IV

CONTINGENT OBJECTS AND COINCIDENT OBJECTS

7. Relativized Metaphysical Modality*

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INTRODUCTION

Metaphysical necessity and possibility are commonly supposed to be necessity and possibility in the broadest, not merely syntactically logical, sense. Hence it is that metaphysical modality is often contrasted with other, restricted forms of modality, as when Burgess (2009) says:

[W]e may distinguish the species of *physical* necessity, or what could not have been otherwise so long as the laws of nature remained the same, from *metaphysical* necessity, what could not have been otherwise no matter what. (46)

In quantificational terms, the supposition is that a single domain of possible worlds enters into metaphysical modal evaluation; a claim is metaphysically necessary just in case it is true in every possible world in the domain, and metaphysically possible just in case it is true in some possible world in the domain. We argue here that the standard understanding is strictly incorrect; rather, whether a given claim is metaphysically necessary or possible depends on which world is, as we put it, 'indicatively actual'. In brief: metaphysical necessities and possibilities are relativized to indicative actualities. The proper understanding of metaphysical modality thus takes modal space to have a complex, relativized structure. The sense in which the standard view is correct concerns its coinciding with metaphysical modality when relativized to our very own indicatively actual world; the sense in which the standard view is incorrect concerns its failing to be sensitive to the more complex relativized structure of metaphysical modality.

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We motivate the alternative proposal by attention to discussions in Salmon (1989) and Fine (2005). In each discussion, the author canvasses data which he takes to support a certain thesis—in Salmon's case, that the transitivity of the accessibility relation between possible worlds, and associated systems of modal logic S4 and S5, should be rejected as characteristic of metaphysical modality; in Fine's case, that nomological and metaphysical modality should be taken to be distinct and equally basic (as per "modal pluralism"). We argue that the data in each case can be accommodated, compatible with transitive accessibility and with modal monism, if metaphysical necessities and possibilities are relativized to indicative actualities; and we offer two ways of implementing the relativized conception within a possible-worlds semantics for metaphysical modal logic. We also note, for heuristic purposes, a formal analogy between the relativized conception and a thoroughly metaphysical interpretation of the 'secondary' or 'horizontal' intensions associated with the two-dimensional semantic framework, which intensions may be seen as representing what is counterfactually possible relative to each indicatively actual world. We close by observing the neutrality of our conception as regards the actualist/possibilist and trans-world identity/counterpart theory distinctions.[1]

1 SALMON'S 'WOODY' CASE

1.1 *Possible Worlds Semantics and Transitive Accessibility*

It is intuitively natural and historically familiar (following Leibniz 1686) to characterize modal claims in quantificational terms, where the evaluation of such claims reflects the spectrum of truths across a given range of possible worlds. Such a characterization is formally vindicated in possible worlds semantics for modal logics (Kripke 1963). A modal logic extends the usual propositional (or predicate; here we follow Salmon in focusing on the simpler case) logics by introducing symbols '$\Box$' and '$\Diamond$', along with certain

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[1] Our project here bears some similarity to but is in key respects different from projects of the sort at issue in Crossley and Humberstone (1977) and Davies and Humberstone (1979), in which the standard modal logic(s) are supplemented with an actuality operator ('A') and associated modal operators ('fixedly', 'fixedly actually'). In the earlier paper, the motivation for an actuality operator is that scope interactions between quantifiers and standard modal operators fail to allow expression of claims like 'It is possible that everything that is in fact red is shiny', and the additional modal

rules or axioms supposed to govern expressions containing these symbols on any of a wide range of interpretations, which include the necessitation rule (if *p* is a theorem of the logic, infer $\Box p$), and the distribution axiom (K) ($\Box(p \to q) \to (\Box p \to \Box q)$).[2] Creating a model for such a logic then involves two steps. The first step involves specifying a frame: a set *W* of possible worlds, along with a relation *R* between worlds; the desired features of the relation are encoded in certain axioms, to be discussed shortly. The second step involves specifying a valuation function *v* setting up the basic non-modal facts in each world; truth clauses for expressions prefaced with one or other modal symbol are then added to the usual truth clauses in such a way that the truth of all basic and non-basic claims in the model is determined. The relevant modal clause (also determining, given that necessity and possibility are duals, the clause for claims involving the possibility operator) is then schematically as follows:

$v(\Box p, w) = T$ iff for every world w' in W such that wRw', $v(p, w') = T$.

operators are briefly introduced in order to respond to concerns about the validity of axioms of the form $A\alpha \to \Box\, A\alpha$ on the semantics offered for 'A', that '"actually *a*" need not have been true because another world might have been actual' (1979, 2); in the later paper, these new modal operators are applied in service of accommodating putative cases of the contingent a priori and necessary a posteriori, with the assistance of certain theses about names and natural kind terms. Our motivations and target applications are different. We aim to show that certain puzzles, having to do with natures or essences as opposed to scope or semantics (or epistemology), ultimately arise from a failure of standard metaphysical modal logics to incorporate relativization to indicatively actual worlds, and to argue that proper incorporation of a relativized structure makes for better resolutions of these puzzles than those currently on offer. Our suggested ways of making sense of such relativization within a possible worlds semantics for modal logic do not involve any additional operators, and though in the course of explicating our view we heuristically appeal to properly metaphysical interpretations of the notions, familiar from 2-D semantics, of considering worlds 'as actual' or 'as counterfactual', unlike Davies and Humberstone we are officially neutral on both the semantics and epistemology of names and natural kind terms. These differences aside, in arguing that the traditional modal operators should be relativized to indicatively actual worlds we are on the same side as these other authors; our contribution here is, first, to offer distinctively metaphysical reasons for incorporating such relativization, and second, to show that this can be done in ways minimally departing from standard modal logic(s).

[2] More precisely, modal logics that include the distribution axiom ($\Box(p \to q) \to (\Box p \to \Box q)$) are known as *normal* modal logics. We assume in what follows that the modal logics under discussion are normal.

As above, different systems of modal logic impose different constraints on the relation R at issue, which are encoded, either explicitly or indirectly, in certain axioms. Typically, the relation R is understood as an 'accessibility' relation; in the case of metaphysical modality, the features of this relation are intended to ensure—again reflecting the standard understanding of metaphysical necessity as necessity in the broadest sense—that the facts holding at any and all possible worlds are relevant to metaphysical modal deliberation. Such an accessibility relation is standardly supposed to be reflexive, such that any world is accessible to '(can "see")' itself; this requirement is encoded in axiom (T):

(T): $\Box p \rightarrow p$ (for any necessarily true proposition p, the proposition that p is true).

The resulting system (i.e., the system imposing no further constraints on R) is system T. The accessibility relation is also standardly supposed to be transitive, which requirement is satisfied by adding axiom (4) to system T:

(4): $\Box p \rightarrow \Box\Box p$ (for any necessarily true proposition p, the proposition that p is necessarily true is itself necessarily true).

The resulting system is system S4. Finally, the accessibility relation is standardly supposed to be symmetric, which requirement is satisfied by adding axiom (5) to system T:

(5): $\Diamond p \rightarrow \Box\Diamond p$ (for any possibly true proposition p, the proposition that p is possibly true is itself necessarily true).

The resulting system is system S5. Since in S5 the accessibility relation R is also reflexive and transitive, R in S5 is an equivalence relation. It is commonly assumed that S5 is the correct logic for metaphysical modality (see Sider 2010).[3]

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[3] This assumption reflects, in part, that the theorems of S5 coincide with those on a modal logic where the accessibility relation is 'total', such that (as per the standard conception) every world is accessible to every other. To prefigure a bit: one way of implementing our transitive relativized conception of metaphysical modality takes advantage of the fact that, notwithstanding the coincidence of theorems, S5 is compatible with modal space being partitioned into non-overlapping equivalence classes (see S2.2).

1.2 Salmon's Rejection of Transitive Accessibility

Salmon (1981, 1984, and 1989) argues (following Chandler 1976) that this is a mistake: axiom (4) has false instances, and so S4 and the stronger system S5 are fallacious logics of metaphysical modality. Salmon takes this result to follow from consideration of a case where a table ('Woody') could have originated from matter m' slightly different from the matter m it actually originated from, but could not have originated from some matter m'' very different from its actual originating matter:[4]

Wherever one may choose to draw the line between what matter Woody might have originated from and what matter Woody could not have originated from, it would seem that […] we may select some […] matter m'' such that, although Woody could not have originated from m'', m'' is close enough to being a possibility for Woody that if Woody had originated from certain matter m' that is in fact possible for Woody—matter differing in as many molecules from the actual original matter m as possible, and sharing as many molecules with m'' as possible, while remaining a possibility for Woody—then it would have been possible for Woody to have originated from m'', even though it is not actually possible. [As such] the conditional claim (which is an axiom of S4) that if Woody necessarily does not originate from m'', then it is necessary that Woody necessarily does not so originate fails. […] S4 modal logic is fallacious. (1989, 5)

Somewhat more formally, Salmon's argument is as follows:

1. Woody originates from matter m.
2. It is possible that Woody originates from matter m'.
3. It is not possible that Woody originates from matter m''.
4. If Woody had originated from matter m', then it would have been possible for Woody to originate from matter m''.
5. It is possible that it is possible that Woody originates from matter m''. (2, 4)
6. It is not possible that Woody originates from m'', but it is possible that it is possible that Woody originates from matter m''. (3, 5)
7. It is necessary that Woody does not originate from matter m'', but it is not necessary that it is necessary that Woody does not originate from matter m''. (6)

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[4] For simplicity we have altered the indexing on the hunks of matter at issue, and will later do so for associated worlds.

