A Biolinguistic Perspective on Semantics

Fitch (2010)

The Evolution of Language

Formal Semantics

- Formal semanticists study the conditions under which certain propositions expressed in natural languages are or are not true.
- **Propositions** are the abstract objects thought to provide the middle term in a link between "the world" and a truth value.
- Crucially, however, we often talk about things that aren't true now. Semanticists therefore think of propositions as functions that map possible worlds onto truth values.
  - The sentence *It is raining outside* maps all the worlds in which rain falls outside the dwelling of the speaker/writer to "TRUE" and all the other worlds to "FALSE"

- Formal semantics has an important virtue from a biological perspective.
  - It allows us to clarify the notion of propositional meaning.
  - A central distinction between language and other human communication systems (such as facial expression or music) is the ability of sentences to express propositions that have truth values.
  - This is precisely what is formalized in formal semantics.
  - In contrast, the far broader notion of "meaning" that applies to thought in general has thus far resisted attempts at formalization.
  - Thus, the apparatus of formal semantics allows us to define linguistic meaning more precisely. If you can't apply the referential variables of first-order logic, or the quantifiers of predicate logic, to a statement in some given 'language," then it lacks the propositional meaning characteristic of human language.

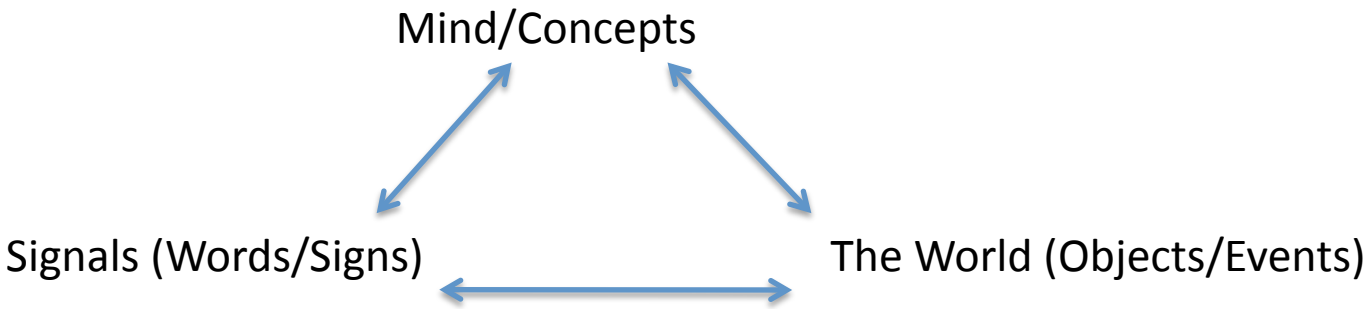
Mentalist semantics and the semiotic triangle

- A long-running controversy in semantics is whether sentences denote possible situations *directly*, the so-called "realist" view, or only indirectly (via the intervening action of a human mind: the "cognitive" view).
- This debate considerably predates the cognitive revolution, and I [Fitch] believe the combined data of modern cognitive science and animal cognition research leave only the latter option open.
- That is, concepts occupy an irreducible intervening role between language and external meaning in the real world.
- Contemporary formal semanticists often discuss proposition ⇔ world mappings as if they are direct, i.e. propositional meanings are "out there" in the world, rather than depending on any individual mind that creates, or perceives, such links.

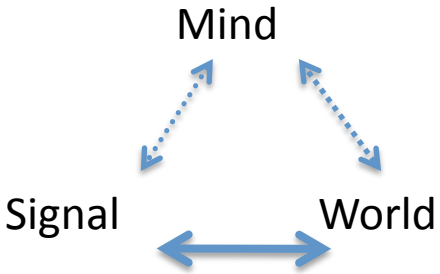
- This approach, perhaps for reasons of conceptual clarity and convenience, represents the model of meaning that dominates contemporary formal semantics, and much of philosophy, today.
- Despite several virtues, Fitch believes that truth-conditional semantics is inadequate as a complete cognitive model of meaning.
- Although understanding how *dog* can be inserted into a frame like *my dog is brown* or *all dogs are mammals* is useful, without an explicit model of how language users are able to identify dogs in the first place it is incomplete (the "symbol-grounding" problem).
- Another major problem is created by imaginary referents. If I say *the unicorn in my dream last night was purple* or *Sherlock Holmes was an Englishman* there is not an obvious situation in the real world, or even *possible* real worlds, that could satisfy the truth conditions for this sentence.

- Cognitive models neatly solve such problems by hypothesizing that, first and foremost, “meanings are concepts”.
- Cognitive models represent an ancient and intuitive model of meaning, dating back to Stoics and Plato.
- In cognitive models, understanding the word *dog* or *chien* involves generating a concept: a mental model or picture of a particular type of medium-size carnivorous mammal.
- Thus, concepts exist prelinguistically: we can have concepts before we know words for them. Words and sentences denote concepts first (solving the “Sherlock Holmes” problem).
- Concepts then provide the foundation, in many cases, for real-world identification of the referents (using “ordinary” cognitive and perceptual processes that predated language biologically and are similar to those used, e.g., by a dog when it recognizes a dog).
- The crucial component of the symbol-grounding problem was solved long ago, by the evolution of vertebrate perceptual and cognitive systems.

Ogden and Richards (1923) Semiotic Triangle

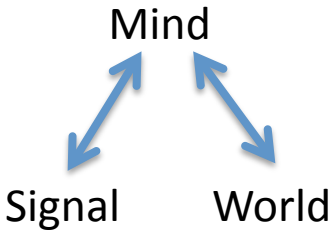


A. Realist Model



Reference

B. Cognitive Model



- The two separate links in the cognitive model clearly exist.
  - We often move directly between signals and concepts without reference to our surroundings, or discuss hypothetical conceptual situations that will never occur.
  - Furthermore, research in animal cognition leaves little doubt that animals possess non-linguistic mental representations that allow the organism to identify and cope with objects and events in the real world. The mind ⇔ world link is a strong and evolutionarily ancient one.
- In sharp contrast to the bottom link of the semiotic triangle, the top two legs are on a firm empirical footing.

- In the realist model, we find a direct arrow from signals into the world (or more specifically, into sets of possible worlds).
  - Cognitivists argue that we should be very suspicious of the bottom leg of the triangle, and therefore of the realist position, as anything more than a convenient shorthand for the more circuitous upper route.
  - Portner (2005) argues in support of a realist stance for essentially practical reasons: we can observe links between words and things, but not ideas in people's heads.

- The realist model is both intuitive and still defended by some contemporary philosophers. Why?
  - A biological view of language provides a plausible developmental explanation for why the realist view is intuitively appealing.
  - While an adult may wonder what this *person* means, the young child acquiring language must simply guess "the" meaning, based on whatever context is available.
  - Given the complexity of this process, the young child is far better off assuming that words point to meanings in the world *directly* rather than worrying about what the speaker means.
  - A simple (innate?) assumption that **words have meanings** is a heuristic device, a handy shortcut that helps the language user converge on the semantics of their local language(s).

- This process will have proceeded quite far before the child even begins conceiving of pragmatic differences in word usage, or to comprehend the dual conceptual iinkage that underlies the apparent direct link between words and meanings.
- This very propensity, the built-in assumption that “words mean things,” is perhaps the most basic biological prerequisite of the semantic component of human language.
- It is this assumption that leads humans to attribute magical powers to names and words, and it is this same intuition that underlies the realist stance towards linguistic meaning.
- This stance seems indeed to be present in humans at or near birth, and perhaps necessarily so.
- The evolution of this referential assumption is one of the core *explananda* in a theory of the evolution of language.