity that enables us to represent scenarios to ourselves using words or concepts or sensory images, scenarios that purport to involve actual or non-actual things in actual or non-actual configurations. There is a natural way of using the term ‘conceive’ that refers to this activity in its broadest sense. When we engage in such conceivings, the things we depict to ourselves frequently present themselves *as possible*, and we have an associated tendency to judge that they *are possible*. Indeed, when invited to consider whether something is possible, we often engage in a deliberate effort to conceive of it; upon finding ourselves able to do so, we conclude that it is. We may even decide that something is impossible on the basis of our inability to conceive of it. (Gendler and Hawthorne 2002, 1-2; emphasis in the original)

As an illustration of this modal theory at work, John Campbell seems to assume something it in his interpretation of Berkeley’s thought when he considers Berkeley’s so-called ‘master argument’ (Gallois 1974, 55):

[11] This assumption, that modal theory has, or should have, a single-criterion is made throughout much of the literature on modal theory and not merely in the dialectic concerning the possibility of nothing. As a further example, George Darby and Duncan Watson (2010, 439) criticise our (2008) formulation of Lewis’s principle of recombination on the grounds that it ‘doesn’t entail that there’s a world at which there’s no gunk’. However, nowhere do we assume that the principle of recombination is the only principle by which possibilities, that is, possible worlds, on Lewis’s (1986) view, are generated. On the contrary, we were well aware that, following Divers and Melia (2002), the principle of recombination does not deliver possibilities regarding alien individuals and properties, but if, as Divers and Melia (2002, 34) argue, the principle that ‘[e]very way that a part of [a] world could be is a way that a part of some world is’, these possibilities are indeed generated, but at the cost of undercutting Lewis’s (1986) reductionist ambitions. Darby and Watson’s criticism thus assumes a single-criterion modal theory, an assumption they never articulate and so never defend.

> But say you, surely there is nothing easier than to imagine trees, for instance, in a park, or books existing in a closet, and no body by to perceive them. I answer, you may so, there is no difficulty in it: but what is all this, I beseech you, more than framing in your mind certain ideas which you call *books* and *trees*, and at the same time omitting to frame the idea of any one that may perceive them? But do not you your self perceive or think of them all the while? This therefore is nothing to the purpose: it only shows you have the power of imagining or forming ideas in your mind; but it doth not shew that you can conceive it possible, the objects of your thought may exist without the mind: to make out this, it is necessary that you conceive them existing unconceived or unthought of, which is a manifest repugnancy (Berkeley 1710/1975, §23)

Campbell (2002, 127) writes, 'Berkeley famously claimed to be unable to conceive of existence unperceived, from which he famously concluded that existence unperceived is impossible'. Similarly, in commenting on the version of Berkeley's (1713/1998) 'master argument' in the *Dialogues*, Andre Gallois seems to read this same single-criterion modal theory in Berkeley's thought when he interprets Berkeley's argument thus:[12]

(1) Hylas thinks that possibly (∃x)(x is perceivable and x is unperceived).
(2) If what Hylas thinks is true, then the concepts being the possible object of some perception and being the object of some perception do not necessarily apply to the very same things.
(3) In order to sustain the claim that something could be both perceivable and unperceived, it must be possible to have an image of a perceivable which is not an image of something perceived.

([3] follows from [2] in conjunction with an imagistic criterion of necessity, the demand that Hylas be in a position to mention the kind of thing that could be both perceivable and unperceived, and finally, that he can image appropriately something of this kind if he is to qualify as having the concept of an unperceived perceivable).

(4) Hylas cannot meet the condition embodied in (3) and his failure in this respect is not the result a contingent limitation of Hylas's powers of imaging.

The desired conclusion that nothing could be both perceivable and unperceived follows (1974, 63-4).

What underwrites both Campbell's Berkeley's inference and Gallois's Berkeley's argument is the left-to-right direction of (Con), and the assumption that possibility is uniquely constituted by conceivability, a single-criterion modal theory. Now, Bede Rundle seems to be making just this sort of argument when he argues against the possibility of nothing thus:

[12] However, Gallois' reading of Berkeley's argument appears to be a misreading, as Berkeley endorses explicitly only the claim that if it is conceivable that there are unperceived things, then it is possible that there are unperceived things. See Stoneham 2002, 134-9 for details.