The last claim expresses that a certain claim is necessary, but not necessarily necessary, contra axiom (4). Salmon thus concludes that neither S4 nor S5 is the correct logic for metaphysical modality.[5]

We find the data that Salmon canvasses in the Woody case to be intuitively compelling. But do the data really establish, as Salmon maintains, that axiom (4) should be rejected as a general constraint on metaphysical modality?

1.3 The Woody Data, Specified

In fact, the data do not clearly establish this. As we now show, one of the premises of Salmon's argument is under-specified, and the argument must be reformulated accordingly. This discussion serves two purposes. First and most importantly, it makes explicit that accommodating the data of the Woody case requires that metaphysical possibilities and necessities be relativized to indicative actualities; as we will see, this is a claim with which Salmon arguably agrees. Second, the discussion reveals two objections to Salmon's argument for the rejection of transitivity; these objections will make room for our preferred treatment of the data, and an associated 'S4-friendly' relativized conception of metaphysical modality.

(Before continuing, a small caveat. We present our concern with Salmon's argument in terms of premise 4's having two 'readings'; but by this we do not mean to imply that this premise or any of its constituting bits of language are ambiguous (perhaps the premise is not ambiguous, but its assessment is sensitive to certain presuppositions— namely, concerning which world is held fixed as indicatively actual). What we are mainly concerned to do is make explicit, via the comparatively coarse-grained means of a difference in truth-value of the two readings of premise 4, the role that relativization to indicatively actual worlds plays in appropriately accommodating the Woody data. Similar remarks will apply to our reformulation of Salmon's argument.)

To start, note that there are two readings of premise 4. The first reading follows premises 2 and 3 in presupposing (or as we'll put it,

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[5] Salmon's discussion focuses on the normal modal logical systems S4 and S5. However, insofar as Salmon's target is the transitivity of the accessibility relation, as characterized by axiom (4), his conclusion plausibly extends to simpler modal logics such as K4, which also include (4). Thanks to Phil Kremer for discussion of this point.

'holding fixed') that Woody actually originates from matter *m*. As a first pass, the first reading of premise 4 might be expressed as follows:

Holding fixed that Woody actually originates from matter *m*: if Woody had originated from matter *m'*, then it would have been possible for Woody to originate from matter *m''*.

The first pass is not yet sufficiently specified, however, since it fails to express the sense in which Woody's actual origins in matter *m* are 'held fixed', notwithstanding that in evaluating the antecedent of the conditional, it is supposed that Woody actually originates in some different matter. What is needed is the distinction between a given state of affairs (or whatever) being *indicatively* vs. its being *counterfactually* actual. To prefigure our heuristic analogy: such a distinction is operative when we allow that, holding fixed that 'water is H_2O' is ('indicatively') true in our very own actual world, 'water is H_2O' would remain true were a world where the watery stuff is XYZ to be ('counterfactually') actual. The first reading of premise 4 should mark this distinction, as follows:

Holding fixed that Woody indicatively actually originates from matter *m*: if Woody had originated from matter *m'*, then it would have been possible for Woody to originate from matter *m''*.

The second reading of premise 4 does not follow premises 2 and 3 in holding fixed that Woody indicatively actually originates from matter *m*. Rather, on this reading the premise is read as presupposing that which world is held fixed as indicatively actual is one where Woody originates from matter *m'*. Making this explicit, we might express premise 4 as follows:

Holding fixed that Woody indicatively actually originates from matter *m'*: if Woody had originated from matter *m'*, then it would have been possible for Woody to originate from matter *m''*.

These two readings of premise 4 are not equivalent, of course. On the first reading, premise 4 is false. Here, that Woody indicatively actually originates from matter *m* is held fixed; hence even if the antecedent of the embedded conditional is counterfactually true (as it might be, as per premise 2) the consequent of this conditional will be false, since (as per premise 3) the fact that Woody ('indicatively actually') originates from matter *m* places constraints on the mate-

rial Woody could have ('counterfactually actually') originated from instead.[6] On the second reading, however, premise 4 is (under the relevant assumptions) true. Here, that Woody indicatively actually originates from matter m is not held fixed; rather, in evaluating the embedded conditional the indicatively (as opposed to merely counterfactually) actual world is taken to be one where Woody originates from matter m'. Whether the conditional is true will then depend on whether Woody's (counterfactually actually) originating from matter m'' is possible given that Woody (indicatively actually) originates from m'. And as Salmon points out, for properly chosen m' and m'', the conditional will indeed be true.

How does the fact that premise 4 has distinct readings, only one of which makes sense of the Woody data, bear on Salmon's argument against axiom (4)? This fact indicates, at a minimum, that the truth-values of modal claims are, somehow or other, sensitive to which world is held fixed as indicatively actual. As such, we need to rewrite Salmon's argument in a way that respects this sensitivity, which we will do by appending subscripts to the modal operators indicating which world is held fixed as indicatively actual when the possibility or necessity at issue is evaluated. (Again, in presenting this reformulation, we do not mean to commit ourselves or Salmon to any particular semantics of the modal operators; we append subscripts to operators here merely to make explicit the need for relativization of modal claims to indicative actualities. Later, we'll offer two ways of accommodating the needed relativization within a possible worlds semantics for modal logic.) So, for example, premise 2 should be rewritten to indicate that the possibility at issue is evaluated given that $w1$ is held fixed as indicatively actual:

2′.　It is possible$_{w1}$ that Woody originates from matter m'.

And premise 4, if it is to be true, should be rewritten to reflect that, given the background suppositions noted above, the possibility at issue is evaluated holding $w2$ fixed as indicatively actual:

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[6] Note that the claim here is not that premise 4 is false because the consequent of the embedded conditional is actually false; the claim is rather that, holding fixed that Woody indicatively actually originates in matter m, the consequent would be false in a world where the antecedent is (counterfactually) true. In other words: the constraints imposed by Woody's indicatively actual origin are in force even in contexts (e.g., $w2$) where Woody counterfactually originates from different matter.

4′. If Woody had originated from matter m', then it would have been possible$_{w2}$ for Woody to originate from matter m''.

Correspondingly, premise 5 should now reflect that the possibilities at issue are evaluated with respect to different indicatively actual worlds:

5′. It is possible$_{w1}$ that it is possible$_{w2}$ that Woody originates from matter m''. (2′, 4′)

Properly specified, then, Salmon's argument is as follows:

1′. Woody originates from matter m.
2′. It is possible$_{w1}$ that Woody originates from matter m'.
3′. It is not possible$_{w1}$ that Woody originates from matter m''.
4′. If Woody had originated from matter m', then it would have been possible$_{w2}$ for Woody to originate from matter m''.
5′. It is possible$_{w1}$ that it is possible$_{w2}$ that Woody originates from matter m''. (2′, 4′)
6′. It is not possible$_{w1}$ that Woody originates from matter m'', but it is possible$_{w1}$ that it is possible$_{w2}$ that Woody originates from matter m''. (3′, 5′)
7′. It is necessary$_{w1}$ that Woody does not originate from matter m'', but it is not necessary$_{w1}$ that it is necessary$_{w2}$ that Woody does not originate from matter m''. (6′)

Note that the last claim is no longer a clear counter-instance to axiom (4). As per the standard assumption that metaphysical modality is modality in the broadest (non-syntactically logical) sense, previous discussions of the axiom have not incorporated the need for relativization to an indicatively actual world. How the axiom should be understood in light of the need for relativization—and in particular, whether it should be understood to apply to modal claims involving iterated or (as we'll put it) '*in situ*' shifts in which world is held fixed as indicatively actual (of the sort occurring in 5′–7′) remains to be seen. This result constitutes our first objection to Salmon's argument that the Woody case motivates the rejection of transitive accessibility: if we appropriately attend to which worlds are held fixed as indicatively actual in this case, no clear violation of axiom (4) results.

More generally, the need to incorporate facts about which world is held fixed as indicatively actual in order to appropriately express the

data indicates that the standard conception of metaphysical modality is strictly incorrect. Hence though we disagree with Salmon's diagnosis and treatment of the Woody case, we agree with him that the data here motivates a revision of the standard conception in the direction of relativization. (The need for relativization is an underappreciated insight of Salmon's discussion, which has been, we speculate, obscured by his rejection of transitivity and endorsement of so-called 'impossible worlds'.) More specifically, a proper understanding of the data concerning Woody indicates that metaphysical modal reasoning and any associated modal logics must be able, first, to make room for different worlds to be indicatively actual; and second, to keep track of which world is held fixed as indicatively actual.

