

## ***Relativized metaphysical modality***

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The doctrine of *relativized metaphysical modality* (RMM), as introduced by [Murray and Wilson \(2012\)](#), claims that ‘whether a given claim is metaphysically necessary or possible depends on which world is [] ‘indicatively actual’ ’ (189). The appeal to *indicative actuality*, a notion contrasting with *counterfactual actuality*, reflects a complexity in the ‘perspective’ adopted in modal deliberation: it involves thinking *about* a ‘target’ world  $w'$ , *within* (or *as from* within) a ‘source’ world  $w$  (195). This enables questions to be entertained both in the ‘indicative’ and in the ‘subjunctive’ (or ‘counterfactual’) mood: we ask (indicatively) how things *are*, if the source world  $w$  is actual; and we ask (counterfactually) how things *would be* if the target world  $w'$  *had been* actual. It is in this sense that the source world is (treated as) ‘indicatively actual’, the target world (treated as) ‘counterfactually actual’.

Noting a structural affinity to the ‘two-dimensional’ apparatus ([Murray and Wilson 2012](#), 190n1: compare [Seegerberg 1973](#)), but resisting the traditional ‘epistemic’ interpretation of that apparatus ([Murray and Wilson 2012](#), sec. 2.3: contrast [Stalnaker 1978](#), [Chalmers 2005](#)), Murray and Wilson instead exploit this perspectival complexity to address a long-standing dilemma in the theory of metaphysical modality. An attractive ‘S5’ entailment-structure for modals predicts that all modal facts hold noncontingently; and yet, reflection on *Chisholm’s Paradox* ([Murray and Wilson 2012](#), sec. 1: contra [Chandler 1976](#) and [Salmon 1981, 1989](#); see [Chisholm 1967](#)) and *nomological necessitarianism* ([Murray and Wilson 2012](#), sec. 3.1: contra [Fine 2005b](#); see [Shoemaker 1980](#)) suggests that some modal facts are contingent. But modal facts, including facts about the contingency-status of modal facts, concern how things are across *target* worlds, having fixed a *source* world; and the data are best interpreted as involving *variation* in the source world: while that can *change* the modal facts, it cannot *constitute* them ([Murray and Wilson 2012](#), secs. 2, 3.2). Accordingly, the S5 structure is preserved: what the data show is not that the modal facts are contingent, but that they are perspective-dependent.

More recently, [Murray \(2017\)](#) embeds RMM within the ‘Context–Index’ (CI) framework of [Lewis 1980](#): in broad relief, this offers a sharp delineation of semantics from pragmatics, which is then used to depict the RMM strategy as an extensive shift of traditional explanatory burdens across that line, as regards phenomena of modality. More specifically, Murray, first, interprets Murray and Wilson’s indicative-actuality–counterfactual-actuality contrast as an instance of Lewis’s *context–index* contrast; second, tethers Murray and Wilson’s distinction between perspective-dependence and contingency to Lewis’s doctrine of the *unbindability of context* ([Lewis 1980](#), 31: compare Kaplan’s ban on ‘monsters’: [Kaplan 1977](#), VIII); third, defends the general desirability of ‘classical’ semantic theories on which index-binding operators are given easy jobs ([Carnap 1946](#),

1947/1956), in contrast with such ‘rich-index’ apparatus as the *accessibility relation* (Meredith and Prior 1956/1996), *world-relative domains* (Kripke 1963), and the *counterpart function* (Lewis 1968); and fourth, extends the empirical coverage of Murray and Wilson’s RMM strategy to encompass the ‘broadly modal’ interaction of modals with quantifiers, defending the ‘Barcan Formulae’ (compare Williamson 1998, 2013).

This chapter has three sections. In the first, we sketch out an RMM-based rebuttal to the Chisholm-Paradoxical objection to views that attempt to combine limited flexibility of essence with the strongest, simplest ‘S5’ logic of modals: perhaps something *could* have been a little different from how it actually is but *couldn’t* have been a lot different; but little differences add up to a lot of difference; so by a chain of little differences, each possible in view of its predecessor, we eventually reach an allegedly impossible lot of difference—so, contra S5, some impossible situation is possibly possible. On RMM, however, ‘possibility in view of a possibility’ is not automatically *possibility*, in any reasonable sense—avoiding the threat to S5.

The key claim here is that ‘possibility in view of a possibility’ is not *possibility*: the second section probes it in some detail. We sketch the rudiments of the Lewis CI framework to anchor the substance of the claim; and to make explicit its posited relationships among meaning, truth, and linguistic content. These provide the basis of our case against ‘Absolutist’ (non-Relativist) treatments of ‘possibility in view of a possibility’, the *Generalized Humphrey Problem*. Kripke (1972/1980, 45n13), famously, complains against Lewis’s counterpart theory about its predicted divergence between what it takes for ‘Humphrey won the election’ to be possible (namely, that there is some world where ‘Humphrey won the election’ is true: to wit, where *Humphrey* won the election) and what it takes for ‘Humphrey could have won the election’ to be true (namely, that there is some world where Humphrey’s *counterpart* won the election). Generalizing, we defend an equivalence between the *truth* of ‘necessarily,  $\varphi$ ’ and the *necessity* of ‘ $\varphi$ ’, which we then show (using CI-framework resources) to be satisfiable only by analyses that are in a certain sense ‘Classical’—in particular, sub-S5 logics are ruled out.

In the third section, we expand on several issues. First, the apparatus of the second section allows for added specificity in our treatment of Chisholm’s Paradox. Second, we discuss a puzzle concerning the modal status of laws of nature: our treatment here is similar in respects but also different in respects from our treatment of Chisholm’s Paradox. Third, the discussion of the Generalized Humphrey Problem reveals *two* directions of divergence from the ‘Classical’, of which one undermines S5: another, exemplified in ‘contingent-domains’ analyses, undermines the ‘Barcan equivalence’ permitting interchange of necessity and universal quantification; the final discussion sketches an RMM-based approach to modal–quantificational interaction which both preserves the Barcanite logical virtues while yet doing justice to the dependence of existence and nonexistence on contingent matters of fact (contrast Williamson 1998, 2013).

# 1 An application: Chisholm's Paradox

We give an introductory sketch of RMM through informal discussion of its application to Chisholm's Paradox: RMM offers a novel resolution, with various congenial features.

## 1.1 Moderately flexible essences

In general terms, Chisholm's Paradox arises for a certain 'principle of essence': a 'metaphysically robust', de re conditional of form *if F(j), then possibly/necessarily G(j)*, relating how a given thing *is* to how it *must* or *could* be. More specifically, the target principle concerns what is essential to a *composite artifact*: of the parts initially composing it, what quantity of those parts *must* have initially composed it? A plausible partial answer is *Not All*: if an artifact *j* is initially composed of a set *S* of parts, then some set *S'* differing from *S* in just one member could have initially composed *j*. Another plausible partial answer, compatible with the first, is *Most*:<sup>1</sup> if *j* is initially composed of *S*, then no set *T* differing mostly from *S* could have initially composed *j*.

Let *Limited Flexibility* be the conjunction of *Not All* and *Most*. To illustrate Limited Flexibility, suppose that a sawhorse is constituted by three parts: left legs, right legs, and beam; suppose that sawhorse parts vary in quality, with some *Good*, others *Junk* (part-quality, suppose, is inessential to sawhorses). Now consider *Horse*, with all Good parts: by *Most*, (A) Horse could not have been mostly Junk; by *Not All*, (B) Horse could have been partly Junk—plausibly so on both fronts, perhaps.

Unfortunately, these consequences collide with prima facie plausible principles about modality. (1) What could have been, is so in some possible world—so, by (B), in some world, Horse is partly Junk: let *w'* be such a world. (2) If, in a world *w*, *j* is *F*; and if it is a true principle of essence that *if F(j), then possibly/necessarily G(j)*; then (so to speak) *from the view of w*, *j* could/must be *G*—so, applying this to *Not All*, *from the view of w'*, Horse could have been mostly Junk. (3) What is so *from the view of* a world, is so *in* that world—so in *w'*, Horse could have been mostly Junk. (4) What is so in some world, could have been—so it could have been that Horse could have been mostly Junk. (5) What 'could have could have been', could have been—so Horse could have been mostly Junk: contradicting (A). This argument will be our operational paradigm of *Chisholm's Paradox*.

Chisholm's Paradox leaves friends of Limited Flexibility with few options. Principles (1) and (4) are just the 'possible worlds analysis of modality'—what could have been is exactly what is so in some possible world—which, in the present context, will not be up for negotiation. Pending further elucidation of *from the view of*, to deny (2) is to reject any reasonable sense in which principles of essence remain stable despite perturbation of contingent circumstances—in tension with the bruited 'metaphysical robustness'. Setting (3) temporarily to the side, the last available move rejects (5): instead, it is maintained, sometimes the impossible could have been possible—and, dually, the necessarily false is sometimes only contingently so, invalidating the '4' schema of

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<sup>1</sup>A weaker answer, *Some*, faces a less efficient but structurally analogous paradox.

the attractive **S5** modal logic ( $\Box\varphi \vdash \Box\Box\varphi$ ). (And taking the view of  $w'$ : @ is possible, so Horsey is possibly all-Good; but  $w''$  is also possible, so Horsey is possibly mostly-Junk, and thus not possibly possibly all-Good—invalidating the ‘5’ schema,  $\Diamond\varphi \vdash \Box\Diamond\varphi$ .)

