NASSLLI-18
Philosophy of Language
Lecture 1
Historical Origins and Foundations of Semantics and Pragmatics

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Ground Rules

- **I get to use the vanilla presentation format you see before you without you thinking you're being cheated out of a proper show. Thinking out loud is still one of the best ways of communicating philosophical ideas, and the projected material is an outline for that, it's not the main event and shouldn't be where your attention is focused.**
- **You get to interrupt me with brief clarification questions, I get to give brief answers. There will be time for discussion at the end of the lecture, and—hopefully—opportunities for out-of-class conversations.**

ZS/RT Collaboration

- **Later this year, Cambridge University Press will be publishing a book on philosophy of language, intended for linguists and philosophers with some knowledge of linguistics.**
- **Zoltan is a philosopher with extensive knowledge of linguistics; I dabble in several fields, but have always remained a logician at heart.**
- **We had to reconcile different opinions at many points during the writing process—I think that makes it a much better book than if it had been written by a single person.**
- **But in these lectures I'm going to back away from the cooperative process and inflict my own attitudes and opinions on you. Zoltan may disagree at many points.**

PART 1: SEMANTICS

Logical Origins

- **The origins of mainstream semantics, as practiced by linguists, are to be found in modern logic—that is in symbolic, or mathematical logic.**
- **My personal list of major players:**
  1. **Gottlob Frege**
  2. **David Hilbert and his school**
  3. **Rudolf Carnap**
  4. **Alfred Tarski**
  5. **Richard Montague**

- **How did the contributions of these figures lead to semantics as we know it?**
- **And how does philosophy fit into the picture?**
- **Here is my take on the history.**

Frege

- **Formalization: Perhaps Frege was not the first person to conceive of what Alonzo Church called "the logistic method." But he was the first to make it work.**
- **The essential components of this method are:**
  1. **A domain: a well delineated target for formalization.**
  2. **A formalized language tailored for the domain.**
  3. **Deductive inference procedures (axioms and rules).**

- **Additional components:**
  1. **A semantics or model theory.**
  2. **Nondeductive inference procedures.**

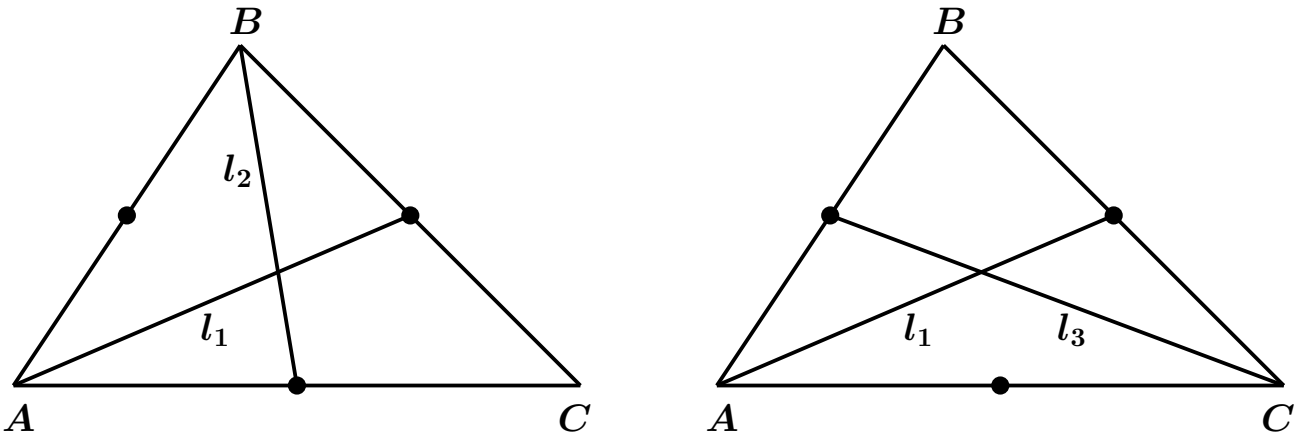
- **Frege's target domain, of course, was the mathematics of analysis.**
- **He provided the essential components of a formalization of this domain.**
- **Frege also contributed the elements of an informal semantics, including the distinction between sense and reference, and the idea of compositional rules.**