That said—and here we raise our second objection to Salmon's argument against transitive accessibility—we do not think that the best way to implement the needed relativization is to make sense, one way or another, of metaphysical modal reasoning that involves *in situ* shifts in which world is held fixed as indicatively actual, of the sort which explicitly occurs in the disambiguated premise 5' of Salmon's argument. On the contrary, we are inclined to see something *defective* in such claims. To again prefigure, compare (what we will later argue is) the formally analogous epistemic interpretation of the two-dimensional (2D) semantic framework, endorsed by, e.g., Jackson and Chalmers (2001). Epistemic two-dimensionalism distinguishes between 'considering as actual' and 'considering as counterfactual'; it makes room for our being able to 'consider as actual' either a world where water is H_2O, or a world where water is XYZ, and to go on to 'consider as counterfactual' other worlds against the assumption that one or other world has been considered as actual. Yet within this framework there is little motivation to accommodate the following sort of claim:

Considering as actual a world where water is H_2O: considering as actual a world where water is XYZ, then necessarily, water is XYZ.

We similarly do not see any motivation for a revision of metaphysical modal logic or associated semantics on which claims such as Salmon's disambiguated premise 5' are accommodated (indirectly, on Salmon's view, by relaxing constraints on accessibility, or directly, by revising rules of modal logical inference so as to explicitly incorporate, e.g., double indexing). As we see it, such claims illegitimately shift indicatively actual horses in modal mid-stream.

Our view is rather as follows: metaphysical modal claims and associated reasoning need to be appropriately sensitive to which world is held fixed as indicatively actual, primarily in order to *avoid* such illegitimate *in situ* shifts in which world is held fixed as indicatively actual. From this perspective, Salmon's argument against transitive accessibility is problematic not just in that no clear counter-instance to axiom (4) follows from its (properly specified) premises, but also in that the argument, once specified, relies on the ill-formed premise 5'.

In response to our objections, Salmon might maintain that, though no counter-instance of axiom (4) is explicitly entailed by the specified data, the axiom's rejection, and associated acceptance of claims involving *in situ* shifts in which world is held fixed as indicatively actual, are required to accommodate the data concerning Woody. As we'll argue in S2, such maneuvers are unnecessary. First, though, we present Salmon's treatment of the data; this will serve to highlight how our relativized conception of metaphysical modality differs from Salmon's, and to flag certain general concerns with his treatment which our preferred conception avoids.

1.4 Salmon's Intransitive Relativized Conception

Salmon understands possible worlds as maximal abstract ways for goings-on to be, and endorses 'the standard identification of necessity with truth in every possible world and possibility as truth in at least one possible world' (1989, 5). He maintains that these commitments are compatible with the data concerning Woody, if one accepts impossible worlds—'total ways things cannot be'—and allows that a world that is impossible 'relative' to one world may be possible relative to another. So, for example, a world where Woody originates in matter m'' is such a world. That world is not possible relative to the actual world, but it is possible relative to a world in which Woody originates from matter m'. Relative to the actual world, it is merely possibly possible. Salmon suggests that 'other impossible worlds may not be even possibly possible, but only possibly possibly possible, and so on; hence the binary relation between (possible or impossible) worlds of relative possibility—the modal relation of *accessibility*—is not transitive'. (1989, 7).

Beyond the relativization of what is possible and necessary to which world 'obtains', and the rejection of transitive accessibility,

Salmon notes two related ways in which his treatment departs from the standard understanding of metaphysical modality. First, '[i]f worlds include ways things metaphysically cannot be in addition to ways things metaphysically might have been, then the idea that metaphysical necessity corresponds to truth in every world whatsoever is flatly mistaken' (1989, 15). Second, given that '[a] possible world is a total way for things to be that conforms to metaphysical constraints concerning what might have been [...] metaphysical modality is definitely *not* an unrestricted limiting case' (1989, 12–13).

The conception of metaphysical modal space that is in the first instance suggested by Salmon's treatment of the Woody case is of a single space of ('maximal', abstract) worlds, whose status as possible or impossible is relative to whatever world is supposed to obtain,[7] and which are connected by an intransitive accessibility relation. In pictorial terms: the standard conception of metaphysical modal space—the conception that Salmon, and we, reject—has the following structure:
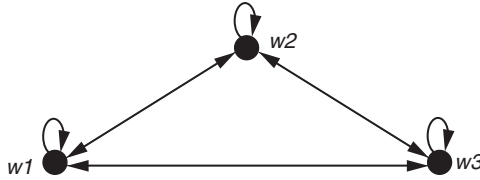

Figure 1. The Standard Conception: Unrelativized Transitive Accessibility.

(Here, and in the figures to follow, arrows point towards worlds accessible to the origin world.) And the conception of metaphysical modal space suggested by Salmon's treatment of the Woody case is as follows:

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[7] We uniformly interpret Salmon's talk of metaphysical possibilities and necessities as relative to which world 'obtains' (in our terms: is indicatively actual), such that, e.g., $w3$ is possible relative to $w2$ when the latter obtains in just the same way that our very own actual world obtains. Though Salmon's emphasis on impossible worlds might be thought to suggest that he sees a substantive difference between whatever world *in fact* obtains and other worlds (e.g., $w2$) that merely hypothetically obtain, Salmon seems to reject such a privileging of our world when disparaging what he calls the 'ostrich approach to modality, with its consequent misconstrual of "necessarily" as meaning actual necessity and "possibly" as meaning actual possibility"' (1989, 29). In any case, a restricted understanding would still have the structure to follow.
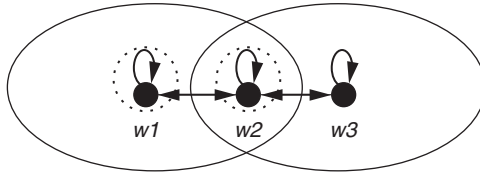
Figure 2. Salmon's Intransitive Relativized Conception.
Relative to *w1*, *w2* is possible, and *w3* is not possible; relative to *w2*, *w3* is possible.

(Here, and in the figures to follow, dotted lines around a world indicate that the world is held fixed as indicatively actual. Solid-line ovals around worlds represent the relativization of accessibility due to shifts in which world is held fixed as indicatively actual.[8]) Again, we emphasize that in our view, Salmon's conception is on the right track, in recognizing the need for metaphysical modal deliberation to be sensitive to which world is supposed to 'obtain' (be indicatively actual). Still, Salmon's approach to a relativized conception is revisionary, in departing from the usual assumption of transitive accessibility and associated systems of modal logic; and many have found the posit of metaphysically impossible worlds problematic (see Lewis 1986, 7, fn. 3 and 246–8).

2 THE TRANSITIVE RELATIVIZED CONCEPTION (RELATIVIZED METAPHYSICAL MODALITY)

Our approach to a relativized conception accommodates the Woody data, compatible with both transitive accessibility and the rejection of impossible worlds. Schematically, our conception is one naturally seen as involving not a single space of mutually accessible worlds (as on the standard conception), nor a single space of intransitively accessible worlds (as on Salmon's conception), but rather multiple spaces, each containing one indicatively actual world, along with whichever worlds are (one might reasonably

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[8] Our purpose here is merely to sufficiently distinguish Salmon's intransitive relativized conception from the standard, transitive conception of metaphysical accessibility (see Figure 1). Plausibly, on Salmon's intransitive conception, had *w2* obtained (in our terminology, been 'indicatively actual') then *w1* as well as *w3* would have been accessible/metaphysically possible from *w2*. In this sense, Figure 2 as it stands represents the relations of accessibility that obtain between worlds *w1*, *w2*, and *w3* in a fairly abbreviated form.

qualify: counterfactually) metaphysically possible relative to that indicatively actual world. In fact, there are two ways of implementing our conception, reflecting two ways of locating the relativization at issue. In presenting these versions and their application to the Woody case, we will speak freely (as we have been doing all along) of possible worlds as located in spaces; depending on one's further commitments, one may or may not understand such talk as metaphorical. Either way, the structural distinctions we aim to identify will be clear enough to get a feel for our proposal(s), and—most importantly—to see that endorsement of either version of the relativized conception is compatible with taking the correct logic of metaphysical modal reasoning to conform to S4 or S5.