> We might insist that it is not possible that there should be, or have been, nothing at all; whether animate or inanimate, material or immaterial, there had to be something. On the other hand, it may well be that of no particular thing can one say that it is inconceivable that it should not have existed; our galaxy did not have to exist, nor did galaxies quite generally. (2004, 110)

In this passage, Rundle seems to take impossibility to be interchangeable with inconceivability, and, as a consequence, thereby endorse, at least implicitly the single-criterion modal theory (Con). This comes out more clearly in the following argument against the possibility of nothing, where, on the assumption that we are unable to imagine nothing, it follows that there had to have been something, at least a setting:

> . . . I suspect that our attempts at conceiving of total non-existence are irredeemably partial. We are always left with something, if only a setting from which we envisage everything having departed, a void which we confront and find empty, but something which it makes sense to speak of as having once been home to bodies, radiation, or whatever . . . [T]alk of imagining there was nothing—which is what is called for—does run the risk of being treated as if a matter of imagining nothing, and that is refraining from imagining anything. Either that, or, I suggest, it is to imagine things lacking where there might have been something: we suppose we can imagine the stars ceasing to exist one by one—like so many lights going out—but we still look to where they were . . . We have not discarded the setting; something we might search in vain, but something—a previously occupied region—none the less. (2004, 110-1)

Rundle's argument is valid only if, again, inconceivability entails impossibility, and, in which case, it would seem, possibility is constituted by conceivability, a single-criterion modal theory. This assumption goes unarticulated and so undefended. So, one way of attacking Rundle's argument, rather than simply denying that there is any connection whatsoever between conceivability and possibility is to maintain that, while conceivability gives one way for a proposition to be possible, there are others as well. So, it being inconceivable that p does not rule out the possibility of <p>. Now, it's likely that Rundle will resist this line of argument, given that he takes the source of necessity to be relations between concepts (2004, 98, see also 109), which then gives rise to a single-criterion modal theory. However, for the objection to metaphysical nihilism to be cogent, Rundle needs to argue that this is the *only* source of modality.[13]

A second example of this unarticulated and so undefended assumption can be found in Graham Oppy's recent argument against the possibility of nothing. He describes his 'favourite theory of modality' thus:

[13] In fairness, we should note that Rundle does indirectly address this issue by arguing that the possibilities not licensed by his single criterion are meaningless (e.g. 2004, 112-3). This requires him to regard many modal intuitions are mere illusions of meaningfulness. Whether this move is the same sort of cost of Conservativeness to a theory as denying the intuitions is a difficult point to adjudicate, but we expect most readers of this volume to be reluctant to accept that they are speaking as much nonsense as Rundle claims.

> Wherever there was objective chance, there were alternative possibilities. Wherever there is objective chance, there are alternative possibilities. Wherever there will be objective chance, there will be alternative possibilities. Possible worlds are alternative ways that the actual world could have gone, or could go, or could one day go; possible worlds all 'share' an initial history with the actual world, and 'branch' from the actual world only as a result of the outworkings of objective chance. Since the laws that govern the evolution of possible worlds do not vary over the course of that evolution, all possible worlds 'share' the same laws. If there was an initial state of the actual world, then all possible worlds 'share' that initial state; if there was no initial state of the actual world, then all possible worlds 'share' some 'infinite' initial segment with the actual world, and hence any two possible worlds 'share' some 'infinite' initial segment with one another. My favourite theory of modality does not assume that there are objective chances. However, if there are no objective chances then, on my favourite theory, there is just one possible world: the actual world. (this volume, 1)

Notice that Oppy begins with a sufficient criterion for a propostion's being possible, namely, if there was, is, or will be an objective chance that p then <p> is possible. However, after taking possible worlds to be 'alternative ways that the actual world could have gone, or could go, or could one day go', he then concludes that all possible worlds '"share" an initial history with the actual world, and "branch" from the actual world only as a result of the outworkings of objective chance'. This inference is valid only if there being an objective chance that p is not only a sufficient but also a necessary condition for <p>'s being possible, that is, that there being an objective chance that p is a single-criterion theory of modality. This assumption can be seen to be at work most dramatically in the last sentence of the passage where he draws the consequence that if there are no objective chances, then there is only one possible world, the actual world. Following this outline of his 'favourite modal theory', he outlines what he takes to be its controversial consequences, which, again, follow only if the modal theory is he is offering is a single-criterion modal theory:

