Detailed Description

Context The context for our project consists, centrally, of (I) the well-known relational ('possible-worlds') semantics for modal propositional logic and its various extensions to modal predicate logic, a technical resource first flourishing from the late 1950s and over the course of the 1960s. The context is filled out by two branches from this central component, each of them first flourishing from the late 1960s over the course of the 1970s: (II) the 'modal metaphysics' tradition of reading metaphysical interpretations into the technical resources from (I) and/or invoking these resources to shed light on pre-existing metaphysical questions; and (III) the 'modal pragmatics' tradition of extending the resources from (I) to accommodate the broadly pragmatical phenomena of context-sensitivity and speech-act content.

(I) Contemporary research into the logic of modalities commenced in the opening third of the twentieth century, with CI Lewis's syntactic exploration in [74] of a variety of systems of intensional logic; roughly concurrently, the conception of a possible-worlds semantics was nascent in Wittgenstein's *Tractatus* [153], with its informal theory of sentence-meanings as truth-conditions on possible states of affairs. The 1940s witnessed Carnap's gradual accretion [12–14] of certain central elements of a *Tractatus*-inspired possible-worlds semantics for an elementary modal predicate logic (with its propositional fragment the strongest non-trivial modal propositional system, Lewis's S5, and the modality interpreted as a universal quantifier over worlds); alongside this early semantical work came Barcan's [2–4] contributions to axiomatic modal predicate logic. systems. Over the 1950s, scattered efforts by a number of authors would gradually integrate the semantical and syntactical strands, culminating in the near-simultaneous publication by Hintikka [57], Bayart [5], and Kripke [70] of completeness proofs for quantified S5, and later by Kripke [69] for many sub-S5 propositional systems.[1]

The apparatus of relational semantics for propositional modal languages is robust, and familiar in philosophy: a 'frame' pairs a set of 'possible worlds' with an 'accessibility relation' over them; a set of frames **F** characterizes a propositional modal system S as the set of all sentences true under any valuation in any world from any frame in **F**, where, in particular, for a frame with accessibility relation R, $\Box\phi$ is true in world w just if ϕ is true in world w' whenever $R(w, w')$. The strength of S varies (in a richly-explored manner) with the constraints on 'accessibility': so the set of all equivalence frames (with R an equivalence relation) characterizes the system S5 (the normal modal system with axioms *T*: $\Box p \supset p$; *4*: $\Box p \supset \Box\Box p$; and *B*: $p \supset \Box\Diamond p$); while the set of all reflexive, transitive frames characterizes the system S4 (with axioms *T* and *4*); and so forth.[2]

Semantical analysis of modal predicate languages is perforce more complex, its robustness attenuated proportionately, with the most straightforward implementation impeded by immediate philosophical worries. That implementation enriches relational semantics with an individual domain, while analyzing Fa as true in w just if F is satisfied in w by the denotation of a (perhaps, following Carnap, by the w-value of the 'individual concept' assigned to a), and $\forall x\, Fx$ as true in w just if F is satisfied in w relative to the entire domain: but these analyses validate $\Box\exists x\, x = a$ ('necessarily, a is something') and represent quantifiers and modals as freely commmuting, yielding the so-called 'Barcan Equivalence' of $\Box\forall x\,\phi$ and $\forall x\,\Box\phi$—thus predicting the putatively unattractive necessity of existence and nonexistence. Weaker systems require more intricate characterizing semantical analyses; an assortment have been proposed, each facing generally recognized shortfalls of either technical or conceptual adequacy. Such shortfalls are mirrored in attendant complications to the underlying (axiomatically characterized) logic: 'classical' modal predicate logic in the style of Barcan and Carnap includes both $\Box\exists x = a$ and the Barcan Equivalence as theorems, and is sound and complete relative to the straightforward semantical implementation noted

[1] Fix this note and next: here should be PW semantics; next should be accessibility semantics.]For detailed analysis of this period, see [25]: signal works discussed are [102, 62, 63, 145, 103, 104, 70, 71, 58].