2.1 The Overlapping Spaces Interpretation: (Some) Truth Relativized to an Indicatively Actual World

On the first implementation, the spaces of worlds associated with different indicatively actual worlds *overlap*. Here it is assumed that, prior to identification of any world as indicatively actual, there is a single space of (what we will call) 'basically individuated' possible worlds, connected, we assume, by a transitive accessibility relation. The principle of basic individuation of worlds might be primitive; or it might proceed by way of, e.g., 'semantically stable' (Bealer 2000) or 'canonical' (Chalmers 2006) descriptions, or some combinatorial function of basic elements (as per Lewis 1986 or Armstrong 1989). While the individuating principle suffices to distinguish worlds, such individuation, we assume, leaves open the truth values of various claims at a given world. For example, in the pre-relativized space there will be a world, $w3$, containing a table-shaped hunk of matter m''. In $w3$, is it true or false that Woody originates from m''? In the pre-relativized space, there is no answer to this question, nor to many other questions, whose answers depend on which world is (held fixed as: henceforth we take this qualification as understood) indicatively actual.[9] Pictorially, the pre-relativized space of basically individuated worlds is structured according to the standard conception of metaphysical modal space discussed above:

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[9] Hence, on this implementation, worlds are not alethically 'maximal' prior to relativization; accordingly, in the pre-relativized space, $v(p)$ (where p is the proposition that Woody originates in matter m'') is indeterminate.
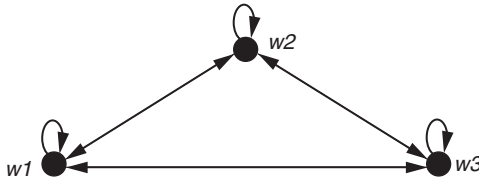
Figure 3. A pre-relativized space of basically individuated worlds.
w1 contains a table-shaped hunk of matter *m*, *w2* contains a table-shaped
hunk of matter *m'*, *w3* contains a table-shaped hunk of matter *m"*

For each world in the pre-relativized space, there is an associated
relativized space, containing the same worlds as in the pre-rela-
tivized space, but with the truth values of at least some previ-
ously undetermined truths—namely, those dependent on which
world is indicatively actual—now determined. In other words, on
the present interpretation (some) *truth* is relative to which world
is indicatively actual. Implementing this interpretation requires
that the valuation function *v* assigning truth values to proposi-
tions be sensitive to which world is indicatively actual, for both
non-modal and modal clauses. We might do this, for a language,
by incorporating such a reference in an additional argument place
in these clauses (as we do below: see Figures 3.1 and 3.2), or we
might keep the usual semantic clauses, and distinguish valuation
functions for each indicatively actual world. Now, when the
worlds in the pre-relativized space are relativized to *w1*, then the
proposition that Woody originates from *m"* is thereby rendered
false in *w3*:

Figure 3.1 The space of basically individuated worlds, relativized to
w1 (*w1* is indicatively actual).
p = the proposition that woody originates from matter m"
v(p, w3, w1) = F

When the worlds in the pre-relativized space are relativized to $w2$, however, the proposition that Woody originates from m'' is thereby rendered *true* in $w3$:
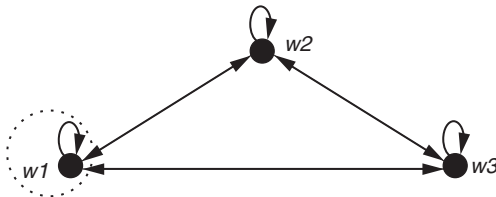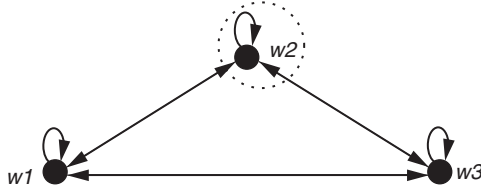

Figure 3.2. The space of basically individuated worlds, relativized to $w2$ ($w2$ is indicatively actual).
p = the proposition that woody originates from matter m''
$v(p, w3, w2) = T$

Crucially, the need for such relativization is no barrier to the standard assumption that modal reasoning proceeds as per S4 or S5; we may continue to assume, as per usual, that the worlds in any post-relativized space are mutually (totally) accessible. In particular, as we'll now show, on our understanding of the data of the Woody case, no violation of axiom (4) is forthcoming.

Again, we start with a pre-relativized space of possible worlds. Let's start by relativizing to $w1$—that is, holding $w1$ fixed as indicatively actual; we want to consider the relevant semantic clauses concerning the proposition p, that Woody originates from matter m''. Given that Woody actually originates from matter m in $w1$, p will be false in $w3$:

$v(p, w3, w1) = F$

(Read: the semantic value of p in $w3$ relative to $w1$'s being indicatively actual is F.) More generally, given that $w1$ is indicatively actual, v will assign F to p in every world in the relativized space. Hence v will assign F to p in every world accessible to $w1$; hence v will assign F to the proposition that p is possible in $w1$; and similarly for $w2$:

$v(\Diamond p, w1, w1) = F$
$v(\Diamond p, w2, w1) = F$

For the same reason, given that $w1$ is indicatively actual, v will assign F to the proposition that p is possible in every world accessible

to *w1*. Consequently, *v* will assign *F* to the proposition that *p* is possibly possible in *w1*:

$$v(\Diamond\Diamond p, w1, w1) = F$$

When *w1* is indicatively actual, no violation of axiom (4) is in the offing. And similarly if we relativize to *w2* (hold *w2* fixed as indicatively actual).[10]

We can now be more explicit about how our characterization of what it is for a proposition *p* to be possible at a world contrasts with Salmon's. Salmon and we agree that propositions such as $\Diamond p$, for *p* as above, are (to speak in purposely rough terms) only relatively true. Salmon takes this to mean that '$\Diamond p$' is true in some worlds but not others. This suggests, on the standard semantics, that some worlds can access a *p* world and others cannot; it follows that not all worlds can access the same worlds, contra S5. The rejection of transitive accessibility is thus built into Salmon's understanding of the rough thought that some modal claims are only relatively true. We, on the other hand, do not take the rough thought to mean that '$\Diamond p$' is true in some worlds and not in others. Rather, we take it to mean that, though '$\Diamond p$' is either true in all worlds or true in none, *which* truth value is assigned to '$\Diamond p$' in all worlds is relative to which world is indicatively actual. (Similarly for the implementation presented in S2.2.) Relative to some indicatively actual worlds, '$\Diamond p$' *is* true in all worlds; relative to other indicatively actual worlds, '$\Diamond p$' is false in all worlds. Either way, transitive accessibility is maintained.

Two questions remain. The first concerns what justifies thinking of worlds in differently relativized spaces as 'the same', such that, e.g., we may speak of *w3* as existing both in a space relativized

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[10] In this case it will rather be true at *w3* that Woody originates from matter *m″*:

$$v(p, w3, w2) = T$$

Furthermore, given that *w2* is indicatively actual (together with the fact that, in *w2*, Woody originates in matter *m′*), *v* will assign *T* to the proposition that *p* is possible in both *w1* and *w2*:

$$v(\Diamond p, w1, w2) = T$$
$$v(\Diamond p, w2, w2) = T$$

Moreover, since *w2* is accessible to *w1*, *v* will assign T to the proposition that *p* is possibly possible in *w1*:

$$v(\Diamond\Diamond p, w1, w2) = T$$

Again, no violation of transitivity results.

to *w1* and in a space relativized to *w2*. A fairly straightforward answer is that worlds in different relativized spaces may be considered to be 'the same' notwithstanding that they differ on the truth values of certain claims (e.g., that Woody originates in matter *m″*) in virtue of being *basically* the same—that is, strictly the same at the level of basic individuation, understood in one or other of the primitive or non-primitive ways mentioned earlier.

The second question concerns what justifies thinking of individuals in differently relativized spaces as in some sense 'the same', so that, e.g., we may speak of Woody as existing both in a space relativized to *w1* and in a space relativized to *w2*. The answer here is less straightforward, and will depend on further details concerning the metaphysics and individuation of material objects. One way to go here, putting things in the formal mode, would be to suppose that expressions denoting material objects (e.g., 'Woody') are relevantly like expressions for natural kinds (e.g., 'water'), in having something like a descriptive or reference-fixing sense, whose association with a referent is dependent upon which world is indicatively actual, and once fixed, is metaphysically necessary (allowing for some counterfactual flexibility). Another way to go, putting things in the material mode, would be to suppose that material objects such as Woody have a sort of 'relativized essence', such that, as a primitive or non-primitive matter, Woody exists and has certain metaphysically necessary features at some relativized worlds, but either fails to exist or has different metaphysically necessary features at others.[11]

2.2 The Non-overlapping Subspaces Interpretation: Domain Relativized to an Indicatively Actual World

On the second implementation of our relativized conception, the spaces of worlds associated with different indicatively actual worlds do not overlap. Rather, the single space of worlds is partitioned into non-overlapping subspaces of finely individuated worlds, each of

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[11] What if some claims concerning Woody—e.g., that Woody is a table—are necessary relative to each indicatively actual world? We may define, if we like, a notion of 'absolute' metaphysical necessity. But given the desirability of avoiding shifts in indicatively actual worlds, we should see the absolute notion as grounded in the relativized notion—as tracking a uniform pattern of variation in what is relatively metaphysically necessary—as opposed to taking 'absolute' metaphysical necessity to be either prior to or distinct from relativized metaphysical necessity.

which is, unlike the basically individuated worlds of the overlapping subspaces implementation, alethically 'complete'; and each subspace corresponds to a space of worlds relativized to a single indicatively actual world (also contained in the subspace). Again, the principle of individuation here may be primitive or otherwise. Within a subspace, worlds are (we may assume) mutually accessible; but worlds are not accessible across subspaces.[12]