## 1.2 Sub-S5 metaphysical modality?

Unfortunately, failures of **S5** are not easy to interpret, when *possibility* is understood in the intended sense. There is no general difficulty, of course, in *interpreting* talk of possibly possible impossibilities—having bought Ventnor Avenue, it is no longer possible to buy Boardwalk; still, I *could* have held out on Ventnor, which would have made it possible to buy Boardwalk—but such talk involves ‘domain-restricted’ notions of possibility: we mean that, while among those worlds compatible with what I have done so far, in none do I buy Boardwalk, still other worlds remain in which I do buy it.<sup>2</sup> Unfortunately, what is at issue in Chisholm’s Paradox is not some restricted notion of possibility, but *metaphysical* possibility: possibility in the widest, most unrestricted sense. With all restrictions lifted, all worlds are flushed out in the open, leaving any remaining possibly possible impossibilities nowhere to hide.

The question of how to sweeten the bitter pill was the occasion of a famous debate in the 1980s. According to Salmon (1989, 5), the lesson is that talk of possibility brings in an ‘accessibility relation’ on the space of metaphysically possible worlds. Our basic notion of possibility is not *simpliciter*, but only of possibility *in a world*: what is possible in  $w$  is what is so in some world accessible from  $w$ . When we speak unqualifiedly of possibility, we intend just possibility *in our world*. Regarding Chisholm’s Paradox, this acknowledges our world @, where Horsey is all-Good; world  $w'$ , where Horsey is (just) mostly-Good; and world  $w''$ , where Horsey is (just) mostly-Junk: @ accesses  $w'$ , which accesses  $w''$ , but @ does not access  $w''$ ; accordingly, we may say that while it is impossible that Horsey is mostly Junk, that remains possibly possible—against (5). Unfortunately, Salmon faces Lewis’s (plausible) complaint: ‘by what right do we ignore worlds that are deemed inaccessible? Accessible or not, they’re still worlds. We still believe in them. Why don’t they count?’ (Lewis 1986, 246).

Lewis recommends, instead, that talk of modality *de re* brings in ‘counterpart relations’ between pairs of individuals-at-worlds. Our basic notion of possibility for  $j$  is not *simpliciter*, but only possibility for  *$j$ -in-a-world*: what is possible for  $j$ -in- $w$  is what is so for some counterpart  $j'$ -in- $w'$ . When we speak unqualifiedly of possibility for  $j$ , we intend just possibility for  *$j$ -in-our-world*. Regarding Chisholm’s Paradox, this acknowledges Horsey-in-@, which is all-Good; Horsey'-in- $w'$ , which is (just) mostly-Good; and Horsey''-in- $w''$ , which is (just) mostly-Junk: Horsey-in-@ has as a counterpart Horsey'-in- $w'$ , which has as a counterpart Horsey''-in- $w''$ , but Horsey-in-@ does not have as a counterpart Horsey''-in- $w''$ ; accordingly, we may say that

<sup>2</sup>Indeed, perhaps even this restricted modality does not undermine **S5**: instead, the appearance otherwise relies on an illicit contextual shift, in which the contextually-restricted domain of modal quantification is expanded in mid-argument.

while it is impossible that Horsey is mostly Junk, that remains possibly possible—against (5). Unfortunately, Lewis faces Kripke’s (plausible) complaint: ‘if we say ‘Humphrey might have won the election[.]’, we are not talking about something that might have happened to *Humphrey* but to someone else, a ‘counterpart’. Probably, however, Humphrey could not care less whether someone *else*, no matter how much resembling him, would have been victorious in another possible world’ (Kripke 1972/1980, 45n13).<sup>3</sup>

Resolving Chisholm’s Paradox by rejecting (5) requires dumping **S5** as the logic of metaphysical modality, counterintuitively; and down the line appears to force a choice: either embrace Salmon-style *accessibility theory* and face Lewis’s ‘by what right’ objection, or embrace Lewis-style *counterpart theory* and face Kripke’s ‘Humphrey’ objection.

### 1.3 Relativized metaphysical modality

Accordingly, we recommend revisiting the status of (3)—recall, that what is so *from the view of* a world, is so *in* the world. Relativized Metaphysical Modality, the focus of this chapter, is a strategy for distinguishing these notions.

In highly schematic terms, RMM resolves Chisholm’s Paradox by ‘two-dimensionalizing’: what is so *in* a world is not so *simpliciter*, but only *from the view of* another world. If so, then sometimes what is so *in w*, *from the view of w\** differs from what is so *in w*, *from the view of w\*\**. Concerning Horsey, the relevant facts are these (we reserve detailed treatment for section 3.1). First, *from the view of @*: *in @*, Horsey is all-Good; *in w'*, Horsey is mostly-Good; *in w''*, it is not the case that Horsey is mostly-Junk. Second, *from the view of w'*: *in @*, Horsey is all-Good; *in w'*, Horsey is mostly-Good; *in w''*, Horsey is mostly-Junk. Third, *from the view of w''*: *in @*, it is not the case that Horsey is all-Good; *in w'*, Horsey is mostly-Good; *in w''*, Horsey is mostly-Junk.

What this amounts to is the following. When we, in @, speak strictly and literally, the truths we speak are the truths *from the view of @*; when folks off in *w'* speak strictly and literally, the truths they speak are those *from the view of w'*; and so on. However, we are not restricted to strict and literal speech: we can instead *impute* a ‘modal perspective’ that is ‘distal’, different from our own, rather than ‘proximal’—we can speak with the pretense of inhabiting not @, but *w'*, or any other world. Imputing a distal perspective within *w'*, then within the pretense, the truths we speak are those *from the view of w'*.

So, speaking strictly and literally, I speak truly when I say this: *in @*, Horsey is all-Good; *in w'*, Horsey is (just) mostly-Good; *in w''*, it is not the case that Horsey is mostly-Junk. Affirming the connection between possibility and *in*—with (1) and (4)—I also speak truly when I say that Horsey could have been (just) mostly-Good, but could not have been mostly-Junk. I may equally

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<sup>3</sup>This assumes counterparts are nonidentical, a matter we have left open. Generalizing to allow also identity between counterparts yields a nested dilemma. First, is Horsey = Horsey''? If so, then Horsey-in-@ *should* ‘care about’ what happens to Horsey''-in-w''. If not, then is Horsey = Horsey'? If so, then Horsey'-in-w' *should not* ‘care about’ what happens to Horsey''-in-w''; but if not, it is then Horsey-in-@ who should not ‘care about’ what happens to Horsey'-in-w'.

well impute a distal modal perspective, from  $w'$ : when I do, I speak truly (within the pretense) when I say this: *in @*, Horsey is all-Good; *in  $w'$* , Horsey is (just) mostly-Good; *in  $w''$* , Horsey is mostly-Junk. Affirming the connection between possibility and *in*—with (1) and (4)—I also speak truly (within the pretense, imputing  $w'$ ) when I say that Horsey could have been (just) mostly-Good, and could have been (just) mostly-Junk. Because we speak *falsely* when we impute a distal modal perspective like  $w'$ , we need not acknowledge any sense in which a ‘possibility’ solely in view of  $w'$  is a *possibility*: Horsey’s being mostly-Junk is not a ‘possible possibility’, but only an *impossibility* that we can within a certain pretense legitimately *treat* as a possibility.<sup>4</sup> The threat to (5) is dissolved.

## 1.4 Against Absolutism

Of course, this strategy for denying (3) in order to preserve (5) conflicts with *Absolutism*: there is some possibility-modal  $\diamond$  such that whenever, for some  $w$ ,  $\varphi$  is true upon imputing  $w$ , then  $\diamond\varphi$  is true (strictly and literally). After all, Absolutism, together with the truth upon imputing  $w'$  of *Horsey could have been mostly-Junk*, yields the truth of  $\diamond$ (Horsey could have been mostly-Junk)—contrary to (5). Now, Absolutism is not obviously true: pending a case for Absolutism, then, RMM becomes available as a resolution to Chisholm’s Paradox; and yet nor is Absolutism obviously false: because many have learned to live with the woes of rejecting (5), pending a case *against* Absolutism, then, the pull of familiarity may diminish the allure of RMM.

But, presupposing a certain framework of background assumptions about linguistic meaning, Absolutism can be *shown* to be false—namely, the *Context–Index* (CI) framework from [Lewis 1980](#). The CI framework describes a general form for a compositional semantic theory for a language, and explains the bearing of such a theory on the *logic* for the language (the ‘entailment-structure’ among its sentences), and on its *speech-act theory* (the use of its sentences in particular occurrences of speech to encode informational content). At its core is an image of the conventional meaning of a sentence—its *semantic value*—as usually ‘incomplete’: as containing a number of free argument places, and therefore falling short of a truth-value, or even a *proposition* (understood as a determinant of a set of possible worlds). These argument-places accommodate both the context-sensitivity of the propositional content of speech acts and the semantic influence of certain sentential operators, including modals: in each case, through a certain sort of control of those argument-places by certain extralinguistic or linguistic entities (more to follow).