[2] Overviews of these issues abound; a small selection: [20, 26, 7]. On accessibility: Copeland, Meredith and Prior.

above. Preserving adequacy with respect to a weaker semantics thus requires a corresponding weakening of the salient classical axioms, or some other *ad hoc* restriction on theoremhood.[3]

(II) Shortly following (or sometimes concurrently and in concert with) these technical developments, theorists came to notice a variety of applications, particularly in the analysis of the conceptual repertoire of the natural sciences; and also a variety of interpretive challenges, pertaining especially to ontology (among these latter are 'Chisholm's Paradox' from the Summary description, and also the 'Barcanite' issue just now briefly sketched). This cluster of applications and challenges has over the interim coalesced into an identifiably, if somewhat diffusely, interconnected literature on 'modal metaphysics', with its highly influential touchstone works Kripke's [72] and DK Lewis's [86] (notably also: [113, 143, 129, 36, 54]). We now sketch three such challenges fitting the STABILITY/DEPENDENCE structure noted in the Summary—severally cutting across the logical types addressed in (I), collectively illustrating the broad significance of modal perspective.

(A) An *undermining* puzzle about laws of nature. A STABILITY principle here would exclude inter-world variability in the truth-value of φ whenever it is a law of nature that φ. On its behalf, *necessitarians* cite the explanatory power of appeals to law: if we answer the question 'why, if it goes up, will it come down?' with 'it is a law of nature that what goes up comes down', necessitarianism virtuously avoids the peculiar further question 'yeah, but what distinguishes this case from one of those cases where it is a law of nature that what goes up comes down, but things can go up without coming down?'.[4] If, as is generally agreed, the logic of metaphysical necessity is S5, this reasoning excludes such variability.

But a powerful case for DEPENDENCE (admitting such variability) comes from the idea that the laws of nature should be sensitive to the 'categorical' facts on the ground—on pain of being 'brute', inexplicable sources of constraint without reciprocal responsibility to the categorical—an idea incorporated by leading theories of laws: perhaps the laws are the simplest, strongest systematization of the categorical facts ('Humean' laws); or perhaps properties carry their causal powers essentially, and the laws are generated by the categorical fact that exactly *these* properties are instantiated ('Aristotelian' laws). But this sensitivity predicts *undermining*—actual categorical facts yielding actual laws permitting categorical facts yielding different laws differently permitting categorical facts: perhaps *richly*, permitting actually forbidden possibilities; or perhaps *leanly*, forbidding actualities. Within the literature, DEPENDENCE theorists forego the explanatory power of necessitarianism; though the prospect exists of 'accessibilism' (as under (B)) for metaphysical necessity (abandoning *transitivity* for *rich* undermining, or *symmetry* for *lean* undermining).[5]

(B) *Chisholm's Paradox* of individual essence. Recall the 'Summary' example of hammer H actually built from iron+oak: the STABILITY principle moves from *H could (metaphysically) not have been built from lead+elm* and its metaphysical necessity, along with the S5 logic of the latter to the unavailability of any possible world verifying *H could have been built from lead+elm*; while the DEPENDENCE principle proceeds from *H could have been built from iron+elm* (or *H could have been built from lead+oak*) together with reasoning by parity between actuality and an iron+elm-world (single-part replacements are possible in both or neither) to the truth at an iron+elm-world of *H could have been built from lead+elm*.

Within the literature, some resolutions of the conflict abandon STABILITY: whereas with (A), the *it is a law of nature* operator may be weakened below S5, the only operator available for such weakening in (B) is *metaphysical necessity*. One such strategy adopts an 'accessibilist' structure for metaphysical necessity, declaring a world in which H is made from lead+elm to be actually 'inaccessible' (and thus

[3] On weak logic: Montague, Prior. On Weak language: [71]. For a systematic, opinionated overview of the technical options, see [45–47], and [150, Ch. 3].

[4] For defense, see [95, 97]; and in the context of the undermining puzzle, [38, p. 247].

