Philosophy of Language.
Metavocabularies of Reason:
Pragmatics, Semantics, and Logic
https://sites.pitt.edu/~rbrandom/Courses

In my summary of four nested, increasingly expressively powerful approaches to semantics last time, I compared them along these lines:

   i)   The *universe*, from which is drawn or constructed
   ii)   the *semantic interpretants* assigned to sentences,
   iii)   in terms of which *reason relations* of consequence and incompatibility-incoherence are defined.
   iv)   The *interpretation function* takes one from (i) to (ii), assigning each sentence some structure constructed or computed from elements of the universe as its semantic intepretant.
   v)   The *semantic definition of consequence* (and incompatibility) then takes one from (ii) to (iii).

Note that Nuel Belnap calls specifying (i) the *presemantics*.
He calls specifying (ii) via (iv) the *semantics*.
And he calls specifying (iii) via (v) the *postsemantics*.

Ulf's First Big Idea (Critical):

Ulf noticed that in defining reason relations, in particular, implication or consequence, in the truthmaker semantic framework (v), Kit Fine only uses *one* of the three additional structural elements he has added to the more traditional possible worlds / model-theoretic framework.

Those three new elements are:
   1. Using a universe of *states* with a *mereological*, part-whole structure imposed on it, from which to draw semantic interpretants that will be assigned to sentences in order to codify the reason relations those sentences stand in (which I have claimed is the defining task of semantics).
   2. Partitioning the universe of states into two disjoint *alethic modal* regions: *possible* states and *im*possible states.
   3. Using as *semantic intepretants* (assigned to sentences by the interpretation function) ordered *pairs* of sets of states (drawn from the mereologically structured universe of states), understood as the truthmakers and falsemakers (verifiers/falsifiers) of those sentences.

But, Ulf noticed, the semantic definitions of consequence Fine considers appeal *only* to truthmakers.

They do not at all use the *bipolar* or *bivalent* character of semantic interpretants as consisting not only of *truth*makers but also of *false*makers—feature (3) above.

Fine's definition of consequence as containment *does* use the mereological structure on the universe of states—feature (1) above—though consequence understood as entailment does not. But neither definition of consequence (as entailment or as containment) appeals to the further *modal* structure of the universe of states that consists in its being divided exclusively and exhaustively into possible and impossible states.

Ulf's Second Big Idea (Constructive):

The two elements of the truthmaker framework that Fine was *not* exploiting correspond exactly to the two basic components of Restall and Ripley's bilateralist normative pragmatic understanding of reason relations.

- Their distinction between assertions and denials (speech acts corresponding to practical attitudes of acceptance and rejection) lines up with Fine's distinction between truthmakers and falsemakers (verifiers and falsifiers)—point (3) above.
- And their normative distinction between deontic positions that are *out-of-bounds* and *in-bounds* (what gets rendered in the Brandom-Simonelli version of RR-bilateralism as constellations of commitments to which one can*not* be jointly entitled and those constellations of commitments to which one *can* be jointly entitled) lines up with Fine's distinction between *im*possible and *possible* states—point (2) above.

Restall and Ripley's *deontic normative* pragmatic definition of consequence is:
Γ |~ Δ iff *asserting* **every element of Γ and** *denying* **every element of Δ is** *out of bounds*.

The result is Ulf's proposed *alethic modal* truthmaker semantic definition of consequence:
Γ |~ Δ iff **every** *fusion* **of** *truthmakers* **of every sentence in Γ with** *falsemakers* **of every sentence in Δ is an** *impossible* **state**.

This way of understanding consequence makes use of all three fundamental elements that distinguish Fine's truthmaker setting from possible worlds semantics:

From (1): The *mereological* structure of the universe of states is appealed to in looking at *fusions* of truthmakers of premises and falsemakers of conclusions.

From (2): The *modal* structure of the universe of states is used to implement an analogue of Restall and Ripley's "out-of-boundness."

From (3): The *bilateral* (bipolar) character of the semantic interpretants of sentences in the truthmaker framework is exploited through the analogy with Restall-Ripley bilateralism, in that both truthmakers (of premises) and falsemakers (of conclusions) are essential to the definition.

<u>Ulf's First Result</u>:

Can understand Fine's modal structural conditions as imposing a *closure* structure on consequence relations (*if* they are defined as Ulf does).

	Gentzen's Sequent Structural Rules	Fine's Modal Structural Conditions
	Monotonicity (MO)	Downward Closure
	Cumulative Transitivity = Cut (CT)	Exhaustiveness
	Reflexivity (RE). (RE+MO $\Rightarrow$ CO)	Exclusivity

<u>Ulf's Second Result</u>:

Ulf uses the isomorphism between truthmakers semantics and the bilateral normative pragmatics in terms of which we understand reason relations as codified in sequent calculi for logical metavocabularies to solve an unsolved problem in the truthmaker setting. That is **to construct, in a principled way, adequate semantics for a whole range of substructural logics**. For Dan's NonMonotonic MultiSuccedent logic NM-MS already solved that problem in the sequent calculus framework, which we understand in bilateral normative pragmatic terms, which Ulf's definition of consequence shows how to map onto Fine's truthmaker semantic framework.

<u>Philosophical Interpretation of Ulf's Insights and Results</u>:

Bimodal Hylomorphic Conceptual Realism.
Two versions of the *content* that is common, that read the hylomorphic metaphor differently:
  a) One *content* specified in two *metavocabularies*: normative pragmatic and alethic semantic. (Bob's Hegel.)
  b) One *form* for two *matters*: mind and world. (Ulf's Aristotle.)

Wittgenstein says: "When we say, and mean, that such-and-such is the case, we—and our meaning—do not stop anywhere short of the fact; but we mean: this—is—so." [*PI* §95.]