> Of course, my favourite theory of modality is controversial: there are many who suppose that it omits further possibilities. For example: (a) some suppose that there might not have been anything at all; (b) some suppose that the initial state of the world—or the entire beginningless history of the world—might have been different; (c) some suppose that the laws might have been different; (d) some suppose that the laws might change as the state of the world evolves; and perhaps there are yet other suppositions that might also be entertained. On my favourite theory, these alternative suppositions are purely doxastic or epistemic: while they are ways that *it might be supposed* that the world could have gone, or could go, or could one day go, they are not ways that the world could have gone, or could go, or could one day go. (this volume, 2; emphasis in the original)

In what follows, we will challenge this assumption that modal theory should be single-criterion and thereby challenge these arguments from Rundle and Oppy, not by denying that it being conceivable that p or that there being an objective chance that p are sufficient criteria for <p>'s being possible but rather for their being

necessary for <p>'s being possible, opening up space in the dialectic for multiple-criteria modal theories.

Modal Pluralism

There is always going to be a trade between simplicity and fit to the data in constructing any theory, and there is plenty of evidence that single-criterion theories of what is possible, while simpler than multiple-criterion theories, always lose too much of the data. For example, while we might accept that if p is conceivable, then <>p, to make this the only criterion of possibility amounts to adding the much more controversial claim that if p is inconceivable, then ~<>p. This claim faces a dilemma. On the first horn, if conceivability is relative to an actual historical circumstance, that is, is what actual people in an actual context have the ability to conceive when they try, then possibility also becomes so relativized. Consequently, we would find ourselves saying that what used to be impossible is now possible and what is now impossible is possibly … possible (because we can conceive of beings who can conceive of beings who … who can conceive of it). There is a debate to be had here, but for many this is too big a conflict with intuition. On the second horn, we consider conceivability under some idealization, so that what is conceivable for us is thereby ideal-conceivable for previous generations and what is conceivably … conceivable for us is ideal-conceivable. But then the theory has been modified to:

<>p iff <> conceivable that p.

Now, while a pluralist theory can readily allow claims of the form '<>p then <>q', a single-criterion theory cannot have this form. For if it did, it would fail to be a theory of the data, the modal intuitions, since all it would allow us to do would be to deduce new modal claims from old, without providing any *explanation* of the original intuitions.

We find similar sorts of difficulty with other candidates for single-criterion theories. Take, for example, the Principle of Recombination (Lewis, 1986, 87) which is often treated as if was a single-criterion theory. In our formulation, this is (2008, 489, original numbering preserved):

(7) For any sequence of intrinsically distinct objects $x_1, x_2, x_3, \ldots, x_m$ and any sequence of cardinals ($n_i \geq 0$) $n_1, n_2, n_3, \ldots, n_m$ and any spatiotemporal relation between those objects, there exists a possible world which contains: exactly n_1 duplicates of x_1, exactly n_2 duplicates of x_2, exactly n_3 duplicates of x_3, …, exactly n_m duplicates of x_m in that spatiotemporal relation.

To make this fit the form of a single-criterion Modal Theory, let's define a PR-world as a possible world the existence of which is a consequence of (7). Then the single-criterion Modal Theory becomes:

(PR) <>p iff there is a PR-world at which p is true.

Now this theory does really well in establishing possibilities, such as there being more or fewer of certain kinds of object or for objects to have existed in different places and times. But it is far less clear how it can establish that talking donkeys are

possible. Presumably, if talking donkeys are possible, there is some re-configuration of matter, specifically donkey cells, probably with additional neurons and also muscles around the throat and tongue, which is sufficient for there to be a talking donkey. (Setting aside, for present purposes, the question of whether there is some PR-world in which a donkey talks in virtue of the transmigration of a human soul into a donkey body.) And the Principle of Recombination tells us that there is a PR-world with that re-configuration of matter. But it doesn't tell us that talking donkeys are possible because it doesn't tell us that that re-configuration of matter is sufficient for there to be a talking donkey. So (PR) does not determine whether it is possible that there are talking donkeys.