[5] Humean: [79, sec. 3.3]; Aristotelian: [128]. Humean undermining: [86, p. 20]; Aristotelian undermining: [15, sec. 3.1], [38, p. 244–5]; 'undermining': [85, p. xv] on [83]—compare [38, p. 246n16].

impossible) but 'accessible' from an iron+elm-world (and thus 'possibly possible'). But a sub-S5 logic is also attainable via a 'counterpart' semantics, according to which the shifts in index-world induced by a modal operator can adjust the individual concept assigned to an embedded term: then we may allow that, contrasting the actual world *a* with an iron+elm-world *w*, indexing to the one rather than the other shifts the individual concept for '*H*' so that, in a lead+elm-world, indexing to *w* yields a lead+elm aggregate but indexing to *a* does not—thereby verifying both *H could not have been built from lead+elm* and *possibly, H could have been built from lead+elm* (the former because the index for 'could' is fixed to *a*, and the latter because the embedding modal shifts it to *w*).[6]

Other resolutions abandon DEPENDENCE: 'mereological essentialism' rejects *H could have been built from iron+elm* (dually, 'antiessentialism' admits *H could have been built from lead+elm*); while a 'sharp cutoff' view denies any legitimacy to reasoning by parity from an iron+elm-world: folks there accept *H could have been built from lead+elm*, but are brutely wrong in doing so.[7] [Still other resolutions manage to preserve both STABILITY and DEPENDENCE, but at significant theoretical cost in logical or semantical complexity. Logical: abandon classical logical assumptions (bivalence) and hold that individual premises in CP are less than wholly or entirely true; semantical: shifting from w to w' involves shift of reference across modally but not materially indiscernible, overlapping entities. Add: Forbes 84 (logic); variations of the semantic strategy: Yagisawa (responding to RMM); Leslie; HDYV (similarly responding to RMM.]

(C) A *Barcanite* challenge about the necessity of existence and nonexistence. Very briefly: can there be inter-world variability in truth-value of statements of ontology (to the effect, perhaps, that the cardinality of the existents is exactly such-and-such; or that some individual (designated 'de re') exists; or that some essential, severally unsatisfiable predicate is satisfied or not)? On behalf of STABILITY is the simplicity and explanatory power of the logic and semantics resulting if it cannot [Barcan–Carnap logic]. But on behalf of DEPENDENCE is the thought that, for a certain human *d*, whether *d* exists depends on whether their parents engaged in appropriate begetting activity: in possibilities where they do not, matter is not ordered in a way sufficient for *d* to exist as a human; and if *d* is a human, *d* is essentially so, and could not possibly exist as 'contingently nonconcrete'.[8]

(III) The end of the 1960s witnessed breakthroughs in the application of intensional semantics to broadly 'pragmatic' phenomena, particularly through the isolation of an important distinction in the broader category of 'context-sensitivity', a distinction giving rise to certain logical peculiarities. The fundamental technical resource for accommodating these phenomena, developed in the early 1970s, was a 'two-dimensional' (2D) foliation of the earlier intensional semantics. Later in the decade, epistemologically-minded theorists located within the expanded approach the representational import of its 'horizontal' and 'diagonal' projections; this, in turn, led to the discovery of the 'as-counterfactual'/'as-actual' contrast in modal perspective mentioned in the Summary.

To expand. A long-standing interest of logicians of tense was the 'indexicality' of temporary sentences like *the sun is in eclipse* in interaction with temporal operators like *always* or *henceforth*: analogously to the world-semantics for a contingent sentence like *Hamilton was born on Nevis* and the quantificational action of modals, a moment-semantics relativizes truth-value to moments of time (perhaps under a certain ordering), and analyzes *always* as a universal quantifier over moments. The category of 'indexicality' was unsettled by Kamp's 1967 discovery (*avant le lettre*) of the 'rigidifying' action of *now*: the apparent logical validity of ϕ *just if now,* ϕ is not sustained through embedment under *always*; a generalization

[6] Accessibilism: [19, 122, 123]; objections: [86, pp. 246–8], [147, sec. 8.3]. Counterpart theory: [75, 78, 88]; as a semantics: [32, 34], [56, sec. 3.2.2]; objections: [55, 154, 35, 33]; and CP: [40], [86, p. 248]; objections: [147, sec. 8.3].