BEGIN DIGRESSION ON INTENSIONALITY

Intensionality

- **Frege is probably most famous among philosophers for recognizing that intensionality presents a challenge for compositional semantics, because of apparent violations of the rule of substituting equals for equals in certain contexts.**
- **One aspect of the problem of intensionality is how to interpret identity, which is certainly important in mathematics.**
- **But—although intensionality is a problem—is it a problem for Frege's formalization domain of mathematics?**
- **Neither Frege nor the Russell of the first edition of *Principia Mathematica* seems to have asked this question.**

Frege Gives One Mathematical Example of the Difference between Sense and Reference



- **Intersection**(l_1, l_2) = **Intersection**(l_1, l_3)

- **But this is not an example of a mathematical intensional construction: a linguistic construction within the target domain that invalidates substitution of equals for equals.**
- **'It is easily proved that**
  Intersection(l_1, l_2) = Intersection$(l_1, l_2)'$
  'It is easily proved that
  Intersection(l_1, l_2) = Intersection(l_1, l_3)'

  would provide an example.
- **But is 'It is easily proved' part of the target domain?**
- **Arguably, it isn't. For one thing, it's vague.**

Removing Intensionality from the Target

- **Frege and the Russell of the first edition of *Principia Mathematica* assumed that the logic required for the formalization of mathematics needed a mechanism for dealing with intensionality.**
- **Hilbert and his school implicitly dispensed with intensionality in formalizations of arithmetic and set theory.**
- **In 1925, Frank Ramsey explicitly separated the problems of formalising mathematics from more general problems of formalizing semantics.**

Two Positions on the Nature and Scope of Logic

- **You could conclude that although the logic needed to formalize mathematics can dispense with intensionality, wider formalization techniques and logics are needed for other purposes.**
- **You could take a more narrow conception of logic; logic is what makes the formalization of mathematics work.**

  In that case it would be tempting to be suspicious of intensional phenomena, attempts to formalize such phenomena, and formalization projects involving natural languages.
- **This is very roughly the difference between Carnap and Quine.**

END DIGRESSION

Carnap

- **Like his teacher Frege, Rudolf Carnap pursued formalization projects.**
- **But his target was science, or (more modestly) foundational aspects of science.**
- **Areas of science overlap with common sense, and the language of science is not entirely mathematical, so Carnap's project includes some areas of philosophy and of natural language semantics.**

- **Since Carnap's formalization target is so ambitious it is difficult to carry out in one grand undertaking, so Carnap's work divides into various subprojects, including:**

  1. **Phenomenalist epistemology**
  2. **The logic of inductive reasoning**
  3. **The formalization of intensionality**

- **In addressing the third of these projects, Carnap gets the credit for formulating and deploying a version of what is now called "possible worlds semantics."**
- **Carnap's "method of intension and extension" replaces Frege's sense/reference distinction with the distinction between (1) the overall pattern of values an expression receives over a space of possible worlds and (2) the value the expression receives in a specific world.**
- **Crucially, this differs from Frege in allowing the intension or pattern to be recovered from extensions by lambda abstraction.**
- **This is the approach to intensionality that was adopted by Richard Montague and that still survives in contemporary formal semantics.**

Alfred Tarski

- **Tarski's formalization project was semantics—not for natural languages in general, but for various areas of mathematics for which syntactic formalizations were available.**
- **Tarski's dominating interest was mathematics, and he was primarily interested in convincing mathematicians that semantics, or model theory, was a legitimate and useful mathematical research area.**

- **Model theory is based on two components:**
  1. **Generalizing the idea of a mathematical structure (e.g., a group, a lattice, or a topological space) to a relational structure consisting of a domain of individuals and various relations and operations. A model relates a formal language to a specific relational structure—for instance, by assigning relations to predicates of the formal language.**
  2. **A satisfaction relation $\mathrm{M}, \mathrm{g} \models \phi$ between a model M, an assignment g of values to variables, and a formula ϕ.**
- **Compositionality is reflected in the inductive definition of satisfaction.**