Assuming for a moment that, even on reflection, we do have the intuition that there might be talking donkeys, then (PR) fails to fit the data in this respect. It also fails to fit the data in respect of any other intuition we might have that <>p, where p is not a fact about the distribution of objects but one which supervenes upon it. This has the consequence that if (PR) were the correct single-criterion Modal Theory, certain vexed debates in philosophy would be quickly resolved. For example, it would become a mere triviality that zombies are possible. To avoid this consequence and fit the data rather better, (PR) needs to be supplemented by 'connecting axioms' (Lewis, 1986, 155) telling us which supervenient facts hold at which PR-worlds. These connecting axioms will be strict conditionals, but for Modal Theory, what is important is not the strict conditional but the consequences of the form 'if <>p then <>q', where p is entailed by the existence of a PR-world and q is some supervenient fact. Which is to say, either (PR) fails to fit the data, or it needs to be supplemented with some further Principles of Modal Theory.

We have no general proof that a single-criterion theory which fits the data well can be constructed, but it should be clear that the burden of proof is on the one who proposes just a single criterion. Those of us who allow multiple criteria will always have a better fit to the data because we can take any proposed single criterion and add a further criterion to improve the fit. But that might be thought to be a cost in terms of simplicity which needs to be weighed in the balance.

It is worth pausing for a moment to consider the dialectical position with respect to those partisans of desert landscapes who think that who think that a poor fit with the data of modal intuition is not a cost to Modal Theory but rather a benefit, for possibility is intrinsically suspect and should only be allowed in the most limited of cases.[14] From the point of view of Methodological Separatism, what is going on here is that a weak Modal Theory – 'weak' in the sense of not doing a good job of theorizing the data – is being preferred over much stronger alternatives on the basis of consistency with *independent* metaphysical views. While that is a perfectly legitimate move to make, we mustn't lose sight of the fact that it is a significant cost has been incurred when we are scorekeeping in the metaphysical game.

So far, we have drawn attention to the fact that many modal theorists seem to assume that Modal Theory is single-criterion, and we then argued inconclusively in favour of a multiple-criteria modal theory. We now consider one alleged advantage of a single-criterion theory, namely, that it does a better job of capturing our intuitions about necessity since we can infer impossibility from the failure of that single-criterion. The obvious way for multiple-criterion theories to capture intuitions about necessity is to write them in as separate Principles, but that really does look *ad hoc*

[14] Oppy (this volume) seems to be an example of this attitude since he is happy to discard all intuitions that there are possibilities with different histories in return for reducing all possibility to objective chance

compared to the single-criterion approach. Another response would be to deny that Modal Theory must in fact capture a set of intuitions about necessity as well as about possibility. We explore this response by considering cases. The best candidates for intuitions about necessity are intuitions about essence. For example, how should Modal Theory capture the various principles of the necessity of origin, such as that I must have had the parents I did or that this table must have been made from the wood it was made from? These appear to have the form:

(NO) (x) (Ox -> []Ox)

Are these Principles of Modal Theory reached by systematizing our modal intuitions? Many philosophers assert that they are (e.g. Ballarin 2011, n. 2). However, on the face of it, we have a contrary intuition. Consider this table, made from the oak which blew down in the Great Storm of '87. The intuition is widely shared that it could turn out that this table here was not in fact made from that oak, that the carpenter had made a mistake and used the wrong wood. Surely then this is the intuition that it is possible that this very table had a different origin?

The defender of the necessity of origin will claim that the possibility just described in which we discover the table had a different origin from the one we believed it had is distinct from the possibility that it has a different origin from the one it actually has. Is it a modal intuition, a pre-philosophical datum that Modal Theory must try to fit, that this is not possible, that *given the table was made from that tree* it could not have been made from another? Kripke tells us that it 'seems so' to him but also that 'in many cases you won't become convinced of this, at least not at the moment' (Kripke 1980, 113), suggesting that it takes some reflection to share the intuition. Can reflection which doesn't appeal to philosophical theories persuade us? Here is how that reflection might go (drawing on Kripke 1980, 114 n. 56): it is possible that as well as this table, made from the oak which fell in the storm of '87, there is another very similar table made at roughly the same time from a different oak, perhaps one felled deliberately in the week before the storm. Since there are two tables in this possibility, the latter is obviously not identical to the former. But then there is a third possibility in which the former is not made but the latter is. It would still not be identical with our original table, and since the choice of alternative origin was arbitrary, this shows that any possible table with a different origin is not identical with the table made from the oak which fell in the Great Storm of '87.

