November 20, 2024

Week 11 Intro Notes

Intro to Project:

1) Recap WASTWATA.

Showed how inferentialists make sense of subsentential content: substitutionally. And results downstream.

This presupposes something like Frege's picture of substitution: replace a syntactic-lexical *component* of the sentence.

He showed how we could discern complex predicates, which are not *parts of* but *patterns in* sentences.

But to do that, we must be able to distinguish genuine components, in particular the simple predicates and singular terms that *are* parts or components of the sentential sign-designs.

For we must be able to notice that two sentences are alike, except that one has one component in the place where the other has another component.

In the language of WASTWATA, we must be able to distinguish as repeatable expression kinds not only substituted *in* expressions, but also substituted *for* expressions, in order to discern *complex* predicates that are *sentence frames*: what results from a sentence when one assimilates them to one another accordingly as they have *different* substituted-for component expressions (*parts* of sentential sign designs) in the *same* "position".

But **what if there *are* no components?** What if the sentential sign designs are either not composite at all, or *replacement* of a component doesn't make sense, or their composition is semantically irrelevant?

2) Dolphins (tell story of silicon-based olefactory images), PDP networks.

Dolphin gut-wrenchings, according to the '70s John Lilly story.

But: If sentence utterance is a constellation of connections, weights, and activations in a **parallel distributed processing network**, what "pieces" are the *semantically significant sub*sentential expressions (the words, not the letters)? The point is that there need not be any such semantically perspicuous syntax or grammar.

For we cd understand implication relations coded to govern assertions of sentences, which were triggered by some state of weights and activations in a network. On the surface, there is an output. Below that is only the state of the network. (Dolphin gut wrenchings) what does substitution mean there? What is a repeatable substituted for?

Can use a more abstract notion of <u>substitution.</u>

3) van F and STSSD use substitution transformations relating sentences as their primitives.
We then stipulate what we need to about how they work semantically. (Combinatory logic works differently.)

4)But **what is substitution**?

5) **Substitution and extensionality**:

Conceptually, we are **unpacking the concept of extensionality**. Quine uses the term to define *sentential contexts*. A sentential context (sentence frame) is *extensional*, for Quine, just in case substituting terms that are related to one another in a certain way preserves a certain semantic property of the sentences formed from putting the term in the context. For him, substituting *coreferential* terms preserves *truth*. This is the Bolzano-Frege method of "noting invariance under substitution." We want to understand the relationship between the terms *by* understanding what (inter)substitution of terms preserves semantically, at the level of sentences.
We are moving *down* from a notion of *intensional* equivalence (intersubstitutability *salva consequentia*.)

6) We have seen various ways to carve up sentences by assuming substitutional transformations.

But **what *are* "substitutional" relations**? From the point of view of *implications* (codifying also *incompatibilities*), what makes a set of good implications *substitutionally* good?
We need a *functional* specification of substitutionality.
When we look for that, we will see that there are *semi*-substitutional relations as well.
We will **impute** subsentential structure based on the broadly inferential roles played by the sentences.
We do that by *stipulating* restrictions on the good implications being considered.

So, we can just stipulate whatever we need to in order to get the substitutional structure we are looking for.
Yes. But **it is important that the stipulations must be couched in the vocabulary we have for characterizing semantic significance. That is implication-space semantics**.
And the structures are relatively simple.
At one level, **a set of points, together with a distinguished subset of points**: the candidate implications, and the good implications. One level further down, the set of points has further structure: it is generated by a *lexicon*, L, and the space is the set of all pairs of sets of elements of the lexicon.
What we are trying to do is to use some features we can specify in this metavocabulary of implication-space models, to impute to *all the sentences of L* a term-predicate structure.
How can just knowing the good implications among *sets* of sentences let us impute structure to all the sentences?

This is a tall order.