On this implementation, it is *domains* that are relativized to indicatively actual worlds. Here, the relativization happens at the level of the frame—that is, in the selection of one subspace of worlds from among the many subspaces. On the standard conception, a frame contains a single set of worlds *W*. On our conception, the frame contains not a set, but a partition, of worlds:
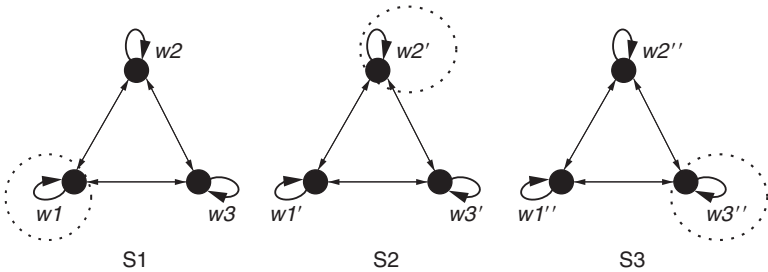

Figure 4. Non-Overlapping Subspaces. In subspace S1, *w1* is indicatively actual; in subspace S2, *w2'* is indicatively actual; in subspaces S3, *w3"* is indicatively actual. Each '*w1*-type' world contains a table-shaped hunk of matter *m*; each '*w2*-type' world contains a table-shaped hunk of matter *m'*; each '*w3*-type' world contains a table-shaped hunk of matter *m"*.
p = the proposition that woody originates from matter m"
$v(p, w3, w1) = F$ $v(p, w3', w2') = T$

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[12] Even though worlds in different subspaces are not identical on this view, worlds in different partitions may be taken to be 'basic' or 'canonical' counterparts of each other, in that (lifting some of the structure of the overlapping spaces interpretation) worlds in different spaces may be basically alike; such similarity may serve as the basis for loose (as opposed to strict) identification of worlds across subspaces. So, for example, distinct subspaces might each contain worlds that are basically, canonically, or qualitatively similar, in containing, e.g., a table-shaped hunk of matter *m"*; such worlds, we might say, are of type *w3*. In a world of type *w3*, is it true or false that Woody originates from *m"*? That depends. In a subspace where the indicatively actual world is (of type) *w1*, this is false; but in a subspace where the indicatively actual world is (of type) *w2*, this is true.

Upon relativization, one of the subspaces in the partition is selected as a basis for subsequent modal and semantic deliberation. So, for example, one might select the subspace in which *w1* is indicatively actual; or one might select the subspace in which *w2* is indicatively actual. Having so chosen, all the usual logical axioms and semantic clauses can remain exactly as per the standard conception. In particular, the valuations of iterated and non-iterated modal clauses involving the proposition *p* in a given post-relativized space will, as in the 'overlapping spaces' interpretation, conform to the assumption of transitive accessibility.[13]

As such, the need for relativization is clearly no barrier to the standard assumption that modal reasoning proceeds as per S4 or S5; we may continue to assume that the worlds in any given subspace are mutually accessible. Indeed, given that the accessibility relation on S5 is an equivalence relation, it is well suited to characterize, not just the mutual accessibility of worlds in a single space, but also the relativized mutual accessibility of worlds partitioned by such an equivalence relation into subspaces.

Summing up: a conception of metaphysical possibilities and necessities as relative to indicative actualities can accommodate the data at issue in the Woody case without incurring the revisionary costs associated with Salmon's treatment of the data.

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[13] Indeed, given the satisfaction of transitive accessibility within a particular subspace (either overlapping or non-overlapping), the evaluation of claims of necessity at a world w in a subspace in which some *distinct* world w' is indicatively actual is straightforward (thanks to Phil Kremer for pressing us on this point). Given transitivity, if some proposition A is necessary at a world w, A is necessarily necessary at w, and hence necessary at every world in the subspace accessible from w; thus, in particular we have:

$$v(\Box A, w, w') = T \textit{ iff } v(\Box A, w', w') = T$$

(A is necessary at w, given that w' is indicatively actual, if and only if A is necessary at the indicatively actual world w' of the subspace). Necessary truth at the indicatively actual world of a subspace can then be given its familiar analysis in terms of truth at all accessible worlds:

$$v(\Box A, w', w') = T \textit{ iff } \forall w[wRw' \rightarrow v(A, w) = T]$$

Combining these results yields the truth-clause for necessary propositions evaluated at worlds accessible from the indicatively actual world of a particular subspace:

$$v(\Box A, w, w') = T \textit{ iff } \forall w[wRw' \rightarrow v(A, w) = T]$$

2.3 Heuristically Situating the Transitive Relativized Conception: A Properly Metaphysical Interpretation of the 2-D Semantic Framework

Our proposal is not as unusual as it might appear, for it may be naturally situated in a thoroughly metaphysical interpretation of the sort of 2-D semantic framework developed by Kaplan (1979, 1989), Stalnaker (1978), and others. Although our interest here is metaphysics, not meaning, we take the formal analogy between our relativized conception of metaphysical modality and (a metaphysical interpretation of) the 2-D framework to be heuristically useful.

The so-called 'epistemic' interpretation of the 2D semantic framework (see, e.g., Chalmers and Jackson 2001, Chalmers 2006), commonly applied to natural kind terms and associated Kripkean necessities (e.g., 'water', 'water is H_2O'), appeals to a distinction between possible worlds, as either *considered as actual* or *considered as counterfactual*. One starts by constructing a 2-D matrix listing worlds potentially considered as actual in the far-left column, and worlds potentially considered as counterfactual along the top row; conventionally, the first world in each list is our very own actual world, and the expression whose meaning is at issue appears in the top left-hand corner. The basic suggestion, then, is that (at least some especially salient) aspects of meaning may be represented by intensions, understood as functions from worlds to extensions. More specifically, the suggestion is that aspects of meaning may be represented by functions taking as arguments two worlds (hence '2-D')—one considered as actual (drawn from the leftmost column), one considered as counterfactual (drawn from the topmost row); different aspects of meaning are then associated with different 2-D intensions.

On the epistemic interpretation, one salient aspect of meaning corresponds to *metaphysical reference*. This aspect is associated with the function which takes our very own world as its first argument, and a world considered as counterfactual as its second argument; this function is sometimes called the 'secondary' or 'horizontal' intension (we'll use the latter terminology, as visually more evocative), and for relevant expressions, is understood to encode (or as we'll loosely say, 'represent') what is *metaphysically necessary*. Consider a portion of the 2-D matrix associated with 'water is H_2O', where an H_2O-world is one where the predominant liquid falling from the sky, found in lakes, etc. (the 'watery stuff', for short) is

H_2O, and an XYZ-world is one where the watery stuff is XYZ; and where it is furthermore assumed that our very own actual world is an H_2O-world:

'water is H_2O'	H_2O-world	XYZ-world
H_2O-world	T	T

The horizontal intension for the expression 'water is H_2O' here reflects, among other relevant facts, that the horizontal intension of 'water' is sensitive to the way the world actually turns out to be, so that, given that the actual world is an H_2O-world, 'water is H_2O' will be true in every world considered as counterfactual. As such, the horizontal intension of 'water is H_2O' returns 'T' for every world considered as counterfactual (if an XYZ-world were to be counter-factually actual, then 'water is H_2O' would have been true, etc.), consonant with Kripke's claim that 'water is H_2O' is metaphysically necessary.

Other modally implicated intensions may be defined within this framework. Chalmers, Jackson and others maintain that terms such as 'water' have an aspect of meaning corresponding to *epistemic sense*, an aspect of meaning supposed to be a priori accessible, in being independent of details about which world is considered as actual, and which is posited as explaining, e.g., intuitions that it might have turned out that water was not H_2O. The associated func-tion is sometimes called the 'primary' or 'diagonal' intension (again, we'll use the latter terminology), and takes as arguments pairs of identical worlds <w, w>. Consider a portion of the 2-D matrix asso-ciated with 'water is the watery stuff':

'water is the watery stuff'	H_2O-world	XYZ-world
H_2O-world	T	
XYZ-world		T

We want to call attention to a third, underappreciated class of inten-sions associated with the 2-D framework, that is required if the matrix is to be appropriately 'filled in'. Note that the diagonal inten-sion, but not the horizontal intension, takes as input worlds other

than our very own actual world 'considered as actual'. We may also define *generalized horizontal intensions*, where a generalized horizontal intension is a function which takes a world considered as actual as its first argument, and a world considered as counterfactual as its second argument; we call such secondary intensions 'generalized' in that the world considered as actual need not be our very own actual world. So, for example, consider the generalized horizontal intension associated with 'water is XYZ', when an XYZ-world is considered as actual:

'water is XYZ'	H_2O-world	XYZ-world
H_2O-world		
XYZ-world	T	T

On the usual epistemic interpretation, such a generalized horizontal intension is taken to represent a merely epistemic necessity: following the usual interpretation of Kripke's results, only the non-generalized horizontal intension, taking as its first argument our very own actual world, is capable of representing what is genuinely metaphysically necessary (or possible).

But as we see it, there is good reason to interpret the necessities represented by generalized horizontal intensions as genuine. After all, the actual world might have turned out to be an XYZ-world, in which case the horizontal intension associated with 'water is XYZ' would have represented a genuine metaphysical necessity. Rather than obscure this fact by treating the represented necessity as epistemic, why not treat all horizontal intensions on a par as representing *genuine relativized metaphysical necessities*—that is, as representing (for relevant expressions) what is metaphysically necessary relative to a given indicatively actual world? Under a properly metaphysical interpretation of the generalized horizontal intensions, the 2-D framework is well suited for such representation; and more generally is structurally analogous to the relativized conception, in encoding what is counterfactually the case, relative to each indicatively actual world.