Formal Versus Artificial Languages

- **Up to, say, 1970, twentieth century philosophers of just about every persuasion agreed that formal and natural languages were entirely different things.**
- **Philosophers like Russell and Carnap thought of themselves as primarily interested in formal languages. Many of these depricated natural language as unruly and vague.**
- **Philosophers like J.L. Austin and Peter Strawson thought of formal languages as largely irrelevant to philosphical pursuits.**
- **Wittgenstein switched.**

Richard Montague

- **Montague, a student of Tarski, explicitly denied the importance of this distinction.**
- **Some languages have been formalized, others have not. Nothing in principle prevents the formalization of significant "fragments" of natural languages, including semantics in the form of model theory.**
- **This is Montague's project, and now is mostly pursued by linguists, under the label "formal semantics."**

But Montague Recognized some Obstacles

- **For Montague, each of these was a technical problem to be overcome.**
- **Montague's list:**
  1. **Ambiguity.**
  2. **Indexical or context sensitive constructions.**
  3. **Intensionality.**

Linguistics vs Philosophy

- **Up to 1970, most work on semantics had been done by philosophers, in philosophical mode, with foundational issues—including the viability of semantics itself—in play and up for debate.**
- **Linguistic work on semantics was either systematic lexicography or demonstrably inadequate.**
- **When linguists inherited formal semantics they brought to it refined techniques for exploiting linguistic evidence, borrowed mainly from generative grammar. The result is a subject that is just as scientific as any other area of linguistics.**
- **So semantics is a recent and perhaps ongoing example of the separation of a new science from philosophy.**

- **The separation can be painful.**
- **The fact that philosophers still feel it's possible to propose alternative foundations for semantics, motivated by philosophical considerations (such as connections to use or ontological minimalism), and can do this without feeling it necessary to compare carefully to the linguistic theory, or to consider the linguistic evidence, is a symptom of this.**
- **Figuring out the proper relationship of philosophy to semantics is a work in progress.**

Pragmatics

Origins

- **The term "Pragmatics" is due to the American philosopher Charles Morris, who established the division that is still current between syntax, semantics, and pragmatics.**
- **Early characterizations of the distinction are still current: syntax deals with interelations between expressions; semantics with relations between expressions and extralinguistic entities; pragmatics with relations between expressions and language users.**
- **Morris (and Carnap, who was also interested in pragmatics) thought of it as a part of what we'd now call philosophy of science, not as part of linguisitcs.**
- **This tradition doesn't seem to have produced a viable research program.**

The Oxford Tradition

- Another tradition originated in "ordinary language philosophy," led by J.L. Austin and including Peter Strawson and Paul Grice.
- You can think of ordinary language philosophy as a form of common sense philosophy, with insights about language use playing the role of common sense.
- Part of Austin's work is mildly skeptical, using ordinary usage to debunk philosophical theories, suggesting that they are somehow misguided.
- But another part is more positive, going beyond mere examples of usage towards generalizations and theories.
- Austin's theory of truth is an example, as is his theory of speech acts.

Doing Things with Words

- **The term "Speech act" is due to John Searle—Austin used more complex terminology, distinguishing *locutionary*, *illocutionary*, and *perlocutionary* acts.**
- **A locutionary act is the act of uttering a linguistic expression with a certain meaning; an illocutionary act is the act of uttering a linguistic expression with a certain force; a perlocutionary act involves a causal effect that is accomplished by an illocutionary act.**
- **Uttering 'Turn left now' on a particular occasion is a locutionary act; instructing the driver to turn left is an illocutionary act; keeping the car on the route is a perlocutionary act.**

- **One consequence of this is that the ways in which locutionary acts can miscarry and are evaluated is a special case of the ways in which acts in general can miscarry and be evaluated.**
- **There is support for this insight: Failing to be heard, for instance, is like turning on a switch connected to a burned out lightbulb; addressing the wrong person is like turning the wrong switch; thanking someone insincerely is like attending a demonstration without feeling any support for the cause.**
- **Another insight—that occured later to computational linguists—is that ordinary means-end reasoning can be applied to locutionary acts.**