The Absolutist’s operator  $\diamond$ , in the CI framework, must bind an argument-place in its operand. The CI framework divides argument-places into the *contextual* and the *indexical*: the choice presents the Absolutist with this *Context–Index Dilemma*. If  $\diamond$  is a context-binder, it is ‘monstrous’ (in the sense of [Kaplan 1977](#), VIII); and within the CI framework, monstrosity just makes no sense—to be a contextual argument-place is just to be unbindable. On the other horn, if  $\diamond$  is an

<sup>4</sup>The metalanguage equally involves pretense, while preserving the mathematical virtues of extensionality—by contrast with the ‘intensional metalanguage’ approach under attack at [Williamson 1998](#), 264.

index-binder, *and* it conflicts with **S5**, it must be ‘Infraclassical’ (in a sense to be expanded upon); and the CI framework prohibits Infraclassical modals, on pain of violating a certain broadly ‘disquotational’ principle. We call this the *Generalized Humphrey Problem*: in a pleasing confluence, both Kripke’s attack on Lewis and Lewis’s attack on Salmon are aspects of a general difficulty for analyses of modals departing in any way from a certain sort of ‘Classicality’.

The remainder of this chapter fills out details. In the next section, we scrutinize the CI framework more closely, and go into detail on the Context–Index Dilemma; the final section returns to the inner workings of our treatment of Chisholm’s Paradox.

## 2 A dilemma for Absolutists

### 2.1 The Context–Index framework

Consider an artificial language in which the sentence *rains* is invested with meaning roughly like the English sentence ‘it’s raining’: someone who asserts *rains* at a certain time in a certain location does so to convey the information that, then and there, it is raining. To sharpen this idea, the CI framework (as presented in Lewis 1980: for the time being, the referent of bare page or section citations) identifies the information that  $p$  with the *proposition that*  $p$ , or set of possible worlds in which  $p$  (section 10); postulates that an act of assertion determines a *context*  $c$ , identified with a certain ‘centered world’ or triple  $\langle w_c, t_c, \ell_c \rangle$ , where the assertion occurs in world  $w_c$ , at time  $t_c$ , in location  $\ell_c$  (28). Now let  $\llbracket \varphi \rrbracket^c$  abbreviate ‘the (propositional) content of  $\varphi$  relative to  $c$ ’ (or: the *c*-content of  $\varphi$ ). Then  $\llbracket \text{rains} \rrbracket^c$  is the set containing  $w$  just if in  $w$ , at  $t_c$ , it rains in  $\ell_c$ .

The strategy by which the CI framework generates that set is nuanced, however; and, unfortunately, the Context–Index Dilemma involves the details of these nuances, so we will have to be explicit. We motivate, and illustrate, the CI framework with a puzzle about locational operators (compare 39–40, 42, 43). Suppose our language contains operators *everywhere* and *here*, with English-like meanings, and a biconditional  $\equiv$ . It is desirable that *here(rains)* and *rains* should be ‘equivalent’—should ‘entail’ one another—at least in the sense that whenever one endorses (implicitly accepts) either, one endorses the other. Similarly, the biconditional  $(\equiv-1)$   $\text{rains} \equiv \text{here(rains)}$  should be ‘valid’—universally endorsed—and of course the same goes for  $(\equiv-2)$   $\text{rains} \equiv \text{rains}$ . Analyzing entailment as the ‘preservation’ of truth, and validity as ‘guaranteed’ truth, it follows that ‘whenever’ either *rains* or *here(rains)* is true, so is the other; and that each of  $(\equiv-1)$  and  $(\equiv-2)$  is ‘always’ true.

But now, a contrast: while universally quantifying  $(\equiv-2)$ , to get  $(\forall-2)$   $\text{everywhere(rains} \equiv \text{rains)}$ , preserves the validity of  $(\equiv-2)$ , the validity of  $(\equiv-1)$  is *not* preserved when it is universally quantified:  $(\forall-1)$   $\text{everywhere(rains} \equiv \text{here(rains))}$  is endorsed only by those who think it either rains everywhere or rains nowhere. Substitution of equivalents under quantificational operators does not preserve validity. And if not, the domain quantified over by *everywhere* is distinct from that quantified over by the notions of entailment and validity.

Handling this technically requires distinguishing between contextual and indexical argument-places (section 6). To be specific, let  $\|\xi\|$  abbreviate ‘the semantic value of  $\xi$ ’ (section 4). Treating  $\|\text{everywhere}\|$  in the obvious way as universally quantifying a location-argument in its operand, then, requires a free location-argument in  $\|\text{rains}\|$  (section 5); treating  $\|\text{here}\|$  along similar lines, it too controls the location-argument in its operand, by saturating it in a context  $c$  with  $\ell_c$ , the location of  $c$ . The inequivalence of (V-1) and (V-2) requires the location argument saturated by  $\|\text{here}\|$  to be ‘invisible’ to  $\|\text{everywhere}\|$ : the free locational argument in  $\|\text{here}(\text{rains})\|$  is of the *contextual* variety, but the one in  $\|\text{rains}\|$  is of a distinct *indexical* variety; and it is only indexical location arguments that can be bound by  $\|\text{everywhere}\|$ . (Terminology: *here* protects the location on which its operand acts from wider-scope locational operators by stabilizing, or ‘rigidifying’, that location to  $\ell_c$ , and is therefore labeled a *rigidifier*.) By contrast, the ‘preservation’ or ‘guarantee’ in entailment and validity quantify over *contextual* argument-places: entailment is preservation *across all contexts* of truth-in-context; validity is the guarantee *across all contexts* of truth-in-context. Of course, we now face the question of how ( $\equiv$ -1) and ( $\equiv$ -2) are equivalent—or, indeed, the broader question of how to treat the logical properties of sentences with free *indexical* argument-places.

To zero in on this, let us return to the relation between the *semantic value* of rains,  $\|\text{rains}\|$ , and its *c-content*,  $\llbracket \text{rains} \rrbracket^c$ —recall, the set containing  $w$  just if in  $w$ , at  $t_c$ , it rains in  $\ell_c$ . Arguably, the *c-content* of a sentence  $\varphi$  is determined by the contextual meaning of  $\varphi$  and the context  $c$  (section 2); identifying conventional meaning with semantic value, how do  $\|\varphi\|$  and  $c$  determine  $\llbracket \varphi \rrbracket^c$ ? The semantic value, as observed earlier, is often ‘incomplete’: its free argument-places must be somehow saturated to yield the ‘complete’ *c-content*. First, recall that  $\|\text{here}(\text{rains})\|$  has a free *contextual* argument-place: it is saturated in  $\llbracket \text{here}(\text{rains}) \rrbracket^c$ . Next, as noted,  $\|\text{rains}\|$  has a free locational indexical argument-place; analogous reasoning shows it to contain a free *temporal indexical* argument-place. These are both saturated in  $\llbracket \text{rains} \rrbracket^c$ . Perhaps there are further indexical argument-places, for still other parameters: we need not settle the issue here. Instead, let the *index of the context*  $c$  (34) be the sequence of determinate values, for each indexical parameter, appropriate to the context  $c$ : so, if the only indexical parameters are time and location, the index of  $c$  is the sequence  $\langle t_c, \ell_c \rangle$ . Finally, if we take seriously the image of modals as quantificational adverbials over a domain of possible worlds, the interpretability of  $\Box(\text{rains})$  requires  $\|\text{rains}\|$  to also contain a free *modal* argument-place (27).

Fully saturated, a sentential semantic value determines a *truth-value* (in line with the traditional image of meanings as ‘truth-conditions’)—we notate *Truth* with 1, *Falsity* with  $-1$ . So, as a general matter, moving from the semantic value  $\|\varphi\|$  to the *c-content*  $\llbracket \varphi \rrbracket^c$  requires applying  $\|\varphi\|$  to  $c$  and its index, leaving the world-argument free; the resulting ‘possible-worlds truth-condition’ then serves as a ‘filter’ on worlds, allowing through just the members of  $\llbracket \varphi \rrbracket^c$  (37–8). Or, less picturesquely, and notating the index of  $c$  with  $\vec{x}_c$ , we may identify  $\llbracket \varphi \rrbracket^c$  with  $\{w : \|\varphi\|\langle w, \vec{x}_c, c \rangle = 1\}$ .

We return finally to the notion of truth-in-context. Plausibly, what we want out of validity is security against endorsement of the false; perhaps equivalently, against assertion of the false

(compare 42–3). Presumably what it is for an assertion of a sentence  $\varphi$  in a context  $c$  to be false is for the content asserted to be false, as asserted; namely for  $\llbracket\varphi\rrbracket^c$  to be false, as asserted; namely, for  $\llbracket\varphi\rrbracket^c$  to be false in  $w_c$ ; namely, for  $w_c \notin \llbracket\varphi\rrbracket^c$ . The question remaining on the table was how to soak up free indexical argument-places in assessment of logical properties; having addressed that issue in the theory of speech acts, it need no longer be confronted in the logic.