Idea: We have at our disposal all the implication-space models. So anything we can say in the MV we use to specify those models is a fair feature to use in imputing *semantically* significant subsentential structure.
So, the idea is to specify the conditions under which a set of implication space models (a subset of the whole universe of them) can be understood as imputing or reflecting a semantically (implicationally) significant term-predicate subsentential structure. This will be to say what it takes to be a term-predicate *dissecting* model set.

7) This is how **the *semi-substitutional* analysis**—the "halfway point"—arises. The relations we impose, before stipulating a suitable *correlation* between the sets of sentences that are terms and the sets of sentences that are simple predicates, *only* give us the two sets of sets of sentences (one of which is symmetric and a so a set of equivalence classes, and the other of which essentially comes with a nonsymmetric ordering of upward cones). The only "correlation" we get in what I am calling the "semi-substitutional" subsentential structure, is that it is the *same* sentences that get classified in *overlapping* sets of sentences in the term-set and *disjoint* sets of sentences in the (simple) predicate-set. In the limiting case of *promiscuous* substitution, for *every* term-set in T, and for *every* predicate-set |A|, *some* sentence in that term-set is also in that predicate-set.

That actually gives **us two versions of the *semi-substitutional* structure: *promiscuous* and *picky***. The difference is just whether it is *syntactically* licit to put any term in any position of any predicate, or whether some terms only 'fit' some positions in some predicates. We certainly would like to be able to make sense of the less structurally demanding "picky" predicates, as well as the more regimented and structured "promiscuous" ones.

Substructurality: There seems to be a halfway house between full substitutional structure, that is, term/predicate structure, and no semantically significant *substitutional* subsentential structure.
Q: How could that be, given the results of WASTWATA?
A: That concerned *full substitutional structure*. What we are going to mark for exploration now is *substitutionally sub*structural: on the way to the full substitutional structure, in the sense that it is definable using substitutional or substitution-like relations, but not meeting the conditions needed for substituted fors and substitutional sentence frames (complex predicates).

The substructural halfway point has *no argument places.*
It has term *occurrences*, but they are *indeterminate* as to *place* or *position*.
The halfway point in substitutional semantically significant subsentential expressions is ***indeterminate*** *term occurrences*.
The halfway point uses a substitutional scalpel, but does not impose correlational requirements.

The halfway has simple predicates (respects of similarity of sentences) and we can associate with each sentence the set of terms that are in it (we can sort sentences into co-term classes). That's it: we can say what sentences share a simple predicate and what sentences share a term. The first creates equivalence classes of sentences (symmetric), the other creates upward cones of sentences (nonsymmetric). Some of the sentences in a given sentence variety (sharing a simple predicate) have different numbers of terms in them. But there are maximally term-diverse variants in each variety.
Can still underwrite and generalize about implications by substitutions induced by term-identities ("identities" in that they license symmetric *inter*substitutions as good implications).
So can make sense of substituting one term for another (in some or all of its occurrences).

8) Set up problem. We are given the semantic relations among sentences that are codified in implication-space models (= lexicon, defining candidate implication space, and distinguished subset of *good* implications).
Need to get to: simple predicates as sets of sentences (exhibiting them), terms as sets of sentences (containing them), adicities, and position functions, since that is sufficient for lambda-calculus treatment of terms/predicates sufficient for quantification and more.
My first idea for an intermediate was ISC classes. Ulf properly pointed out that that was not going to get what was wanted. My next idea is symmetric singleton-singleton good implications.

We have introduced such a notion functionally, in terms of CO: *all* implications that have one sentence on one side of the turnstile and the other sentence on the other side are valid, in *all* (dissecting) models. We are defining a particular *species* of extensionality: ***CO-extensionality***.
And we want to define *terms* by means of relations that have the right structural properties to count as *substitutional* relations (among terms, so construed). Those are complicated. (van F and STSSD are both trying to specify these—I can't yet understand combinatory logic as doing this).

In fact, in seminar, mention the **Quine-Schoenfinkel piece** linked to on the course website, and say that it would be wonderful to understand how what the **combinatory logic** approach does is connected to the substitutional analysis. At this point, I don't see how to connect the two structures or approaches.