Let's make the structural analogy explicit. To accommodate the data concerning Woody, we represent two ways in which the counterfactual possibilities for Woody might depend on Woody's actual

origin, one of which holds fixed that Woody indicatively actually originates from matter m, and the other of which holds fixed that Woody indicatively actually originates from matter m'. We do this by letting entries in the leftmost column represent which world is held fixed as indicatively actual; entries along each row then represent what is the case, as regards Woody's origin, in worlds that are counterfactual relative to the associated indicatively actual world (and where an 'm-world' is a world where the salient candidate for being Woody originates in matter m, etc.).

'Woody does not originate from m'''	m-world	m'-world	m''-world
m-world	T	T	T
m'-world	T	T	F

As desired, the structure allows us to represent the dependence of what is metaphysically possible and necessary concerning Woody on which world is indicatively actual.

At this point we want to revisit our earlier (S1.3) observation that attention to the 2-D framework supports thinking that *in situ* shifts in which world is held fixed as indicatively actual, of the sort associated with Salmon's disambiguated 5′, are in some sense defective or ill-formed. As above, one of the salient intensions associated with the 2-D framework is the diagonal intension, which for each world w returns the extension of the relevant expression at w when w is considered as actual, and which on the epistemic interpretation is taken to represent epistemic sense—an aspect of meaning that is supposed to be a priori accessible, in being independent of details about which world is considered as actual, and which allows for representation of certain modal truths, such as 'necessarily, water is the watery stuff'. As an extension of our 'metaphysical' interpretation of generalized horizontal intensions, constant diagonal intensions might be taken to represent genuine facts—namely, those independent of which world is indicatively actual. Such independence, in turn, might be understood in terms of a notion of 'absolute' metaphysical modality, tracking patterns in what is the case, either nonmodally or relatively modally, when different worlds are held fixed as indicatively actual. (See note 11.)

Does the fact that (as attention to the diagonal and generalized horizontal intensions suggests) we can make sense of claims involving shifts in indicatively actual worlds pose a problem for our thinking that some such shifts are illegitimate, from the perspective of metaphysical modal reasoning? No. Certain claims and associated reasoning involving shifts in which world is (considered as) indicatively actual are, on our view, perfectly legitimate—namely, those which are appropriately seen as 'meta-modal', in tracking patterns of what is the case, non-modally or relatively modally, when different worlds are held fixed as indicatively actual. We see nothing defective in claims like the following, tracking patterns in what is non-modally the case across different worlds considered (held fixed) as indicatively actual:

Considering as (indicatively) actual a world where water is H_2O: water is the watery stuff; and considering as (indicatively) actual a world where water is XYZ: water is the watery stuff.

Nor do we see anything defective with claims like the following, tracking patterns in what is modally the case across different worlds considered (held fixed) as indicatively actual:

Considering as (indicatively) actual a world where water is H_2O: it is necessary that water is H_2O; and considering as (indicatively) actual a world where water is XYZ: it is necessary that water is XYZ.

Again, the sort of claims that we maintain are in some sense defective, from the point of view of metaphysical modal reasoning, are those involving iterated or '*in situ*' shifts in which world is indicatively actual, of the sort characteristic of Salmon's disambiguated premise 5', or of the following sort of claim:

Considering as (indicatively) actual a world where water is H_2O: considering as (indicatively) actual a world where water is XYZ, then it is necessary that water is XYZ.

Such *in situ* shifts are not motivated by diagonal intensions, or the associated generalized horizontal intensions, whether these are understood to involve merely epistemic or properly genuine necessities.

Relatedly, we have no deep complaint against claims, e.g., to the effect that some world w^* different from our very own actual world

'could have been' indicatively actual—so long as such claims are interpreted as meta-modal claims, whose evaluation requires looking at the space of worlds or subspaces 'from the outside', as it were.

3 FINE'S 'SCHMASS' CASE

3.1 Fine's Rejection of Modal Monism

In 'The Varieties of Necessity' (2002), Fine notes that there appear to be different ways in which a claim might be said to be necessary or possible, reflecting, e.g., logical, conceptual, mathematical, metaphysical, nomological, or normative necessity or possibility; he then considers whether any of these can be defined in terms of the others, and if so, which are most basic. Fine characterizes metaphysical necessities as necessities which hold in virtue of the natures and identities of the entities at issue, and takes it to be plausible that logical, conceptual, and mathematical necessity may be defined in terms of metaphysical necessity, with the former varieties of necessity being defined as restrictions on the latter. So, for example, the logically necessary claims are those that are, first, metaphysically necessary and second, true in virtue of the nature of logic. Fine does not think, however, that metaphysical necessity is the only basic variety, but rather argues that nomological necessity is also basic, in not being appropriately seen as a restricted form of metaphysical necessity.

The focus of Fine's discussion is the view, typically endorsed by those (Shoemaker 1980, Ellis 2001, and Bird 2007) taking powers or laws to be essential to properties, according to which nomological necessities are metaphysical necessities (as Shoemaker puts it, are 'necessary in the strongest sense'), based in the nature or identity of laws of nature or natural kinds. While Fine is inclined to agree that some nomological necessities (e.g., that electrons are negatively charged) are metaphysically necessary, certain other nomological necessities, he claims, are such that their denials are metaphysically possible.

Suppose, for example, that it is a law of nature that massy entities attract according to an inverse square law. As Fine notes, the neces-

sitarian may plausibly maintain that it is metaphysically necessary that massy entities so attract, reflecting the nature or identity of the property of being massy. Still, Fine continues, there is a nomological necessity in the vicinity that is not metaphysically necessary, to which necessitarians appear to be committed.

He reasons as follows. Among the necessitarian's burdens is to explain away intuitions that massy entities might have entered into different laws—say, an inverse cube rather than an inverse square law. One might maintain that the intuition is merely epistemic—the content is not really 'imaginable'—and there is no genuine possibility corresponding to the intuition of contingency at issue; but given the important role intuitions play in supporting modal claims there is a case to be made that this line is unprincipled. Hence it is that Kripke prefers to treat intuitions of the contingency of certain identities as tracking possibilities that are genuine but misdescribed. Necessitarians about laws also typically implement such a redescription strategy, as in Shoemaker's treatment of intuitions that strychnine might not be fatal to humans:

Let the law be that strychnine in a certain dosage is fatal to human beings. We can grant it to be imaginable that ingesting vast amounts of what passes certain tests for being strychnine should fail to be fatal to what passes certain tests for being a human being, but deny that this amounts to imagining a human being surviving the ingestion of that much strychnine. (1998, 62)

Applying the redescription strategy to the case at hand would allow the necessitarian to maintain that massy entities necessarily attract according to an inverse square law; but on the other hand such an implementation is puzzling, in seeming to undermine the necessitarian's core claim that nomological necessities are metaphysically necessary. As Fine notes, the strategy requires commitment to there being some property—call it 'schmass'—which enters into the redescription of the purported counterexample to the nomological necessity of the inverse square law. Given that schmass enters into the redescribed scenario in this way, however, it follows that a world containing schmass is metaphysically possible. Furthermore, Fine surmises, the proposition that there is no schmass is nomologically necessary, given that mass exists in the actual world and the existence of schmass is nomologically incompatible with it. In that case, there appear to be some nomological necessities—e.g., 'There

is no schmass'—that are not metaphysically necessary. Hence, Fine continues, nomological necessity cannot be seen as a species or restricted form of metaphysical necessity, contra the usual necessitarian line.

To be sure, the necessitarian has certain options for response: they may maintain (as Shoemaker does) that intuitions of the metaphysical possibility of schmass are mistaken; or they may deny that the non-existence of schmass is nomologically necessary, on grounds that the incompatibility of mass and schmass is due, e.g., to nomologically contingent initial conditions. Such responses do not seem fully principled, however. Given that many intuitions of contingency admit of genuine redescription, why not the one concerning schmass? And given that many claims are nomologically necessary as a matter of nature, why not the one concerning the non-existence of schmass?

Indeed, attention to redescriptive strategizing isn't necessary to see that it is problematic to suppose that nomological necessity is a restricted form of metaphysical necessity, when the latter is characterized, as per usual, as involving a single space of mutually accessible possible worlds. After all, necessitarians are typically not modally nomocentric; as Shoemaker says, 'Nothing I have said precludes the possibility of there being worlds in which the causal laws are different from those that prevail in this world.' (1980, 248). Such worlds must involve completely alien properties, but no matter—such alien worlds can serve as witness to the general claim that some nomological necessities are not necessary *tout court*. But how are such alien possibilities *not* precluded, one wonders, if 'nomological necessity is necessity in the strongest sense'? However one interprets the data concerning 'schmass', it remains to make sense of why necessitarians like Shoemaker, on the one hand, subsume nomological under metaphysical necessity; yet on the other, allow that some nomological necessities are not metaphysically necessary.