## 2.2 A context-binder?

We turn now to the Context–Index Dilemma. Its target, recall, is Absolutism, according to which there is some possibility modal  $\diamond$  such that whenever, for some  $w$ ,  $\varphi$  is true upon imputing  $w$ , then  $\diamond\varphi$  is true (strictly and literally). In the CI framework, (nonextensional) operators act on free argument-places in their operanda. As noted, CI-framework argument-places come in two sorts (well, a third is involved in the analysis of quantification—we return to this): the contextual, and the indexical (for present purposes, we include the modal under this). The question for the Absolutist, then, is this: does  $\diamond$  act on a *contextual* argument-place, or on an *indexical* argument-place?

Taking the first horn, suppose  $\diamond$  is supposed to be a context-binder. The problem with this proposal is that, within the CI framework, *this makes no sense* (31: compare [Stalnaker 2014](#), 27–9). After all, ask: what, really, is the difference between an indexical and a contextual argument-place? There is no difference in subject-matter. As we have seen, the determination of the *index of the context*, required for determination of contextual-content, requires the context to determine values for all nonmodal indexical parameters; and the determination of truth-in-context requires the context to determine a world, and therefore a value for the modal parameter. Nor, conversely, is there any in-principle aspect of context immune to the action of indexical operators: perhaps these are limited to time and location, along with world; but perhaps not. Indeed, there could perhaps be a language with sufficient semantic capacity that *any* aspect of context was fair game for action by indexical operators.

Rather, the import of the distinction is that, when the conventional meanings of a language deem a certain argument-place to be contextual, the language thereby protects the argument-place from itself: it decrees it to be off-limits from control by its own operators—walls off semantics, awaiting the contribution of pragmatics. Instead, whenever such an argument-place appears free at any stage of semantic composition, it will remain free at every further stage of semantic composition. Control of such an argument-place is held in reserve past the completion of semantic composition, and is available only to extralinguistic aspects of the context, in the determination of contextual content for a sentence with a fully composed semantic value.

One core hypothesis of RMM is that sometimes, imputing a nonactual world can shift the truth-value of  $\varphi$ ; the other is that this dependency is not a variety of contingency. Instead, we claim, it is due to a free *contextual* argument-place in the semantic value of  $\varphi$ . If so, the Absolutist’s alleged modal operator  $\diamond$  is in no position to control that argument-place; and, we claim, no variety of

dependence deserves the name ‘contingency’ unless it is available for control by a modal operator. Our elucidation of the critical distinction between imputation-dependence and contingency relies on the CI framework. But for those Absolutists who accept the CI framework, it is no longer fair game to complain that we have not fully characterized the distinction; nor that our view can be trivially ‘reparenthesized’ to recover  $\diamond$ : this latter is what is ruled out on the first horn of the dilemma.

## 2.3 An index-binder?

Over on the second horn,  $\diamond$  is supposed to be an index-binder. The challenge here—the Generalized Humphrey Problem—is rather more involved. In very broad terms, it seems important to equate the truth of *possibly*,  $\varphi$  with the possibility of  $\varphi$ ; unfortunately, the conditions for attaining this *Equivalence*— $\diamond\varphi$  ( $\Box\varphi$ ) is true just if  $\varphi$  is possible (necessary)—imposed by the CI framework on semantic values for modals are very stringent—indeed, more stringent than is needed to lock down **S5** as the logic of modality. We argue in two stages: first, briefly, for the importance of the Equivalence; second, at greater length, for what the Equivalence requires of an analysis of modality.

### 2.3.1 The Generalized Humphrey Problem

First. We find it very plausible that a sentence  $\Box\varphi$  should be assessed as true just if  $\varphi$  is assessed as necessary (similarly for  $\diamond$  and sentential possibility): to endorse ‘possibly, goats eat cans’ while withholding assent whether ‘goats eat cans’ is possible—or to maintain the necessity of ‘horses eat hay’ while suspending judgement regarding ‘it is necessary that horses eat hay’—strikes us as a sort of linguistic confusion, on a par with endorsing  $\varphi$  but failing to endorse ‘ $\varphi$  is true; or with maintaining (in serious discourse) ‘in the Holmes stories, Holmes is insane’ while suspending judgement during Holmes-story pretense regarding ‘Holmes is insane’; or with suspending judgement regarding ‘if  $\psi$ ,  $\varphi$ ’ despite affirming ‘ $\varphi$ ’ subject to supposition of ‘ $\psi$ ’. Such ‘generalized disquotation’ is a core part of our understanding of sentential operators; the Equivalence is a straightforward instance of it.

Second. The Equivalence concerns the *truth of*  $\Box\varphi$  and the *necessity of*  $\varphi$ : what do these amount to, in the CI framework? Concerning the truth of  $\Box\varphi$ , a sentence  $\varphi$  is assessed for a truth-value not absolutely, but in a context  $c$ . As an instance of what that amounts to in general,  $\Box\varphi$  is true in  $c$  just if  $w_c \in \llbracket\Box\varphi\rrbracket^c$ . Concerning the necessity of  $\varphi$ : Lewis’s presentation of the CI framework does not contain an explicit characterization of ‘sentential necessity’; still, a congenial analysis is not far afield. By way of an intuitive starting point: plausibly, what it is for a sentence to be necessary is for its propositional content to be necessary. In the CI framework, a sentence does not have a propositional content absolutely, but in a context  $c$ : so we should not speak of  $\varphi$  being necessary simpliciter, but instead of its being necessary-in- $c$ —where that amounts to  $\llbracket\varphi\rrbracket^c$  being necessary. What it is for a *proposition* to be necessary, is for it to be true in all possible worlds;

so  $\varphi$  is necessary-in- $c$  just if  $\llbracket\varphi\rrbracket^c$  is true in all possible worlds. Familiarly, and as noted earlier, what counts as *all* possible worlds may be also contextually variable: perhaps context sometimes restricts the domain of modal quantification. Let  $c$  determine a set of worlds  $W_c$  as its domain of modal quantification (if domains are contextually invariant, this is just some constant function): then  $\varphi$  is necessary in  $c$  just if  $W_c \subseteq \llbracket\varphi\rrbracket^c$ . So the Equivalence requires that  $w_c \in \llbracket\Box\varphi\rrbracket^c$  just if  $W_c \subseteq \llbracket\varphi\rrbracket^c$ .

Now, as we have seen, the conventional meaning of a sentence  $\varphi$  determines as its semantic value a truth-condition  $V$  mapping a world  $w$ , sequence of indexical parametric-values  $\vec{x}$ , and context  $c$  into a truth-value;  $w \in \llbracket\varphi\rrbracket^c$  just if  $V(w, \vec{x}_c, c) = 1$ . Let  $B$  be the semantic value of  $\Box$ . The semantic value of  $\Box\varphi$  is therefore  $B(V)$ , also a truth-condition; and the left side of the Equivalence reduces to (T)  $[B(V)](w_c, \vec{x}_c, c) = 1$ , while the right side reduces to (N)  $(\forall w' \in W_c)(V(w', \vec{x}_c, c) = 1)$ ; the Equivalence, then, reduces to: for all  $c$ , (T) just if (N). The issue at hand is then what this *T–N Equivalence* requires of  $B$ , the semantic value of  $\Box$ .

### 2.3.2 Classical, Supraclassical, Infraclassical

One option for  $B$  on which the T–N Equivalence is preserved is the *Classical* analysis first advanced in Carnap 1946. On this analysis, all  $B$  does is bind into the modal argument-place in its operand in order to universally quantify over the contextual modal domain  $W_c$ : more formally,  $[B(V)](w, \vec{x}, c) = 1$  just if  $(\forall w' \in W_c)(V(w', \vec{x}, c) = 1)$ . After all, then (T) evaluates as  $(\forall w' \in W_c)(V(w', \vec{x}_c, c) = 1)$ —namely, as (N).

Now, the Classical analysis has two distinctive features. First, Classical  $B$  binds a modal argument-place and contains no free modal argument-place of its own, so when  $V$  has a free modal argument-place,  $B(V)$  has at least one fewer free argument-place: we say that  $B$  *decrements* the ‘arity’ (number of free argument-places) of its operand. And second, Classical  $B$  does not bind any argument-place other than the modal argument-place, so if  $V$  contains any free (non-modal) indexical argument-places, they remain free in  $B(V)$ : we say that  $B$  does not *multiply decrement* (the arity of) its operand. Assembling these, when  $B$  is Classical, it *just decrements* its operand; conversely, a *Nonclassical* analysis is one on which  $B$  does not, or does not *just*, decrement its operand.