Kripke himself tells us that this argument rests on the necessity of distinctness, but as decades of attempts to reconstruct the argument have shown, it must rest upon more than just that. A different line of reflection is offered by Dummett (1973, 130-1), who suggests that the necessity of origin follows from the thought that an essential property of an object is one which, at every time during its existence, it cannot 'cease to have'. Clearly, the circumstances of something's coming into existence fulfil this condition. But, apart form the fact that this makes way too much essential (McGinn 1976, 130), this only establishes the necessity of origin if it is not possible for one thing to have different essential properties – on this definition of essence – in different possible worlds. And clearly the world in which the table was made from a different tree is an apparent counter-example to that claim. So no progress is made.

Perhaps we don't need an argument here at all, perhaps there is a modal intuition about naming which will rule out the possibility that this table could have had a different origin? In the last paragraph we took care not to name the table, but

Kripke's discussion, and all that follow it, always introduce a name for the original table. So let us call the table actually made from the wood of the oak that fell during the Great Storm of '87 'Tabby' and make clear that this is a genuine singular term and not an abbreviated description. Now, consider the possible world in which no table is made from that tree but a very similar table is made from another tree. Is that table Tabby? One way of addressing that question is to ask about the name, that is, does the name 'Tabby', as we use it, refer to that table in that possible world? (Of course, the people in that world may have their own name for the table and that may also be 'Tabby', but it is our name we are asking about.)

This question about naming could surely only receive an intuitive answer if semantic competence with the name involved grasping some principles of the form: [] (x) (Fx -> 'T' refers to x). Now Kripke of all people is not going to appeal to semantic intuitions about naming of that form. It seems instead that what is driving Kripke's intuition is that there are constraints upon which possible objects a given actual name can refer to, that these constraints are not part of the intension or connotation or sense of the name, but rather they must derive from some contingent causal connection between the name and the object. Thus, since our name 'Tabby' only refers to a particular table in virtue of that table's causal relations, for it to refer to a possible table, that possible table must have the right position in the causal order to be the referent of our name. It could then be argued (not easily, but one can see how the argument might proceed by ruling out alternatives) that only having the same origin as Tabby is sufficient to make it the case that the name 'Tabby' refers to that object.[15] If this is what underlies Kripke's conviction that a table with a different origin would not be '*this table'* (1980, 113; emphasis in the original), that is, would not be Tabby, then we can see that far from the necessity of origin being a modal datum, the modal intuition that Tabby could have been made from a different tree is over-ruled by the *theoretical* requirement that there be a determinate fact as to whether our name 'Tabby' refers to a given merely possible table or not.[16]

The necessity of identity may have greater claim to be a modal intuition. However, when we examine this debate more closely, this is again not so obvious. For it seems that both sides agree that we have the intuition that the lump of bronze 'is' the statue and that it might not have been the statue (had it not been poured into the mold). Proponents of contingent identity claim that these intuitions are about the identity and thus their view conserves the data, whereas proponents of the necessity of identity claim that these intuitions are not about the identity of the bronze and the statue but some other relation such as constitution. So again we have a situation in which the intuitive data apparently conflicts with the essentialist claim and has to be re-interpreted. But when re-interpreted it does not support essentialism, merely fails to conflict with it. The support for essentialism comes from a process of reflection which, typically, appeals to the necessity of self-identity and Leibniz's Law applied to modalized open sentences. However, this process of reflection is not one which produces general, let alone universal, agreement, so does not look to be a good candidate for a modal intuition. Perhaps the necessity of self-identity will have to be an axiomatic Principle of Modal Theory, but that is hardly a great cost to simplicity. However, we might think that if, among the multiple modal Principles, there is to be

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[15] This is a metalinguistic version of Salmon's (1981, 206) premise (V).