[7] Essentialism: [21–23, 157, 139]; objections: [114, 146, 68]; antiessentialism: [99]. Sharp cutoff: [147].

[8] 'Barcanists' siding with STABILITY: [156, 93, 94, 148, 151]. Barcanism and the 'contingently nonconcrete': [94], [148, p. 266], [151]. Contingent *existence*: [45, p. 257], [148, p. 258], and cites in [151, ch. 1]; *nonexistence*: [71, pp. 65–6], [148, p. 258]. The canonical 'domain relativization' semantics for DEPENDENCE: [71, 132]; complaints: [45, 46, 148, 151]; taxonomy of other strategies: [45, p. 250]; 'individual concepts': [142, 46]. An approach with some affinity to RMM: [37].

to the modal case, swiftly observed by DK Lewis, involves the rigidifying *actually*: the apparent logical validity of *ϕ just if actually, ϕ* is not sustained through embedment under *necessarily*.[9]

The early 1970s subsumed proposals of Kamp and Lewis under a general 'double-indexing' framework assigning truth-values along two 'dimensions' and providing a 'diagonal' or 'real-world' analysis of logical consequence. For modals, truth is relativized to both an 'index'- and a 'context'-world; the data of the embedment puzzle are then explained thus: relative to worlds i and c, *necessarily, ϕ* is true just if for every world i', ϕ is true relative to i' and c, while *actually, ϕ* is true just if ϕ is true relative to c and c; and ϕ is logically valid just if (on all frames and valuations) for every world c, ϕ is true relative to c and c.[10]

Later in the decade, various theorists noted an affinity to, and thus a prospect of interpreting, Kripke's dissociation of metaphysical necessity from apriority: *ϕ just if actually, ϕ* is predicted to be logically valid and thus presumably apriori—but with its embedment under *necessarily* not valid, is predicted to be not metaphysically necessary; while the above apriority suggests that *actually, ϕ* has the same epistemic status as ϕ, so that both are aposteriori if either is—but *actually, ϕ* is predicted to be noncontingent.[11]

Late in this literature, 'consideration as actual' was coined to label reasoning about truth-values along the diagonal; during a mid-1990s resurgence of interest, 'consideration as counterfactual' was applied to reasoning about truth-values along the horizontal. This terminology drove an eventual explanatory theory of the Kripkean dissociation: what we care about in valid reasoning is security against error about how things *are* (actually); while metaphysical necessity is manifestly concerned with how things *could be* (counterfactually)—thus, the dissociation stems ultimately from a distinction in *modal perspective*.[12]

Objectives and methodology Despite the roughly concurrent appearance and early development of components (II) and (III) of the context, each long unfolded in large part or entirely in isolation from the other. Their mutual relevance, as sketched in the Summary, is that each puzzle in (II) can be resolved by appeal to the distinction in modal perspective from (III): to wit, it is variation in the world considered *as counterfactual* which displays the putative STABILITY, whereas the putative DEPENDENCE appears varying instead the world considered *as actual*—so the appearance of conflict is engendered by an equivocation of modal perspective. This observation was first published in 2012 by Murray and Wilson [110]; what has since come to be known as the 'Relativized Metaphysical Modality' (RMM) program develops the observation in service of a systematic reassessment of a variety of subregions of metaphysics. Hellie joined the RMM program as the co-supervisor (with Wilson) of Murray's dissertation [108], and was the primary drafter of the overview [56] (the puzzles in (II) are expanded on there in sec. 3, and technicalities of RMM resolutions sketched in sec. 4).[13]

The objective of our proposed research is to contribute to the rounding out and completion of the RMM program. The considerations involved are broadly distributable into: (IV) issues in metaphysics, including the metaphysics of science; (V.a) questions in philosophy of language; (V.b) questions in philosophical logic; and (VI) matters of historical development. Hellie's relevant areas of expertise are more weighted toward the technical and historical, with contributions to the program envisaged as lying primarily in (V.a) and (VI), with some localized subregions of (IV). Murray's relevant areas of expertise: metaphysics and philosophical logic; Wilson's as lying primarily in IV and related history.