Fine interprets the data concerning 'schmass' along the following lines. Insofar as some nomological necessities ('There is no schmass') are not metaphysically necessary, it follows that nomological necessity is not a restricted form of, and more generally cannot be defined in terms of, metaphysical necessity. Meanwhile (though this step is implicit in his discussion) other forms of neces-

sity (e.g., conceptual necessity) to which nomological necessity might be reduced *are* plausibly taken to be restricted forms of metaphysical necessity, so that nomological necessity cannot be defined in terms of these other forms of necessity either. Putting the previous results together, Fine concludes that nomological necessity is a basic form of necessity—as basic as metaphysical necessity.

We have three concerns with Fine's proposal. First, the supposition that nomological modality is fundamentally distinct from metaphysical modality fails to sync with the fact that, as Fine grants, it is natural to see many nomological necessities (e.g., that massy entities attract as per an inverse square law) as grounded in the natures and identities of the entities at issue, and hence as metaphysically necessary.[14] Second, if nomological necessities aren't grounded in the natures or identities of the entities at issue, then what are such necessities grounded in? In virtue of what are they true? As it stands, Fine's proposal to take nomological modality as basic is unilluminating. Third, Fine's proposal fails to illuminate how it could be—as necessitarians typically allow—both that nomological necessities are metaphysically necessary and that some nomological impossibilities are metaphysically possible. To be sure, as above, necessitarians haven't explained how this could be, either. But a more satisfying treatment of the data concerning 'schmass' would show how, when properly understood, the necessitarian's seemingly contradictory claims might jointly make sense.

3.2 An Alternative Treatment of the 'Schmass' Case: Relativize Necessities to Indicative Actualities

Taking metaphysical necessities to be relative to indicative actualities makes sense of the data concerning schmass and provides the

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[14] Moreover, *qua* natural property schmass appears to be on a par with mass: it too is a property that, in appropriate circumstances, lawfully influences the motion of entities having the property. Hence considerations rendering it natural to think that necessities involving mass are grounded in its nature and identity would seem equally to motivate thinking that necessities involving schmass would be grounded in *its* nature and identity.

basis for a consistent necessitarianism, while avoiding concerns associated with taking nomological necessity to be a basic form of necessity. (Either implementation of the relativized conception will do for purposes of treating the 'schmass' case.)

According to the relativized conception, what is nomologically possible or necessary is, like what is metaphysically possible or necessary, relative to which world is indicatively actual. Since different worlds may be indicatively actual, the necessitarian can avoid being nomocentric. The necessitarian may rather suppose that relative to the world which is in fact actual (that is, our very own world), it is nomologically necessary that there is no schmass; but allow that relative to another indicatively actual world, it might rather be nomologically possible that there is schmass. If we are operating with the domain-relative version of the relativized conception, for example, then on the necessitarian's view, there may be multiple subspaces of possible worlds, associated with different laws of nature. Moreover, the relativized conception can accommodate the core necessitarian claim that the laws are metaphysically necessary: here it will be supposed that the laws of nature operative at each indicatively actual world impose constraints on the laws at all the other worlds in the associated subspace—namely, that these laws be the same as (or relevantly similar to) the laws operative at the indicatively actual world.

Relativized metaphysical modality thus has the resources to reconcile the basic necessitarian claim that what is nomologically necessary is metaphysically necessary with Fine's observation (with which Shoemaker agrees) that it is metaphysically possible that there be worlds governed by entirely different laws: the first claim may be accommodated by supposing that, relative to a given indicatively actual world, every nomological necessity is metaphysically necessary; while the second claim (like the data concerning schmass) may be accommodated by supposing that indicatively actual worlds may differ with respect to what is metaphysically, hence nomologically, necessary.

Here again the real culprit giving rise to the seemingly problematic nature of the data is the insensitivity of the standard conception of metaphysical modality to the need for relativization to indicatively actual worlds. Insofar as (a live interpretation of) the

data concerning schmass indicates that some nomological impossibilities are metaphysically possible, there is no way, on the standard conception, to reconcile the data concerning schmass with the necessitarian view that nomological necessity is a species of metaphysical necessity. However, on the supposition that metaphysical modalities are relative to indicative actualities, this relativization may be interpreted in necessitarian-friendly fashion as indicating that relative to an indicatively actual world, every nomologically necessary claim is metaphysically necessary. As with the Woody case, the key moral of the schmass case, in the first instance, is that appropriately accommodating the data requires that metaphysical modal space have a relativized structure.

More generally, to return to Fine's deeper concern, this structure illustrates how nomological necessity might be, in an appropriately relativized sense, a restricted form of metaphysical necessity. Every nomological necessity is a metaphysical necessity, relative to some indicatively actual world. As such, on the relativized conception nomological necessity need not be seen as a basic form of necessity, but rather may be seen, in a fashion desirably unified with the other non-metaphysical forms of necessity, as ultimately grounded in the natures or identities of the entities at issue in nomological claims.

4 THE BROAD NEUTRALITY OF RELATIVIZED METAPHYSICAL MODALITY

In closing, we want to briefly flag the broad neutrality of relativized metaphysical modality with respect to the actualist/possibilist and transworld identity/counterpart theory distinctions and associated debates. We can't do full justice to the options here, but will try to illustrate the flexibility of the relativized conception, and note a couple of choice points, by attention to how the conception might accommodate certain standard positions in these debates.

4.1 The Actualist/Possibilist Debate

Actualists subscribe to the thesis that everything that exists is actual. Possibilists disagree. According to the possibilist, in addition to the actual world and actual individuals, there exist other, merely possible worlds and individuals. Relativized metaphysical modality is broadly neutral with respect to this debate: actualists and possibilists alike can in principle help themselves to either the overlapping spaces or non-overlapping subspaces implementations of the view. We say 'in principle', though, since depending on how a given version of actualism or possibilism is spelled out, one or other implementation of a relativized conception might be thought a better fit.

On a standard actualist treatment, possible worlds are identified with some sort of actually existing abstract entity—a complex property (Stalnaker 1976), a complex state of affairs (Plantinga 1976), or a set of propositions (Adams 1974); the actual world is distinguished from merely possible worlds as being the world that is instantiated, obtains, or is such that the constituent propositions are true, respectively. Can abstractionist actualists endorse worlds of the sort entering into either implementation of the relativized conception? First, note that abstractionist actualists typically assume that possible worlds are 'maximal', which assumption might be thought to fit better with the non-overlapping subspace implementation, on which worlds, both pre- and post-relativization, are maximally characterized; on the overlapping spaces implementation, worlds are incomplete prior to relativization, hence (in abstractionist terms) represent only the 'canonical' or basic truths (e.g., as a non-maximal set of propositions or complex property). Still, on either implementation worlds post-relativization will be maximal; and since there is no in-principle problem with abstract entities' being non-maximal, it seems the abstractionist actualist can go either way.

The question remains: does the actualist supposition that everything that exists is actual make good sense in a context where different worlds can be indicatively actual? Again, we see no conflict here. On one reading, the concern is that the relativized conception can't make sense of the intuition, sometimes seen as supporting the actualist view, that the actual world is somehow 'special' as compared to other merely possible worlds. As above, for the abstrac-

tionist actualist, the special nature of the actual world is reflected in one of the worlds being instantiated or obtaining; as such, that some other world might instead be indicatively actual is no more problematic than that some other properties than those that are actually instantiated might instead be instantiated. In any case, one needn't insist that making sense, e.g., of the Woody data requires that *w2* 'really' (somehow or other) be instantiated; if no worlds besides our very own actual world can be so lucky, then one may rather understand the relativized conception as tracking a certain complexity in our hypothetical deliberations (as involving consideration of not just counterfactually actual, but also hypothetically indicatively actual, goings-on). On another reading, the concern is that relativization to a world different from our very own actual world would introduce a non-actualist domain. But the relativized conception, while making room for worlds relevant to modal deliberation to involve non-actual individuals, does not require any such thing. Here the action is in the further details of what worlds the modal theorist thinks exist; given that the actualist constructs merely possible worlds from actualia, as per the abstractionist and other standard 'domain-inclusion' versions of actualism, then the relativization to such a world as indicatively actual will not introduce a non-actualist domain.

Indeed, it is worth pointing out that either implementation of relativized metaphysical modality is broadly consistent with versions of actualism according to which possible worlds and individuals do not exist at all, but merely could exist, as on the 'non-domain-inclusion' actualism recently developed in Bennett (2005). For example, holding fixed our own world as indicatively actual, the non-domain-inclusion actualist may consistently hold both that everything that exists is actual and that each of the other possible worlds in the post-relativized space does not exist, but merely could exist, as a matter of fact not grounded in any existing entity.

The relativized conception can also accommodate standard accounts of possibilism. Broadly conceived, possibilism allows, contra the actualist view, that possible worlds and their occupants may not actually exist. So broadly characterized, possibilism is compatible with either implementation of a relativized conception; indeed, one standard way to make out the view is as extending the

sort of abstractionist actualist account to allow that some abstracta corresponding to possible worlds may advert to alien individuals or properties (see Menzel 2008). Here again the usual supposition of the maximality of worlds may be accommodated, post-relativization, on either implementation; and either implementation may accommodate the status of worlds as constructed from possibilist-friendly resources.