There are two directions in which an analysis may diverge from Classicality. First, on *Supra-classical* analyses,  $B$  fails to decrement its operand—so while  $B$  binds any free modal argument-place in its operand  $V$ , it also contains an ‘endomodal’ argument-place: a modal argument-place free in  $B$ , such that the sentential semantic value  $B(V)$  contains a free modal argument-place. Second, on *Infraclassical* analyses,  $B$  multiply decrements its operand—some argument-place is ‘exomodal’: an argument-place such that if it occurs free in  $V$ , it is bound in  $B(V)$ , which is nevertheless a (non-modal) indexical argument-place.<sup>5</sup> We will argue that either direction of divergence upsets

<sup>5</sup>The directions are compatible. On some analyses, in  $B(V)$ ,  $B$  both creates an endomodal argument-place and binds a free exomodal argument-place in  $V$ . On such an analysis, the arity of  $B(V)$  *literally* ‘just decrements’ that of  $V$ ; but we think of this not as Classical, but as simultaneously Supra- and Infraclassical. Only pedagogical significance

the T–N Equivalence—Classical modals are therefore in a ‘Goldilocks’, local minimum, position relative to the assumptions of the CI framework—but, recognizing that the level of abstraction is nearing nosebleed levels, we pause to consider some examples.

**Accessibility** To begin. A familiar Supraclassical analysis is *accessibility semantics*, which postulates a contextually-determined function  $A_c$  mapping a world  $w$  to a certain set of worlds  $A_c(w)$ : the ‘ $c$ -accessibility sphere’ of  $w$  (perhaps invariably,  $A_c(w) \subseteq W_c$ , the contextual modal domain).  $B$ , then, creates an endomodal argument-place, and binds into the modal argument-place in its operand in order to universally quantify over the  $c$ -accessibility sphere of *whatever world is the applicandum of the endomodal argument-place*: more formally,  $[B(V)](w, \vec{x}, c) = 1$  just if  $(\forall w' \in A_c(w))(V(w', \vec{x}, c)) = 1$ .

Note the free occurrence of (undecorated) ‘ $w$ ’ on the right side: this is the endomodal argument-place; coindexed with the parametric occurrence on the left side, this means that when  $w^* \neq w^{**}$ , it might potentially be that  $[B(V)](w^*, \vec{x}, c) \neq [B(V)](w^{**}, \vec{x}, c)$ . By way of contrast, the Classical analysis offers no free occurrence of  $w$  on the right side, to coindex with the parametric occurrence on the left side: accordingly, on the classical analysis, invariably  $[B(V)](w^*, \vec{x}, c) = [B(V)](w^{**}, \vec{x}, c)$ .

**Contingent domains** A familiar Infraclassical analysis is *contingent-domain semantics*, which postulates a contextually-determined function mapping a world to a certain set of individuals, the ‘local domain’ of individuals ‘existing in’ that world (see [Williamson 2013](#), chapters 2–4 for extensive historical and formal discussion). To avoid the inevitable clutter attending to predicative languages, we simulate the approach with our locational operators; the operative assumption is that the *spatial extent* of reality is contingent, so that which locations are available for occupation varies from world to world. In detail, we extend our indexical argument-places for time and location with an exomodal *locational domain* argument-place ( $d$ ), representing a set of locations (perhaps invariably a subset of some  $c$ -relevant set of locations  $L_c$ ); and we assume a function  $\delta$  mapping a world  $w$  to a locational domain  $\delta(w)$ . Then the semantic value of **everywhere** is a function  $U$  for which  $[U(V)](w, t, \ell, d, c) = 1$  just if  $(\forall \ell' \in d)(V(w, t, \ell', d, c) = 1)$ ; and  $\square$  receives this Infraclassical semantic value  $B$ :  $[B(V)](w, t, \ell, d, c) = 1$  just if  $(\forall w' \in W_c)(V(w', t, \ell, \delta(w'), c) = 1)$ .

Note the coindexation on the right side of three occurrences of ‘ $w'$ ’: the leftmost of these represents the binding of the other two by the universal quantifier; the central occurrence is structurally just like the bound occurrence in the Classical analysis; but the rightmost occurrence is the argument to the  $\delta$ -function, which in application to  $w'$ , now controls the locational domain argument in  $V$ . Accordingly,  $B$  now Infraclassically controls not just the modal domain argument-place in its operand, but also an exomodal locational domain argument-place. In consequence, for any values  $d^*$  and  $d^{**}$ , invariably  $[B(V)](w, t, \ell, d^*, c) = [B(V)](w, t, \ell, d^{**}, c)$ ; more generally, the value of  $[B(V)](w, t, \ell, d, c)$  is not generally determined by the course of values taken on by 

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 attaches to our talk of ‘counting argument-places’.

$V(w', t, \ell, d, c)$  as  $w'$  is varied, but only by the course of values taken on by  $V(w', t, \ell, d', c)$  as  $w'$  and  $d'$  are *both* varied. By way of contrast, the Classical analysis controls only modal argument-places: accordingly, it is not generally the case that, for classical  $B$ , there is *any* general prohibition against  $[B(V)](w, \dots, x^*, \dots, c) \neq [B(V)](w, \dots, x^{**}, \dots, c)$ ; or, more generally, any influence on  $[B(V)](w, t, \ell, d, c)$  by  $V(w', t, \ell, d, c)$  for arbitrary values of  $w'$ .

**Counterparts** Finally, it would appear that *counterpart semantics* is both Supra- and Infraclassical. ‘Appear’, we say, because there is no standard semantical development of the approach: Lewis never offered one, and only recently has opinion begun to coalesce regarding the proper development—our approach is based on that of [Fara 2008](#). Still, considerable guidance is offered by the well-known slogans of counterpart theory. First, while ‘Humphrey’ actually denotes Humphrey, what ‘Humphrey’ denotes in some other world  $w'$  is that individual  $j^*$  such that, considering the qualities  $Q$  Humphrey actually has, alongside the qualities  $Q(j)$  had by  $j$  in  $w'$ , for every individual  $j$ ,  $Q(j^*)$  stands out uniquely as most comparable to  $Q$ —thereby making  $j^*$  the counterpart-in- $w'$  of Humphrey as he is actually. Prescinding from this detail, the structure is of a ‘counterpart function’  $\kappa$  mapping a *source*-individual (in the example: Humphrey), a *source*-world (actuality), and a *target*-world ( $w'$ ), into a *target*-individual ( $j^*$ ). Second, what this is important for is not the evaluation of ‘categorical’ claims—in evaluating ‘Humphrey lost’, it matters only how *Humphrey* is—but rather the evaluation of *modal* claims: in evaluating ‘possibly, Humphrey won’, the modal takes us off to another possible world, and there we are not required to look at *Humphrey* per se, but instead at Humphrey’s *counterpart* there, in assessing whether that world counts as a witness to the existential quantifier.

Continuing to avoid the clutter attending predicative languages poses a challenge, as counterpart theory is paradigmatically about individuals; fortunately, among the locational adverbials, some are ‘referential’: we have already encountered the rigidifying *here*, and there are also ‘constants’ like *in-Paris*—on a straightforward analysis,  $\|in-Paris(\varphi)\|(w, t, \ell, c) = 1$  just if  $\|\varphi\|(w, t, Paris, c) = 1$ : the semantic value saturates the location argument-place with its operand with a conventionally-determined location, namely *Paris*. Now, how to implement the slogans in a language with a counterpart-theoretic referential locational adverbial—say, *in-Bristol*?<sup>6</sup> We propose to extend the indexical argument-places with an exomodal *counterpart-tracking* argument-place ( $k$ ): candidate saturators of the argument-place are individuals; its exomodality consists in its availability for ‘shifting’ by modals, in accord with the second slogan; the detailed ‘contour’ of this shifting follows the contextually-determined counterpart-function  $\kappa_c$ , in accord with the first slogan; and finally, the action of  $\|in-Bristol\|$ , at a given level of semantic composition, is to saturate the location argument-place of its operand with whatever value  $k$  has taken on, at that stage. More formally:  $\|in-Bristol\|(V)(w, t, \ell, k, c) = 1$  just if  $V(w, t, k, k, c) = 1$ ;  $[B(V)](w, t, \ell, k, c) = 1$  just if  $(\forall w' \in W_c)(V(w', t, \ell, \kappa_c(k, w, w'), c)) = 1$ .

Observe that counterpart-theoretic  $B$  is Supraclassical: the analysis involves an endomodal

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<sup>6</sup>Compare [Lewis 1981](#).

argument-place, marked with the free occurrence of ‘ $w$ ’ in the second argument-position of the  $\kappa_c$ -function. In addition, the analysis has  $B$  applying a functor to the indexical counterpart-tracking argument-place—namely, the value  $k$  provided as a counterpart-tracking argument-value to  $B(V)$  is adjusted to the value  $\kappa_c(k, w, w')$  prior to being handed down to  $V$  as a counterpart-tracking argument-value. This resembles the treatment by the contingent-domain semantics of the locational-domain ( $d$ ) argument-place, in that both analyses have  $B$  acting on a nonmodal argument-place. There is also this contrast: the contingent-domain analysis of  $B$  quantifies over the locational-domain argument-place, thereby screening it off from either the semantic action of higher operators or the ‘postsemantic’ semantic saturation in a context  $c$  by a contextually-established value  $d_c$ ; but the counterpart-theoretic analysis of  $B$  leaves the counterpart-tracking argument-place free, merely applying a functor to it. While this does not lead to *additional* decrementation of the arity of the operand (the  $k$ -place is free both coming in and going out), and does not contribute to scopal interaction between  $\|\Box\|$  and  $\|\text{in-Bristol}\|$  (in contrast with  $\|\text{everywhere}\|$ ), it does (we will see) underlie the view’s susceptibility to the Generalized Humphrey Problem: in that sense, then, the analysis is *Infra*classical.