[Then: during the granting period, we propose: to individually publish several papers each in our relevant areas of RMM-based research (at the level of both technical/theoretical foundations, clarifications, new developments). These will then fold into a collaboratively authored book on the RMM program. [We

[9] 'Indexicality': [105, 106, 77]. 'Rigid': [72]; rigidification: [64, 65, 117, 76].

[10] Double indexation: [127]; diagonal consequence: [144, 66, 41, 42]; opposition: [27, 29, 51, 52]. 'Index'/'context': [81].

[11] 2D and Kripke: [80, pp. 172–3], [66, 131, 31, 29].

[12] 'As actual': [29]; 'as counterfactual': [16, 61]; resurgence: [60, 90, 8, 134, 17, 18, 48].

[13] For reactions to RMM, see [140, 44, 121, 30] Yagisawai, Bassford, Forbes in prog.?.

now say a bit more about the relevant areas above?]

(IV) An initial aspect of the metaphysical component involves a canvas of the literature for further puzzles fitting the same schematism and potentially resoluble along analogous lines: several examples stand out (preliminarily to a more thorough survey). Closely resembling (A) is Lewis's 'Big Bad Bug' concerning objective chance, with its well-known conflict between the conceptual role of chance (a source of STABILITY) and an attractive metaphysics (a source of DEPENDENCE—indeed, the 'undermining' considerations in (A) are directly analogous to phenomena Lewis so labels). Resembling aspects of both (A) and (B) is [recent debate concerning the modal status of metaphysical truths: in support of dependenc: views of metaphysical theses as neither analytic nor necessary a posterori (and so subject to alethic variability across worlds; more directly, in terms of dependence upon underlying subject matter (Rosen on set theory) ; in support of stability is a longstanding conception of metaphysical investigation (as broadest/investigation into the basic structures of reality thereby concerned with universal truths. (Metaphysical hypotheses concern constutive identities, or truths grounded in facts of essence; as such cannot be contingent. [Metaphysical principles concerning eg nature of composition, temporal persistence, nature of physical objects, nature of metaphysical priority]. [14] A direct application of (C) is a well-known tension (arguably tracing to the *Tractatus* case for the necessity of objects, and thus their simplicity, and thus a logically perfect language) between the conception of propositions as a set of worlds (motivating STABILITY for claims about the existence of propositions) and the thought that some propositions are [singular or] *de re* (motivating DEPENDENCE).[15]

A further aspect: [amelioration/regimentation of wide swathe of concepts in the toolkit of contemporary modal metaphysics; all in some ways sensitive to or growing out of the dependence/stability contrast, consequently perspectival in character (idea is: general taxonomy; theoretical replacement with the general and explanatorily superior contrast in as-actual and as-counterfactual suppositional perspective.

A [final?] aspect involves the development of an underlying, explanatory picture: how can it be that what is metaphysically necessary makes, in some way, an ineliminable appeal to how things actually are? In the present context, the 2D apparatus is naturally read as parceling out the component inputs to our reasoning about metaphysical necessity into *specific facts* and *general principles*—the former component associated with the categorical truths about the 'contextual' world (the 'as-actual' coordinate), and the latter with a system of categorical-to-modal conditionals (those evaluated as true in every 'diagonal' coordinate pair). The overall image is of a sort of 'bounded naturalism' in metaphysics, in which the limits of possibility for the world (so to speak) project from the (arbitrary, brute) condition of nature, along (absolutely fixed, principled) vectors of logic. This image finds a middle ground between a pure naturalism, on which questions of metaphysics (when sensible) are handed over to natural science; and the more 'apollonian' approach of the traditional modal metaphysics, in which actuality is constrained by, but has no reciprocal input into, the limits of possibility.[16]

(Va,b) Making sense of this bounded naturalism requires delicate follow-on investigations in philosophy of language, in order to thread between a dilemma of complaints that (D) the true notion of 'metaphysical' necessity would better apply to our truth in all worlds as-counterfactual, at all worlds as-actual; and that (E) the categorical-to-modal conditionals required to state 'general principles' are inexpressible.