[16] Some may think that there is an intuition that it is determinate whether our name refers to any *actual* object or not. This might become a requirement that it be equally determinate whether it refers to any possible object or not via the necessity of identity. But it is not clear that the necessity of identity is a modal intuition either.

one introducing necessities, it is most likely to be a version of the Rule of Necessitation: if p is known *a priori*[17] then []p. This would explain the necessity of self-identity (we know the self-identity of each thing *a priori*) and analytic or conceptual truths such as 'All vixens are foxes' and 'Nothing is red and green all over at the same time'. And of course, within a multiple-criterion Modal Theory, accepting this Principle does not rule out a posteriori necessities.

The objection was that we always have a reason to prefer a single-criterion Modal Theory because it directly entails intuitions of necessity whereas a multiple-criterion theory will have to capture those intuitions by adding *ad hoc* Principles. But we have seen that the alleged intuitions of necessity are either no such thing or can be captured by the single Principle 'if it p is known *a priori*, then []p'.

So we have seen that single-criterion theories will always have trouble providing an adequate fit to the data and that there is no such problem with multiple-criterion theories. Of course, there is always a trade between simplicity and fit, but we are left with no reason to think that only a single-criterion theory can find the appropriate balance. Thus the widespread, unargued assumption that an adequate Modal Theory will be single-criterion is unjustified.

Burdens of proof and metaphysical nihilism again

If a multiple-criterion Modal Theory consists of a collection of Principles of the form 'if p then <>q' (and the Principle 'if p is known *a priori* then []p'), then our knowledge of the range of possibilities becomes, in a sense, open ended. For in order to establish ~<>p, one would either have to know ~p *a priori* (and we are right to think that the scope of genuine *a priori* knowledge is probably quite narrow) or to know that some specific set of Principles are *all* the Principles of Modal Theory and deduce ~<>p from the failure of this complete Modal Theory to entail <>p. However, once we accept the need for a multiplicity of criteria of possibility, it seems epistemically risky to make the assumption that one's Modal theory is complete, since there is always the chance that some first-order axiom has been missed. Thus, for a given possibility not entailed by the (first-order) axioms, it is usually an epistemically open question as to whether that possibility is a genuine possibility or not.

Now, if the extent of possibility is open ended in this way, Hume's Razor, as formulated by Peter Forrest (2001; cf. Efird and Stoneham 2005),

(HR) Do not multiply necessities beyond necessity.

then follows. For in positing a necessary truth, the philosopher is taking a risk, since for all they know, they have missed out an axiom of their corresponding Modal Theory which entails the possibility ruled out by the necessity they posited. Similarly, what might be termed 'Leibniz's Principle of the Presumption of Possibility':[18]

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[17] Being a priori is analogous to being a theorem because a theorem rests on no assumptions and what is known a priori depends upon no evidence. Note that it is important that p be *known* a priori: a priori warrants are defeasible, so we may have a priori warrant for some beliefs without knowing them (e.g. Flockemann 2011) and even without their being true.

[18] Leibniz (1703-5/1982, 438) writes,

> And it is already something that by this remark it is proved that given that God is possible, he exists, which is the privilege of Divinity alone. One has the right to presume the possibility of every Being, and above all that of God, until someone proves the contrary. So that this

(LP) One has the right to assume <>p until someone proves the contrary.

is also a good regulative principle in philosophy, since proving impossibility requires proving one has not over-looked some Principle which generates possibilities, and that is harder than proving the acceptability of some proposed Principle. In general, where theoretical certainty is lacking, pragmatic considerations can come in to judgement-making.

John Heil (this volume, 5), following C. B. Martin (2008, 65) disagrees. He formulates the following principle:

(C) It is no good *assuming* that *p* is contingent in cases in which *p*'s being contingent functions as a substantive premise in an argument.

And comments, 'Where *p* is a substantive thesis that serves as a premise, the claim that *p* is contingent and the claim that *p* is not contingent are on all fours' (this volume, 6). In a footnote to this remark, he (this volume, 6 n. 5) writes,

> Roy Sorensen has reminded me that Martin's principle itself includes a substantive commitment to 'modal fallibilism'. The principle assumes that modal truths have mind-independent truthmakers concerning which we could be wrong. I do not know how to discuss the issue at hand—the why-is-there-anything question—without making this assumption.