### 2.3.3 Against Nonclassical modals

As announced, either direction of departure from Classicality undermines the T–N Equivalence. With a more vivid sense of what those departures amount to now on the table, we defend the announcement.

**Supraclassicality: accessibility** Consider first Supraclassicality, where the semantic value of  $\Box$  involves an endomodal argument-place, so that  $B(V)$  contains a free modal argument-place. As observed, potentially:  $(\neq) [B(V)](w^*, \vec{x}, c) \neq [B(V)](w^{**}, \vec{x}, c)$ . Now, in (N), the modal argument-place in  $V$  is bound by the universal quantifier over  $W_c$ ; and suppose (in the simplest case) that  $V$  involves no further dependencies, either indexical or contextual. Then whenever contexts  $c^*$  and  $c^{**}$  share their modal domains ( $W_{c^*} = W_{c^{**}}$ ), (N) holds in  $c^*$  just if it holds also in  $c^{**}$ . So the T–N Equivalence fails unless the same is true of (T)—unless whenever  $c^*$  and  $c^{**}$  share their modal domains,  $[B(V)](w_{c^*}, \vec{x}_{c^*}, c^*) = [B(V)](w_{c^{**}}, \vec{x}_{c^{**}}, c^{**})$ . But, by  $(\neq)$ , for that to be so in general would require contexts sharing their modal domain to share also their world—which would reserve the privilege of speaking with metaphysical necessity to the lucky inhabitants of some unique possible world!

To make this more concrete, let us see how it applies to the accessibility semantics; for vividness, let  $g$  inherit the (context-insensitive, suppose) meaning of ‘goats eat cans’, with contextually-invariant propositional content  $g$ . Then (N) holds of  $g$  in  $c$  just if  $W_c \subseteq g$ , namely just if in every world in  $W_c$ , goats eat cans; and so whenever  $W_{c^*} = W_{c^{**}}$ , (N) has the same status in  $c^*$  and  $c^{**}$ . Now, on the accessibility semantics, (T) holds of  $\Box g$  in  $c$  just if  $A_c(w_c) \subseteq g$ , namely just if in every world in  $A_c(w_c)$ , goats eat cans. Generalizing over all propositions  $p$ , the T–N Equivalence, then, requires that whenever  $W_{c^*} = W_{c^{**}}$ , it is also the case that  $A_{c^*}(w_{c^*}) \subseteq p$  just if  $A_{c^{**}}(w_{c^{**}}) \subseteq p$ . That would

be generally so if for any  $c$ ,  $A_c(w_c) = W_c$ .<sup>7</sup> Perhaps it is a desirable constraint that  $A_c(w_c) \subseteq W_c$ ; but insisting on the reverse inclusion would collapse the accessibility-semantics into the Classical analysis. Unfortunately, insisting on substantial Supraclassicality runs the accessibility theorist headlong into a starker version of Lewis’s complaint against Salmon. Suppose every world in the contextual accessibility sphere is a *goats eat cans*-world, but some  $w'$  outside the sphere but inside the contextual domain is not: though ‘goats eat cans’ is not necessary, the accessibility-theorist maintains ‘necessarily, goats eat cans’ is true, because  $w'$  is ‘inaccessible’—so we may complain ‘by what right do we pronounce  $w'$  impossible, despite not ignoring it: accessible or not, it is still salient to us; why doesn’t it count?’ In our view, the complaint is entirely legitimate, to the detriment of the accessibility-theorist.

**Infraclassicality: contingent domains** Consider next Infraclassicality, where the semantic value of  $\Box$  binds an exomodal argument-place, so that sometimes the value of  $[B(V)](w, \vec{x}, c)$  is underdetermined by the course of values of  $V(w', \vec{x}, c)$  for arbitrary  $w'$ : there are  $V$  and  $V^*$ ,  $\vec{x}$  and  $\vec{x}^*$ , and  $c$  and  $c^*$  such that for every  $w'$ ,  $V(w', \vec{x}, c) = V^*(w', \vec{x}^*, c^*)$ , and yet  $[B(V)](w, \vec{x}, c) \neq [B(V^*)](w, \vec{x}^*, c^*)$ . Suppose that, for some  $V$ ,  $c$ , and  $c^*$ , (N) holds for  $V$  at both  $c$  and  $c^*$ :  $(\forall w' \in W_c)(V(w', \vec{x}_c, c) = 1)$ ; and  $(\forall w' \in W_{c^*})(V(w', \vec{x}_{c^*}, c^*) = 1)$ . By the underdetermination claim, this is compatible with inequality between  $[B(V)](w_c, \vec{x}_c, c)$  and  $[B(V)](w_{c^*}, \vec{x}_{c^*}, c^*)$ —namely, with (T) holding at exactly one of  $c$  and  $c^*$ . So (N) does not entail (T), against the T–N Equivalence. The failure of the converse is illustrated by assuming (N) *not* to hold for  $V$  at either  $c$  or  $c^*$ , and then appealing to underdetermination: the one for which (T) holds is then the counterexample to (T)’s entailment of (N).

To make this more concrete, let us see how it applies to the contingent-domain semantics. We have the semantic value  $\|\text{everywhere}(\text{rains})\|(w, t, \ell, d, c) = 1$  just if  $(\forall \ell' \in d)(\|\text{rains}\|(w, t, \ell', d, c) = 1)$ ; accordingly,  $\llbracket \text{everywhere}(\text{rains}) \rrbracket^c$  contains  $w'$  just if in  $w'$ , at  $t_c$ , for all locations  $\ell' \in d_c$ —we may assume this set to be  $\delta(w_c)$ , the domain of the world of the context—it rains in  $\ell'$ . (N) holds in  $c$  for  $\|\text{everywhere}(\text{rains})\|$ , then, just if those worlds exhaust  $W_c$ . We also have the semantic value  $\|\Box \text{everywhere}(\text{rains})\|(w, t, \ell, d, c) = 1$  just if  $(\forall w' \in W_c)(\forall \ell' \in \delta(w'))(\|\text{rains}\|(w', t, \ell', \delta(w'), c) = 1)$ ; accordingly, the sentence is true in  $c$ —and (T) holds—just if  $(\forall w' \in W_c)(\forall \ell' \in \delta(w'))(\|\text{rains}\|(w', t_c, \ell', \delta(w'), c) = 1)$ —just if  $W_c$  is exhausted by  $w'$  for which in  $w'$ , at  $t_c$ , for all locations  $\ell' \in \delta(w')$ , it rains in  $\ell'$ . The difference here is that in the condition on (N), the domain of quantification is fixed to  $\delta(w_c)$ , the set of locations available at the world of the context; but in the condition on (T), the domain at each world is  $\delta(w')$ , with  $w'$  bound by the universal quantifier over worlds. When it rains at every world in every location available in  $w_c$  but remote worlds harbor alien locations at which it does not rain, that makes for (N) the necessity of *everywhere*(rains) without (T) the truth of  $\Box(\text{everywhere}(\text{rains}))$  (counterexamples to the converse, however, require more expressive power than is available in the present language: a point to which we return). An analogue of Lewis’s complaint against Salmon is available (compare [Williamson 1998](#), 263): ‘by what right do we

<sup>7</sup>Or if  $A_c(w_c)$  is invariably the vacuous ‘absurd’ proposition.

maintain that we have spoken of *everywhere*, when we pronounce it necessary that ‘it is raining everywhere’: the alien locations are still available for quantifying over, even if modals are required to activate this quantification—why don’t they count?’ A reasonable complaint, in our view, to the detriment of the contingent-domains theorist.

**Infra- and Supraclassicality: counterparts** The counterpart semantics, as noted, combines Supra- and Infraclassicality. We have the semantic value  $\| \text{in-Bristol(rains)} \| (w, t, \ell, k, c) = \| \text{rains} \| (w, t, k, k, c) = 1$  just if in  $w$ , at  $t$ , it rains in  $k$ ; accordingly,  $\| \text{in-Bristol(rains)} \| ^c$  contains  $w$  just if in  $w$ , at  $t_c$ , it rains in  $k_c$ —which, we may suppose, focusing on some specific  $c$ , is just Bristol. So (N) holds in  $c$  just if in every world in  $W_c$ , at  $t_c$ , it rains in Bristol. We also have the semantic value  $\| \Box \text{in-Bristol(rains)} \| (w, t, \ell, k, c) = 1$  just if  $(\forall w' \in W_c) (\| \text{rains} \| (w, t, \kappa(k, w, w'), \kappa(k, w, w'), c) = 1)$  just if in every  $w' \in W_c$ , at  $t$ , it rains in  $\kappa(k, w, w')$ ; accordingly,  $\Box \text{in-Bristol(rains)}$  is true in  $c$ , and (T) holds, just if in every  $w' \in W_c$ , at  $t_c$ , it rains in  $\kappa(k_c, w_c, w')$ —namely, it rains in the  $w'$ -counterpart of Bristol-in- $w_c$ . Obviously these conditions are different unless counterparthood only ever traces identity; in which case, the approach collapses into the classical approach. The ‘by what right’ objection is transformed to the ‘Humphrey’ objection: ‘by what right do we maintain that we have spoken of *Bristol* when we assert the truth of ‘necessarily, it rains in Bristol’ merely because it rains in every world in Bristol’s counterpart: Bristol itself is sitting right there, bone dry—why doesn’t that count?’