On a more specific, and more notorious, approach to possibilism, this view is combined with the thesis that possible worlds and their occupants are in some sense 'concrete' (see Lewis 1986, Bricker 2008). Supposing, as in Lewis (1986) and McDaniel (2004), that concrete worlds are determinate with respect to all matters of particular fact, the non-abstractionist possibilist will find the overlapping subspaces implementation unappealing, in requiring a pre-relativized space of worlds individuated at the level of canonical or semantically stable descriptions which leave out, as above, many (perhaps most) truths of matters of particular fact. Possibilists who take on this additional (but by no means mandatory) metaphysical constraint on the nature of possible worlds will then presumably find the non-overlapping spaces implementation more amenable.

4.2 The Transworld Identity/Counterpart Debate

A similarly broad neutrality applies to the issues of transworld identification and representation *de re*. Does a given individual ever literally exist at more than one possible world, in the sense defended in Kripke (1972), Plantinga (1973), and van Inwagen (1985)? Or do worlds represent that something is possible or necessary, for an individual *i*, in virtue of containing a numerically distinct counterpart of *i* which resembles *i* in certain (typically contextually determined) respects? Relativized metaphysical modality does not force a choice here: each implementation of this view is consistent with either literal transworld identity across worlds or its denial in favor of some counterpart-theoretic means of *de re* representation.

Paradigmatic of accounts that reject transworld identity is Lewis's treatment according to which representation of an individual in modal claims involves not (necessarily) that individual itself, but rather the individual's counterparts at various possible worlds,

where the notion of a counterpart is defined in terms of overall (see Lewis 1968) or context-dependent (see Lewis 1971) similarity. So, for example, given that Woody actually originates from matter *m* in world *w1*, what it would be for a possible world *w2* to represent that Woody originates from some different matter *m'* would be for Woody to have a counterpart in *w2* that originates from *m'*. In the same vein are accounts on which representation *de re* is based in sameness of maximally specific qualitative roles (see McMichael 1983). Here, for distinct worlds *w1* and *w2* to represent *de re* facts concerning Woody is for a certain qualitative role to be exemplified at both *w1* and *w2* (exemplification of the role will presumably make appropriate room for the flexibility of Woody's origins). This proposal, like Lewis's, is typically offered against a background where individuals are strictly speaking world-bound. The relativized conception, in either version, has no trouble accommodating the failure of individuals in different worlds to be strictly identical; even on the first implementation of the conception, talk of overlapping worlds might be understood as involving type rather than token identity of basically individuated worlds. To be sure, if the modal facts are context-dependent in the way that counterpart theory supposes, then this will introduce another degree, so to speak, of relativization: rather than the metaphysical modal facts being relative just to which world is indicatively actual, such facts will also be relative to which counterpart relation is in place. In any case, nothing in either version of the relativized conception rules out incorporating further contextual aspects, in line with counterpart theory.

On the other hand, one might rather treat *de re* representation in terms of literal transworld identity. Here again there are options. One might suppose (following Kripke) that in considering what is possible or necessary for a given individual, one may stipulate that it is *that very individual* that one has in mind—notwithstanding, of course, that we cannot stipulate (assuming the falsity of modal conventionalism) what is modally the case with the individual in question. Alternatively, one might suppose that Woody's existence across various possible worlds is grounded in the exemplification of a haecceity (roughly, the property of being identical to Woody), as in Plantinga (1974). Or, as per Spencer (2006), one might endorse an intermediate position and treat representation *de re* in

terms of counterpart relations that are restricted so as to model the formal properties of the identity relation (i.e., symmetry and transitivity). Each of these options is formally compatible with either implementation of relativized metaphysical modality, as developed so far. This conception simply leaves open such further details concerning how and why *de re* representation is to proceed.

That each implementation of relativized metaphysical modality is compatible with either transworld identity or counterpart theory leads to a final moral of the Woody case; namely, that debates over the viability of transworld identity are largely orthogonal to debates over essentialism and the sorts of flexibility in material origins brought out by the data in that case.[15] This orthogonality is liable to be overlooked, given Salmon's own treatment of the data in terms of literal transworld identity, and Lewis's subsequent (1986) reply and critique, couched entirely in the language of counterpart theory. The choice presented by the Woody case is not, as the Salmon–Lewis debate suggests, between a view on which transworld identity is retained by accepting intransitive accessibility (along with the 'impossible' worlds that gave Lewis such pain), and a view on which transitive accessibility between worlds is retained by accepting counterpart theory between individuals. Indeed, on relativized metaphysical modality, the Woody case can be closed while leaving all these options open.

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REFERENCES

Armstrong, D.M., 1989. *A Combinatorial Theory of Possibility*. Cambridge: Cambridge University Press.
Bealer, George, 2000. 'A Theory of the A Priori'. *Pacific Philosophical Quarterly* 81 (1):1–30.
Bennett, Karen, 2005. 'Two Axes of Actualism'. *Philosophical Review* 114(3):297–326.
Bird, Alexander, 2007. *Nature's Metaphysics: Laws and Properties*. Oxford: Oxford University Press.

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[15] Thanks to Laurie Paul for calling this advantage to our attention.

Bricker, Phillip, 2008. 'Concrete Possible Worlds'. In *Contemporary Debates in Metaphysics*, J. Hawthorne, T. Sider, and D. Zimmerman (eds.). Oxford: Blackwell Publishers.

Burgess, John P., 2009. *Philosophical Logic*. Princeton: Princeton University Press.

Chalmers, David J., 2006. 'The Foundations of Two-dimensional Semantics'. In *Two-Dimensional Semantics: Foundations and Applications*, Manuel Garcia-Carpintero and Josep Macia, (eds.). Oxford University Press.

Chalmers, David and Jackson, Frank, 2001. 'Conceptual Analysis and Reductive Explanation'. *Philosophical Review* 110: 315–60.

Chandler, Hugh, 1976. 'Plantinga and the Contingently Possible'. *Analysis*, 36:106–109.

Davies, Martin and Humberstone, Lloyd, 1980. 'Two Notions of Necessity'. *Philosophical Studies*. 38:1–31.

Ellis, Brian, 2001. *Scientific Essentialism*. Cambridge: Cambridge University Press.

Fine, Kit, 2005. 'The Varieties of Necessity'. In *Modality and Tense*. Oxford University Press.

Kaplan, David 1979. 'On the Logic of Demonstratives'. *Journal of Philosophical Logic*. 8.

——1989. 'Demonstratives'. In *Themes from Kaplan*, Almog, J., Perry, J., Wettstein, H., and Kaplan, D. (eds.). Oxford: Oxford University Press. 481–564.

Kripke, Saul, 1963. 'Semantical Considerations on Modal Logic'. *Acta Philosophica Fennica*, 16:83–94.

—— 1972. *Naming and Necessity*. Cambridge MA: Harvard University Press.

Leibniz, Gottfried, 1686. *Discourse on Metaphysics and the Monadology.* Drier Publications.

Lewis, David, 1968. 'Counterpart Theory and Quantified Modal Logic'. *Journal of Philosophy* 65:113–126.

——1971. 'Counterparts of Persons and their Bodies'. *Journal of Philosophy*. 68:203–11.

——1986. *On the Plurality of Worlds*. London: Blackwell.

McDaniel, Kris, 2004. 'Modal Realism with Overlap'. *Australasian Journal of Philosophy* 82(1): 137–52.

McMichael, Alan, 1983. 'A Problem for Actualism about Possible Worlds'. *Philosophical Review*, 92(1): 49–66.

Menzel, Christopher, 2008. 'Actualism'. *Stanford Encyclopedia of Philosophy*, Edward N. Zalta (ed.), http://plato.stanford.edu/entries/actualism.

Plantinga, Alvin, 1973. 'Transworld Identity or Worldbound Individuals?'. In *Logic and Ontology*, Milton Munitz (ed.). New York: New York University Press.

Plantinga, Alvin, 1976. 'Actualism and Possible Worlds'. *Theoria* (42): 139–160.

Salmon, Nathan, 1981. *Reference and Essence*. Princeton: Princeton University Press.

——1984. 'Impossible Worlds'. *Analysis*, 44:114–17.

——1989. 'The Logic of What Might Have Been'. *Philosophical Review*, 98:3–34.

Shoemaker, Sydney, 1980. 'Causality and Properties'. In *Time and Cause*, Peter van Inwagen, (ed.). 109–35. Dordrecht: D. Reidel.

Sider, Theodore, 2010. *Logic for Philosophy*. Oxford: Oxford University Press.

Spencer, Cara, 2006. 'Keeping Track of Objects in Conversation'. In *Two-Dimensional Semantics: Foundations and Applications*, Manuel Garcia-Carpintero and Josep Macia, (eds.). Oxford: Oxford University Press.

Stalnaker, Robert, 1976. 'Possible Worlds'. *Noûs* 10 (1): 65–75.

——2008. 'Assertion'. In *Formal Semantics: The Essential Readings*, P. Portner and B. H. Partee, (eds.). Blackwell Publishers.

van Inwagen, Peter, 1985. 'Plantinga on Trans-world Identity'. In *Alvin Plantinga*, van Inwagen and Tomberlin, (eds.). Dordrecht Publishers, 101–120.