(D) The complaint is developed efficiently using the *undermining* puzzle from (II-A). On the view in [56, sec. 4], the actual world, a, induces laws of nature verified at just the worlds in a set $L(a)$; among

[14] Add cites (Rosen, Miller, Parsons on contingentism, also Lewi Parsons, Cameron, Balaguer on composition; Rosen re nature of properties; Lewis on persistence. s; on necessitism: Fine WIM; Sider ??]

[15] (A): [82, 85, 89] and, inter alia, [50, 141, 1, 96, 9, 112, 10]. (B): [6]. (C) [153, 2.02–2.0212]; inter alia, [116, 136], and citations in [43]: Murray describes the RMM treatment in [109].

[16] This polarity is typically manifest as an 'ethos' underlying detailed work, with certain works more representative of an 'ideal type': [53, 151] (apollonean); [73, 115] (naturalist). Bounded naturalist sympathies appear in, e.g., the case from quantum entanglement to priority monism in [125].

these is an 'undermining' world u inducing different laws of nature, verified at just the worlds in a distinct set $L(u)$: suppose that this $L(u)$ contains a world w not in $L(a)$, and thus verifying some sentence ϕ false at every world in $L(a)$: according to the nomological necessitarian, this ϕ is metaphysically impossible. But why say this? The world w is right there, verifying ϕ, after all. Although the consideration of the actual world a as actual renders w unavailable for consideration as counterfactual, w becomes available for consideration as counterfactual upon consideration of the undermining world u as actual. On the traditional understanding of metaphysical possibility as the 'broadest' variety of possibility, attained by lifting absolutely all restrictions on quantification over worlds, it would seem that w is metaphysically possible: after all, we are speaking about it, apparently requiring our capacity to quantify over it—jumps among directions of modal perspective notwithstanding.

In response, I appeal to Kaplan's famous prohibition on 'monsters begat by elegance': intensional sentential operators can shift only *indexical* coordinates (such as an as-counterfactual world); shifts in *contextual* coordinates (such as an as-actual world), are beyond natural language.[17] But the objection appeals to 'monstrous' metaphysical modal operators: the troublesome world w is beyond the set $L(a)$ and so no modal operator can quantify over w with the contextual world fixed to a; and it would require a monstrous shift of the contextual world to u in order to bring w within the domain of modal quantification.

Why bar monsters? An empirical motivation sees the Kamp/Lewis discrimination of 'indexical' from 'contextual' dependence as reflecting a real contrast in semantical argument structure: the former a kind of unsaturatedness amenable to control by compositional, language-internal mechanisms, with the latter reserving control to language-external, contextual factors. For a logical motivation, allowing *all* monsters admits a 'diagonal necessity' operator with ϕ an invariable truth (and thus a tautology) if ϕ is true down the diagonal and otherwise an invariable falsehood (and thus a contradiction). Next, Williamson observes that the fundamental conception of rigidification (the core phenomenon motivating 2D) motivates the construction of a 'universal rigidifier' such that, for any environment and sentence ϕ, ϕ is equivalent to $(\phi\top) \wedge (\neg\phi\bot)$ ($\top/\bot$ some 'invariable' truth/falsehood). On the diagonal analysis of entailment, ϕ is then true at a diagonal point just if $(\phi\top) \wedge (\neg\phi\bot)$—equivalently: $(\neg\phi\bot)$; $(\neg\phi\bot)$; ϕ—is. But whatever the semantic behavior of , ϕ is by stipulation either a triviality or a contradiction—so ϕ is equivalent either to (and is itself thus) a tautology or a contradiction. Short of *ad hoc* restrictions of motivation or expressive power, we must bar monsters to secure language against collapse into triviality.[18]