Now, it is ironic that Martin's and Heil's position is dependent upon a form of modal fallibilism since it is also a form of modal fallibilism that is motivating our position, a position which supports the regulative (LP). For on our modal fallibilism, since we could have missed out one of the axioms of Modal Theory (of the form 'if p then <>q'), it is safest to assume that those we do have are not all that there are, and so possibilities are, in general, never ruled out but rather ruled in; consequently, it is then safest to presume a putative possibility genuinely possible unless we have positive reason to rule it out, which is just (LP).

Finally, it seems that not only does a multiple-criteria modal theory consisting of axioms of the form 'if p then <>q' support not only Hume's Razor and Leibniz's Principle of the Presumption of Possibility, two popular and deeply held methodological principles, it also seems to leave open the epistemic possibility of impossible worlds. For, the modalized Principle of Non-contradiction

(NC) ¬<>(p & ¬p)

is not one of the axioms of modal theory, since it is not of the form 'if p then <>q'.[19] It is then an open question whether it could be rational to assert the possibility of a contradiction.[20]

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metaphysical argument already yields a moral demonstrative conclusion, which implies in the present state of our knowledge we ought to judge that God exists, and act accordingly.

[19] It might be a theorem if ~(p & ~p) is known a priori. But the dialethist takes the Liar and related paradoxes to cast doubt on precisely that.

[20] One way of resolving this question is by considering the philosophical theory of propositional attitudes. Hintikka (1975, 475) puts the following claim forward:

This way of understanding the theory of possibility fits very well with a framework introduced by Nathan Salmon (1989). Salmon distinguishes *ways for the things to be* from *ways things might have been* (1989, 11), calling the former 'generic worlds' and the latter 'possible worlds'. Now the possible worlds are clearly a subset of the generic worlds, though they may not be a proper subset. Salmon is primarily concerned to argue against the S4 axiom []p -> [][]p on the basis of examples where it is impossible that a given table *T* might have been made out of a certain block of wood *w*, even though it is possibly possible that it might. Thus, the world in which *T* is made from *w* is impossible relative to the actual world but possible relative to some other world. In order for this to make sense, we need a notion of worlds, the generic worlds, which is independent of the question of whether any given world is possible or not. And once we have this in place, we can allow that 'Some ways for things to be are not even possibly possibly … possible, for any degree of nesting. […] As far as I can tell, worlds need not even be logically consistent.' (1989, 7-8).

There is no need for us to take a view here on which generic worlds, if any, may not be possible worlds. However, we should accept the metaphysically neutral translation schemata:

If (p v ~p) then there is a generic world at which p;
If <>p then there is a possible world at which p.

Rather, the distinction between generic and possible worlds allows us to understand the role of Modal Theory in the debate about whether there might have been nothing. For what a Modal Theory does is say of a generic world, whatever that might be, that it is a possible world, of a way for things to be that it is a way things might have been. Now, there being nothing concrete is a way for things to be (*pace* Rundle): the empty world is a generic world. What an argument for metaphysical nihilism has to do is to give a principle of Modal Theory on which that way for things to be is a way they might have been. The Subtraction Argument as we reconstruct it (2005a) does precisely this by formulating and justifying the principle of subtractability. Similarly, we noted (2008) that one plausible formulation of the Principle of Recombination also entails that the empty world is possible. Thus, there are two candidate reasons to accept metaphysical nihilism, and we can endorse both.

All this goes to show that the burden of proof in the debate lies with one who denies that the empty world is a possible world. They must either offer an argument that regarding it as possible conflicts with some other piece of metaphysics (e.g. Lowe (this volume)) and opt to reject the best Modal Theory in favour of one which doesn't have the plausible principles which entail metaphysical nihilism, or they must offer an alternative Modal Theory and argue that it is a better theory of our modal intuitions.

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(1) A sentence of the form '*a* knows that *p*' is true in a world *W* iff *p* is true in all epistemic *a*-alternatives to *W*, i.e., in all the epistemically possible worlds which are compatible with everything *a* knows in *W*.

Now, this claim is not, strictly speaking, a part of Modal Theory, in the sense of the theorization of the pre-philosophical modal data. However, it does generate possibilities: if *a* does not know that *p*, then there is an epistemically possible world in which *p* is false. Furthermore, with some plausible assumptions, as Hintikka notes, it generates logically impossible worlds.

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