This concern appeals only to the underdetermination feature, characteristic of Infraclassicality: the feature responsible is the counterpart-theoretic manipulation by  $\| \Box \|$  of the  $k$ -argument; that does not rely on the Supraclassical free endomodal argument-place as an input to the  $\kappa$ -function. That underdetermination feature, however, is required for the failure of **S5** modal logic, as it is what makes  $\Box \text{in-Bristol(rains)}$  *contingent*—rather than merely not about *Bristol*. And there, it is crucial that the Humphrey complaint returns in application to  $\Box \text{in-Bristol(rains)}$ : its necessity again comes apart from the truth of its necessitation; and again a ‘by what right’ complaint is available—‘we thought we had pinned down the modal profile of ‘it rains in Bristol’ as the set  $RB$  identified with that largest set  $W_c$  such that  $c$  verifies ‘necessarily, it rains in Bristol’; we had even accepted that this involves an ‘individual concept’, rather than ‘rigid designation’—but now it turns out that even the contextual necessity of  $RB$  does not suffice for the truth of ‘necessarily, necessarily it rains in Bristol’—by what right do we suddenly throw out the old individual concept and start talking about a new one?’ The general challenge here is that modal auxiliaries do not, intuitively, have the power to kick meaning down the road indefinitely, in isolation from nonmodal considerations of content.

### 3 More on RMM

This section goes into further detail about the RMM approach for securing dependency without contingency: we first tie up some loose ends regarding Chisholm’s Paradox; we then discuss a

closely analogous puzzle involving the laws of nature; and we conclude with a treatment of the interaction of quantification and modality.

### 3.1 Chisholm's Paradox

One RMM-friendly strategy for securing Limited Flexibility appeals to context-dependence of 'individual concepts' (Carnap 1947/1956, I.9). The result, very roughly, is a sort of 'pragmatic counterpart theory': here is a sketch. Begin with an ontology of sawhorse-parts including: a Good beam  $gb$ ; a Junk beam  $jb$ ; Good left and right legs  $gl$  and  $gr$ ; and Junk left and right legs  $jl$  and  $jr$ ; and assume a 'mereological aggregation' operation  $+$  over arbitrary parts. Let *horsey* be a referring term for a sawhorse, with semantic value  $H$ ; and let  $H$  map the *source* world  $c$  (a world 'treated as context', or 'imputed') and the *target* world  $i$  (a world 'treated as index') into  $H(i, c)$ , a mereological aggregate of sawhorse parts.<sup>8</sup>

Assume worlds  $@$ ,  $w'$ , and  $w''$ : in  $@$ , of all the aggregates of our six parts, the unique aggregate arranged in sawhorse-form is  $gb + gl + gr$ ; in  $w'$ , it is  $gb + gl + jr$ ; in  $w''$ , it is  $gb + jl + jr$ . The Limited Flexibility principle suggests thinking of  $H(i, c)$  as selecting its denotation by looking first to  $c$ , to assess which aggregate  $a$  is arranged in sawhorse-form there; and then to  $i$ , where it applies the following lexically-ordered rules: (i) if some aggregate  $b$  sharing at least two parts with  $a$  is arranged in sawhorse-form in  $i$ , then  $H(i, c) = b$ ; (ii) otherwise  $H(i, c) = a$ . This yields the following course of values for  $H$ :  $H(@, @) = H(w'', @) = H(@, w') = gb + gl + gr$ ;  $H(w', w') = H(w', @) = H(w', w'') = gb + gl + jr$ ;  $H(w'', w'') = H(w'', w') = H(@, w'') = gb + jl + jr$ .

Next, we let the predicate *Most-Junk* have a semantic value  $F$ , such that for a term semantic-value  $T$ ,  $[F(T)](i, c) = 1$  just if in the world  $i$ , most parts of the aggregate  $Tic$  are Junk. Accordingly,  $F(H)$  is true at just these  $\langle i, c \rangle$  pairs:  $\langle w'', w'' \rangle$ ;  $\langle w'', w' \rangle$ ;  $\langle @, w'' \rangle$ . Finally, we let  $\diamond$  have the semantic value  $D$ , such that for a sentence semantic-value  $V$ ,  $[D(V)](i, c) = 1$  just if  $(\exists i')(V(i', c) = 1)$ . Accordingly,  $D(F(H))$  is true at exactly the  $\langle i, c \rangle$ -pairs for which  $c = w'$  or  $c = w''$ . In consequence, the proposition  $[\diamond \text{Most-Junk}(\text{horsey})]^c$  is true in every world just if  $c = w'$  or  $c = w''$ , and true in no world just if  $c = @$ ; the content  $[\text{Most-Junk}(\text{horsey})]^c$  is true in some world and therefore *possible* just if  $c = w'$  or  $c = w''$ ; and the sentence  $\diamond \text{Most-Junk}(\text{horsey})$  is true-in- $c$  just if  $c = w'$  or  $c = w''$ .

Some noteworthy consequences are that (the possibility version of) the T–N Equivalence holds for *Most-Junk(horsey)* (of course: the semantic value  $D$  is Classical); the logic is **S5**; relative to any context, it is noncontingently noncontingently ... noncontingent whether *Most-Junk(horsey)*. In our context (in  $@$ ),  $\diamond \text{Most-Junk}(\text{horsey})$  is false; still, the availability of  $w'$  in our modal domain of quantification opens the prospect of imputing a modal perspective as from the context of  $w'$ : this imputation affords a pretense in which the truth-value is reversed; however, for the reasons

<sup>8</sup>A more ontologically-committal alternative would trade in individual concepts over aggregates for rigid designation of nonmereological wholes, contingently constituted by aggregates; this would move the parentheses—and, perhaps, remove a superficial 'Humphrey'-style worry—but the underlying structure would be the same.

canvassed in the previous section, this variability in truth-value does not amount to *contingency* in any reasonable sense.

### 3.2 Laws of nature

According to the attractive doctrine of *nomological necessitarianism*, the ‘laws of nature’ (the most ‘fundamental’ such laws, at least) are metaphysically necessary (Shoemaker 1980; compare Shalkowski 1992): after all, natural law has an explanatory power unavailable to any mere contingent generalization, even if the contextual modal domain is restricted to make the generalization come out ‘necessary’ (compare Loewer 1996, 2012; Fine 2005b, 247). But it is also attractive to think of the laws of nature as *actuality-dependent*: as somehow proceeding from the course events happen to take, such that significant, but still possible, differences in the course of events would have yielded different laws of nature (Lewis 1973); formally, a world  $w$  generates a  $w$ -nomological neighborhood  $\mathfrak{Q}(w)$  such that the laws of nature determined by  $w$  can be identified with the proposition  $\mathfrak{Q}(w)$ , and such that  $w'$  is  $w$ -nomologically possible just if  $w' \in \mathfrak{Q}(w)$ : nontrivial dependence results when sometimes  $\mathfrak{Q}(w) \neq \mathfrak{Q}(w')$  (compare Lewis 1986, 20; Fine 2005b, 244–5).

On a Salmon-style ‘accessibility’ strategy, these are reconciled by postulating a ‘metaphysical accessibility’ function  $A$  such that a ‘metaphysical’ reading of  $\Box\varphi$  is true in  $w$  just if  $\varphi$  is true in  $w'$  whenever  $w' \in A(w)$ . Nomological necessitarianism is implemented by identifying  $A(w)$  with  $\mathfrak{Q}(w)$ : this yields the truth of  $\Box\varphi$  at  $w$  whenever  $\varphi$  is  $w$ -nomologically necessary. This, however, runs up against the Generalized Humphrey Problem.

Accordingly, we recommend instead a roughly ‘pragmatic accessibility’ approach within RMM (compare Murray and Wilson 2012, sec. 3). For a context  $c$ , its world  $w_c$  determines a  $c$ -maximally inclusive modal domain (‘ $c$ -metaphysical neighborhood’)  $\mathfrak{B}(w_c)$ , such that a proposition  $p$  is  $c$ -metaphysically necessary just if  $\mathfrak{B}(w_c) \subseteq p$ ; in particular, for any context  $c$  in a world  $w_c$ , the conversational modal domain of  $c$  is limited by the  $c$ -metaphysical neighborhood ( $W_c \subseteq \mathfrak{B}(w_c)$ ). Throwing the domain wide open in  $c$ ,  $\Box\varphi$  receives a metaphysical reading, and is true-in- $c$  just if  $\mathfrak{B}(w_c) \subseteq \llbracket\varphi\rrbracket^c$ . Here, nomological necessitarianism is implemented by identifying  $\mathfrak{Q}(w)$  with  $\mathfrak{B}(w)$ .