(E) Over to the other horn: barring monsters would seem to bar the categorical-to-modal conditionals articulating 'general principles', rendering bounded naturalism inexpressible. After all, we grasp these principles by shifting the world considered as actual; so a conditional apt to state such reasoning would be along such lines as 'if things are actually such that ϕ, it is metaphysically necessary that ψ'. But in order to have the intended result, the *if*-clause must somehow shift the world of the *context* against which the consequent is evaluated; and, having barred monsters, it cannot do so through the ordinary semantic activity of an intensional operator—so unless (indicative) *if*-clauses are somehow semantically extraordinary, the intended result is unobtainable, and bounded naturalism is inexpressible.

In response: *if*-clauses are semantically extraordinary. An ordinary intensional operator—a modal or temporal operator, or the *if*-clause as analyzed by Stalnaker/Lewis—adjusts a coordinate against which its operand is evaluated during semantic composition. In contrast, the shift of context associated with an *if*-clause does not occur during semantic composition, but is instead a 'postsemantic' effect, occuring only once a fully composed semantic value must project a certain propositional content against a specified context c. Picturesquely, *if* ϕ 'punches a hole' in the semantic value of its operand, 'shaped' like those contexts verifying ϕ; a content appropriate to c can only be assigned to the sentence by 'filling the hole':

[17] [66, sec. VIII]; also [81, 59, 126, 124, 119, 137].

[18] Empirical: [81, pp. 31–2]. : [149]. Collapse: compare the [24] 'slingshot' against [12]; and more generally [111].

to wit interpreting the operand in a context (selected by c) verifying ϕ.[19]

Rather than *ad hoc*, this postsemantic analysis is independently motivated. First, incorporating Kamp's tensed, rigidifying language within a proppositional pragmatic theory requires a postsemantic operation on semantic values to convert (bindable) *indexical* temporal arguments to (saturable) *contextual* arguments (the lesson of Lewis's discrimination of Kaplanean characters from compositional semantic values). Second, Williamson's invocation of the 'universal rigidifier' is to collapse the indicative *if* to the material conditional: interrupting the argument apparently requires excluding the operand of an *if*-clause from those 'environments' available for rigidification; the extraordinary 'hole-punching' behavior posited motivates this exclusion. Third, a postsemantic approach assembling these threads improves, along both conceptual and technical lines, the most adequate standing proposal (McGee's 2D 'sentence storage' theory) for interrupting a further, widely discussed 'multiple antecedent' collapse due to Gibbard.[20]

(VI) If the distinction in modal perspective has been widely discussed in epistemology but scarcely noticed in metaphysics, why? (F) Technical barriers include: (1) the logical tools exploited by opponents of STABILITY are all older than double indexation (though, contrastingly, a fully *semantic* counterpart theory is relatively recent development); (2) the various puzzles are themselves old; (3) pivotal figures Lewis and Kripke are, respectively, by admission compartmentalized in thinking about double indexation and largely silent about it; (4) the diagonal conception of consequence coalesced later than double-indexation, and certain metatheoretic oddities render it yet controversial; (5) monster-barring remains controversial, with its motivation not generally appreciated; (6) standing theories of the conditional are not adeqate to bounded naturalism. (G) Conceptual barriers (more speculatively) include: conceptions of metaphysics as 'apollonian', untainted by brute circumstance; or as 'absolute', requiring 'objectivity' and excluding perspectival input; or as hand in hand with logic, the latter envisaged as in tension with perspective-sensitivity.[21] ii

[19] 'Ordinary': [81, pp. 27–31]. 'Stalnaker/Lewis': [130, 79]. 'Postsemantic': [98]. 'Selection': [130, 11].

[20] For postsemantics: [81, pp. 39–42]; and [118, 120, 155]. Williamson collapse: [149, 152]; opposition: [137]. Gibbard collapse: [49, 39, 67]; storage: [101, 100].

[21] This sketch is lightly expanded upon in [56, sec. 5].

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