- **Austin claims that utterances and the accompanying locutionary acts are the basic and most important elements of meaningful communication, and at the beginning of his posthumous lecture series he seems to suggest that formal approaches to language are working with the wrong ingredients.**
- **But this suggestion pretty much disappears by the end of the lectures, and in fact it is quite natural to think of speech acts in terms of dynamic systems.**

Dynamic Systems and Dynamic Logic

- **A dynamic system is a discrete-time system in which the changes are driven by actions.**
- **Execution runs of computer programs are dynamic systems; so are games of chess.**
- **We know how to use dynamic systems to interpret formal languages. Dynamic logic, for instance, shows how to do this with computer programs, where the basic sentence-level components are conditional imperatives, and the states of the system are associations of values with memory locations.**

- **To interpret speech acts in this way, you need to figure out how to characterize the states of the system—the conversational states—so that changes in these states will correspond to whatever illocutionary acts are in play.**
- **Stalnaker showed how to do this for assertion, by incorporating as part of the conversational state a set of worlds representing what could be taken for granted.**
- **It's not difficult to see how to do something similar for many other illocutionary acts—though perhaps with acts like greeting and cheering the relevant components become harder to motivate.**

Absorbing Pragmatic Theories into Enriched Semantics

- **Speech acts started out as part of pragmatics; but dynamic semantics is a part of semantics.**
- **This isn't the only case in which an idea that is pragmatic in its infancy grows up to be semantic—this also happened with indexicals. (Something we'll return to later.)**
- **But you seem to reach the limit of what can be absorbed in this way with areas of pragmatics that incorporate common sense reasoning based on massive world knowledge.**
- **And this brings us to speaker meaning and implicature.**

Speaker Meaning

- **In a famous 1957 paper, Paul Grice sets out to provide necessary and sufficient conditions for when a speaker means p in producing utterance U. (Grice calls this "non-natural meaning.")**
- **Speaker meaning, in this sense, is not the same as the literal meaning of the sentence that the speaker utters (when U involves a linguistic vehicle).**
- **On a given occasion, the literal meaning may be underspecified or ambiguous:**

  'She will visit him on Tuesday' is underspecified in at least three ways.
  'Time flies like an arrow' is ambiguous in at least three ways.

- **Grice's analysis is complicated by the fact that he doesn't want to say that a speaker means anything when the utterance provides independent evidence for what is to be communicated.**

  – Herod, Salome, and John the Baptist's head.

- **But the idea is that speaker meaning involves a recognizable communicative intention—an intention to change either beliefs or perhaps something like beliefs.**

Gricean Conversational Agents

- **The ingredients of a Gricean conversational agent, then, are these:**
  - **a. The ability to form and change beliefs. (Or perhaps belief-like attitudes.)**
  - **b. The ability to form intentions.**
  - **c. The ability to recognize intentions.**
  - **d. The ability to model other Gricean agents.**
- **These ingredients are psychologically plausible.**

- **My personal take on conversational implicature (which is controversial and even idiosyncratic) is that speaker meaning is basic, and that conversational implicature has to do with the fact that speaker meaning ordinarily and routinely contains content that is implicitly added to the literal meaning.**
- **An example: 'I can stick out my tongue and touch the top of my head'.**
- **In the AI community, this is known as the problem of "natural language understanding."**
- **The challenge is how to reconstruct the right inferences from the utterance, the context, and general-purpose knowledge. This is close to an "AI complete" problem.**

Two Ways to Address the Problem

(1) You can try to derive the inferences from rational principles about conversation. [Grice]

(2) You can try to use machine learning and linguistic corpora to produce the inferences. [An idea that would seem natural to most computational linguists.]

- **I believe that (1) is certainly unworkable.**
- **On the other hand, (2) is also almost certainly unworkable, except in highly circumscribed conversational domains, given current techniques. And if it turned out to be workable this would be disappointing, because this would produce no explanation of conversational implicature.**