Again, in a context, the modal status of  $\varphi$  is noncontingently . . . noncontingently noncontingent, avoiding the Generalized Humphrey Problem; so if  $\lambda$  states a genuine law of nature,  $\lambda$  is necessarily . . . necessarily necessary; and if  $\psi$  describes a genuinely nomologically possible situation,  $\psi$  is necessarily . . . necessarily possible. Nevertheless, if some  $w' \in \mathfrak{Q}(@)$  is such that  $\mathfrak{Q}(w') \neq \mathfrak{Q}(@)$ , there is a sense in which  $\lambda$ ’s status as a law remains actuality-dependent:  $w'$  is possible, and therefore available for imputation; so in that sense, a shift of perspective to a nomologically possible world has the potential to undermine either the necessity of  $\lambda$  or the possibility of  $\psi$ . Such perspective shifts are inevitably mere pretense, however: strictly and literally, nothing can be done to undermine the genuine modal status of  $\lambda$  and  $\psi$ .

### 3.3 Ontology

Plausibly, matters of *existence* and *nonexistence* depend on contingent matters: Obama’s existence is not a necessary matter; Obama has no sister, but he could have had one—each claim depends on who did what when, none of which had to have been done.

These are intuitive judgements: perhaps theory should pronounce otherwise. We discuss a simplified example to sharpen the issue. Consider frog gametes  $e_0$  and  $e_1$ , and  $s_0$  and  $s_1$ . Actually,  $e_0$  and  $s_0$  fuse into a frog  $f_0$  (better: frog-zygote; we suppress associated complications), as do  $e_1$  and  $s_1$ , fusing into  $f_3$ . Presumably cross-fusion is possible: in some world  $w'$ ,  $e_0$  fuses with  $s_1$  while  $e_1$  fuses with  $s_0$ .

Perhaps origins are essential (Kripke 1972/1980, 110ff); perhaps  $j$  has  $F$  essentially only if, if  $j$  exists,  $j$  is  $F$ . Granting both: if, possibly,  $e$  and  $s$  fuse into  $f$ , then, necessarily, if  $f$  exists,  $e$  and  $s$  fuse into  $f$ . This has the following consequences.

*Actual existence*: Actually,  $e_0$  and  $s_0$  fuse into  $f_0$ ; so, necessarily, if  $f_0$  exists,  $e_0$  and  $s_0$  fuse into  $f_0$ . In  $w'$ ,  $e_0$  and  $s_0$  do not fuse into anything; so—it would seem— $f_0$  does not exist in  $w'$ . So, apparently, something exists, but in some sense could have failed to. Taking the sense to be *possibility*, however, yields the truth of  $\exists x \diamond \neg Ex$  (where  $E$  is an ‘existence’ predicate, applying to everything that exists—if desired,  $Ex$  can be understood to abbreviate  $(\exists y)(x = y)$ ). Unfortunately, without appeal to a Supraclassical *contingent-domains* approach, the quantifier and modal do not interact scopally, yielding an equivalence to the inconsistent  $\diamond \exists x \neg Ex$ —‘possibly, something is nonexistent’.

*Actual nonexistence*: Plausibly, fusion requires fusion *into something*: so let  $f_1$  be the  $e_0$ – $s_1$ -fusion and  $f_2$  the  $e_1$ – $s_0$ -fusion. In  $w'$ ,  $e_0$  and  $s_1$  fuse into  $f_1$ ; so, necessarily, if  $f_1$  exists,  $e_0$  and  $s_1$  fuse into  $f_1$ . Actually,  $e_0$  and  $s_1$  do not fuse into anything; so  $f_1$  does not actually exist. (Not even, contra Williamson 1998, as a ‘merely possible fusion of  $e_0$  and  $s_1$ ’. After all, it would seem that essentiality of origins requires the following: if  $x$  is the fusion of  $e_0$  and  $s_1$  in a world  $w^*$  and  $x$  exists in a world  $w^{**}$ , then  $x$  is the fusion of  $e_0$  and  $s_1$  in  $w^{**}$  as well. From this, the existence in @ of  $f_1$  requires that  $e_0$  and  $s_1$  fuse in @—but they do not: compare Williamson 2013, 7.5.) So, apparently, something that in some sense could have existed, yet does not. Again, taking the sense to be *possibility* yields the truth of  $\forall x \square \neg Fx$  but the falsity of  $\square \forall x \neg Fx$ —which, again, requires a Supraclassical contingent-domains approach.

RMM offers a sense in which domains can be understood as *dependent* (‘chunky’: Williamson 2013, 314) and yet *noncontingent*: imputing a distal modal perspective can shift the domain, within pretense, from what it actually is; but (again) this shift of imputation does not amount to a kind of contingency.

To elaborate. One approach appeals to context-dependence of the maximally inclusive individual domain (‘metaphysical ontology’), generating what amounts roughly to ‘pragmatic world-relative domains’. A world  $w'$  generates a  $w'$ -maximally inclusive ontology  $\mathfrak{J}(w')$ , such that for any context  $c$  with  $w_c = w'$ ,  $J_c \subseteq \mathfrak{J}(w')$ —the contextual *conversational* ontology of a context restricts the *metaphysical* ontology of its world. Intuitively,  $\mathfrak{J}(w)$  is the set of entities generated by the

merely propositional, unindividuated goings-on in  $w$ . The set  $J$  that  $w$ , here in the actual world @, see as the maximal ontology is identified with the actual metaphysical ontology:  $J = \mathfrak{J}(@)$ ; but in other worlds  $w'$ ,  $\mathfrak{J}(w') \neq J$ —imputing a distal-world context may therefore impute a metaphysical ontology distinct from  $J$ .

When the context  $c$  imputes source-world  $w_s$  to consider target-world  $w_t$ , the maximally inclusive domain remains  $\mathfrak{J}(w_s)$ ; but for purposes of maximally inclusive ‘internal’ characterization of  $w_t$  (compare [Fine 2005a](#)), any residue of  $\mathfrak{J}(w_s)$  not included in  $\mathfrak{J}(w_t)$  is useless. When  $c$  is such a case of maximally inclusive internal characterization, we write the conversational domain  $J_{w_s w_t}$ , the set of entities *internal to  $w_t$ , from the point of view of  $w_s$* : accordingly,  $J_{w_s w_t} = \mathfrak{J}(w_s) \cap \mathfrak{J}(w_t)$ . In our frog example,  $\mathfrak{J}(@)$  includes  $f_0$  and  $f_3$  and excludes  $f_1$  and  $f_2$ ;  $\mathfrak{J}(w')$  includes  $f_1$  and  $f_2$  and excludes  $f_0$  and  $f_3$ . Both contain  $e_0$  and  $e_1$ ,  $s_0$  and  $s_1$ , so these may all be presumed whichever of @ and  $w'$  is imputed, whichever considered. So (excluding irrelevant entities)  $J@@ = \{e_0, e_1, s_0, s_1, f_0, f_3\}$ ;  $Jw'w' = \{e_0, e_1, s_0, s_1, f_1, f_2\}$ ; and  $J@w' = Jw'@ = \{e_0, e_1, s_0, s_1\}$ .

One moral is that a proper notion of essence should be conditional not on *existence* in a world, but instead our notion of *relative internality* to it: from the point of view of  $w_s$ , for  $f_0$  to originate essentially in the fusion of  $e_0$  and  $s_0$  is for any world  $w_t$  to which  $f_0$  is  $w_s$ -internal—such that  $f_0 \in J_{w_s w_t}$ —to be such that, in that world  $w_t$ ,  $f_0$  originates in  $e_0$  and  $s_0$ . Addressing the challenge in *actual existence*: having adjusted the notion of essence, we need not agree that  $f_0$  fails to ‘exist in  $w'$ ’ (indeed, a notion we find suspect).

Another is that consideration of a world often leads swiftly to its imputation: imputing @ and considering  $w'$ , we say that  $e_0$  and  $s_1$  fuse, but cannot say there is something into which they fuse ( $f_1$  is absent from  $J@w'$ ); this inconvenience is remedied by reconsidering  $w'$  as imputed ( $f_1 \in Jw'w'$ ), so pressure for that imputative shift will emanate from our desire to avoid the inconvenience. Addressing the challenge in *actual nonexistence*: with proximal imputation of @, we must acknowledge that possible cross-fusion is not possible cross-fusion *into something*; but this creates pressure behind distal imputation of  $w'$  and the acknowledgement of possible cross-fusion into something, namely  $f_1$  and  $f_2$ : following the imputative shift, reconsidering @, we find  $f_1$  and  $f_2$  existent, though not internal to @.

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