We agree that Dan's implication-space semantics is a way to specify that *content* or *form* that is independent of the pragmatic and semantic metavocabularies, and the matter of mind or world.
  c) I think that semantics it is something like the native metavocabulary of reason relations— and so, of *roles* w/res to reason relations.
  d) Ulf describes Dan's semantics as an *abstract* specification of rational form.
     What it abstracts *from* is the matter: subjective or objective, the activities by which the practitioners who deploy or use a vocabulary *take* claimables to be true and the worldly states that *make* those claimables true.

(Much) more on this issue in later weeks.

Dan's Implication-Space Semantics:

The implication-space semantics directly characterizes the *contents* of claimables (expressed by declarative sentences)—which Ulf shows are common to what can be specified in bilateral normative pragmatic metavocabularies and truthmaker semantic metavocabularies—in terms of *roles in reason relations* of implication and incompatibility.
It is a true inferentialist *conceptual role semantics* (CRS)—generically, as Harman, Field, and Boghossian use that term.

These are four important large-scale features of Dan Kaplan's implication-space semantics:

1.   The *universe* from which the semantic interpretants of sentences is drawn—what in the four semantic frameworks we looked at last time plays the role played by the set of two truth-values, the set of all relational structures that are potential models of sentences of a vocabulary with a specified lexicon, the set of all possible worlds with an accessibility relation, and the mereologically structured set of all states (possible and impossible)—is a set of *candidate implications*.

We inferentialists had always thought that the *semantic interpretants* of sentences should be something like sets of implications—even that, as Dan has it, they should be *pairs* of sets of implications, corresponding to the inferential role the interpreted sentence plays as a *premise* and the inferential role the interpreted sentence plays as a *conclusion* in implications.
It was a huge conceptual step forward to *start* the process, not by interpreting *sentences*, but to have not only the semantic *interpretants*, but also what is semantically *interpreted*, consist to begin with of *implications* rather than *sentences*. ("It's implications all the way down.")

Candidate implications are ordered pairs of sets of sentences Γ, Δ (drawn from the lexicon of a base vocabulary). We can ask of each such $<\Gamma, \Delta>$ whether $\Gamma \mathrel{|\sim} \Delta$.
The only structure on that universe is a distinguished set **I** of *good* implications, which answers that question.
The intended interpretation of the apparatus is that $\Gamma \mathrel{|\sim} \Delta$ just in case $<\Gamma, \Delta> \in$ **I**.

There is also a mereological structure on this universe of candidate implications, though we will call the operation "adjunction" rather than "fusion."

2.   The *modal* character of the *v-function* that Dan defines on the implication space universe before we get to assigning *semantic interpretants* of sentences codifies an intuitively appealing and philosophically suggestive feature of implications, including candidates that are not good implications as they stand. For implications that are already good, the *v-function* assigns them, as their value, their *range of subjunctive robustness*. It assigns them all the *additional premises*

that, when playing the role of collateral commitments or auxiliary hypotheses *would not infirm* the implication—would not defeat it, in the sense of turning it from a good implication into a bad one. (A corresponding role is played by additions on the side of conclusions or consequences.) For candidate implications that are *not* good as they stand, where the conclusion does *not* follow from the premises (where commitment to accept all the premises and reject all the conclusions would *not* put one "out of bounds"), the *v*-function specifies what one would need to add to that candidate implication to *make* it a good one.

3.   The bipolar, bilateral character of semantic interpretants of sentences. Here implication-space semantics can do what Fine's truthmaker semantics can do using the two elements of the ordered pairs. Corresponding to truthmakers and falsemakers (verifiers and falsifiers) in Fine's setting, we have premissory and conclusory roles. Restall-Ripley bilateralism shows us that and how these correspond: the premissory side of a sequent is the truth-maker side—the side of *assertion* (=taking-true) or commitments to *accept*—and the conclusory side is the falsemaker side—the side of *denial* (=taking-false) or commitments to *reject*.

These three points correspond to the phases of Dan's semantic interpretation:
1) Universe of candidate implications, partitioned into good and bad ones (cf. Fine: universe of states partitioned into possible and impossible ones).
2) Define adjunction operation (rather than *stipulate* it, as Fine must do with fusion).
3) Define *v*-functions.
4) Define bilateral semantic interpretants of sentences, which again, do not need to be *stipulated*, as they do with Fine.
5) Use those semantic interpretants to specify the functional roles of sentences play in reason relations.
The first application and demonstration of usefulness of the semantics is:
A *completeness proof for NM-MS with arbitrary open-structured base vocabularies*.

A key point is that because Dan approaches *semantics* from the perspective of an expressivist view of *logic*, where the point is to *extend* a base vocabulary, elaborating the new reason relations from the old ones, he starts his semantics from a *base vocabulary*, whose *reason relations* now take the form of the implication space with its partition into good and bad implications.
This lets him *define* everything that Fine has to *stipulate* as additional structure:
i)   the commutative monoid (adjunction—compare: Fine's fusion) that confers mereological structure, and
ii)   the semantic interpretation function that assigns sentences bipolar *pairs* of sets of elements of the underlying universe.

4.   Then, Dan defines and generalizes the notions of <u>premissory role</u> and <u>conclusory role</u> of sentences. These articulate what is often called the "*external logic*" of reason relations, by which is meant a distinctive class of *meta*inferences that the "*internal logic*"—the logic across the turnstile—induces.
This account illuminates the relations between our account and the projection of the phenomena Dan describes into the three-valued logics K3 (Strong Kleene) and LP (Graham Priest's Logic of Paradox).

- K3 shows up as the logic of truthmakers: more deeply, of *premissory metainferences*.
- LP shows up as the logic of falsemakers: more deeply, of *conclusory metainferences*.