1. Preliminaries

Semantics is the study of meaning. So, the fundamental question is, "What is meaning?"

1.1. Semantic versus speaker's meaning

Semantic meaning: meaning of a sentence independently of a speaker's quirks.

- Sometimes called "sentence" or "literal" meaning.

Speaker meaning: what speaker intends when uttering a sentence.

- Sometimes called "utterance" or "non-literal" meaning.

So, more precisely, the fundamental question is, "What is *semantic* meaning?"

*1.2. Why **formal** semantics?*

Formal semantics uses logical and mathematical tools to answer this question in a *scientific manner*.

Formalization encourages the construction of *precise theories of meaning*. Precision is needed so as to avoid fudging a fit between theory and linguistic evidence.

Formalization also enables implementation of semantic theories in *computational settings*. This is important for integrating semantics with other fields, especially cognitive science.

2. Rejected Theories of Meaning

2.1. Definitional theories

Core idea: a word's meaning = its definition.

- Ex. What does "*pizzicato*" mean? Answer: plucking a stringed instrument.

2.1.1. Objection to definitional theories: the regress problem

General Argument	Example
1. A definition is composed of words.	The definition of "pizzicato" is composed of the words "plucking," "a" "stringed" and "instrument."
2. If a word's meaning = its definition, then the words constituting the definition must be meaningful.	If the definition of "pizzicato" were "gleeb barl nub nub," then "pizzicato" would be meaningless.
3. But this means that if word w_1 is defined by word w_2, then w_2 must be defined by some word w_3, which in turn must be defined by w_4, …	What are the definitions of "plucking," "a" "stringed" and "instrument?" And how do we define the words in the definitions of "plucking," etc.? And how do we define the words in *those* definitions?
4. But this is impossible.	Our definitions have to run out somewhere.
5. ∴ A word's meaning ≠ its definition.	

Holist solution to regress problem: Suppose that the chain of definitions in the regress problem went something like this:

$$\begin{array}{ccc} w_1 & \Leftrightarrow & w_2 \\ \Updownarrow & & \Updownarrow \\ w_3 & \Leftrightarrow & w_4 \end{array}$$

Furthermore, each word is defined by its relationships to the other words.

This is called *semantic holism,* since the meaning of one word depends on how it relates to the entire "network" of other words.

2.2. Idea theories (a.k.a. "internalist" theories)

Core idea: A word's meaning = its user's concept.

- The (my?) meaning of the word "water" is then the (my?) concept, WATER.[1]

2.2.1. Twin earth objection

On our earth, John does not know the chemical structure of water, but does know that it's typically clear, that it freezes, is potable, etc.

Now imagine a Twin Earth, identical to ours, save that the water on Earth is not H_2O, but is some other compound, XYZ.

[1] It is standard to use small caps for concepts and to either quote or italicize words. Please take note.

Then Twin Earth John will have the same idea of water as our John, but he doesn't mean the same thing as our John does.

So, a word's meaning ≠ its user's concept.

2.2.2. Psychological differences objection

Different people have different concepts for the same word.

So, if a word's meaning = a person's concept, then the same word has different meanings for different people.

This would communication among competent users of the same language difficult.

Such communication is not difficult.

So a word's meaning ≠ its user's concept.

Rebuttal to psychological differences objection: Our concepts overlap significantly. In particular, if 2+ individuals both have a concept X, then X aims to describe the same set of objects.

Problem with this rebuttal: It turns the Idea Theory into a "side-trip". We can identify the meaning of "water" without appealing to anyone's concepts, and simply with the set of objects that they classify as water.

2.3. Social practice theories

Core idea: A word's meaning = the rules governing its use in a social practice.

- Slogan: meaning is (correct) use

Just as a chess-piece is defined by the permissible moves one can make with it, so is a word. In this case, the "moves" are actions, inferences, etc.

2.3.1. Three objections to social practice theories

Language-use has a lot of socially invariant patterns.

Twin Earth Problem

The social practice theory doesn't replicate/isn't necessary for the advances that linguists have already made.

3. Truth-Conditional Semantics (TCS)

Core idea: A word's meaning = the thing(s) it describes.

TCS does not face the definitional, idea, and social practice theories' difficulties, and has become the dominant theoretical approach among linguists.

3.1. Motivation

Meanings are "based in language- and mind-external reality. The meaning of the word dog implies that it describes all of those things that are actually dogs, regardless of our ability to define it with words or to formulate an appropriate mental concept." (11)

3.2. Meanings and truth-conditions

So far, we've been focusing on the meanings of *words*.

When strung together in the appropriate way, words constitute *sentences*.

What are the meanings of *sentences*?

A crucial aspect of understanding the meaning of a sentence is knowledge of the conditions in which that sentence is true, and of the conditions in which it's false.

3.3. Key terms

TCS holds that *all* there is to meaning of a sentence = its truth-conditions.

Truth-conditions = the conditions wherein a sentence is true/false.

Truth-value = the truth/falsehood of a sentence.

Note that *because we can understand false sentences* (as well as sentences with unknown truth-values), truth-conditions and truth-values should be distinguished. Only the former matter for meaning.

Possible worlds: different ways the whole universe may be.

Possible situations: different ways part of the whole universe may be.

Propositions: meanings of sentences.

- Sentences *denote* or *express* propositions.
- Propositions are sets of possible worlds.
- A sentence's meaning is the set of possible worlds in which the sentence is true.

3.4. Virtues of TCS

TCS gives us plausible theories as to the meanings of logical vocabulary such as *and, or,* and *not*.

TCS allows us to define basic semantic concepts such as synonymy, contrariety, entailment, contradiction, and tautology.

- *Synonymy*: Two sentences are synonymous when they have identical truth conditions, i.e. they are true in exactly the same set of possible worlds.
- *Entailment:* A sentence *p* entails another sentence *q* if the truth of *p* guarantees the truth of *q*.
- *Contrariety:* Two sentences are contrary when they can't both be true, i.e. when there is no overlap between the possible worlds in which they are true.
- *Contradiction:* Two sentences are contradictory if they can't both be true and can't both be false.
    - This differs from contrariety in that there may be cases in which contraries can both be false.
    - Ex. *All students study logic* is a contrary to *no students study logic*, but both may be false if *some students don't study logic and some students do study logic.*

We use language to gain information about the world so as to navigate it more effectively. TCS explains how we can do this: if we understand the meaning of a sentence, then we know the conditions in which it's true, so we can act accordingly.