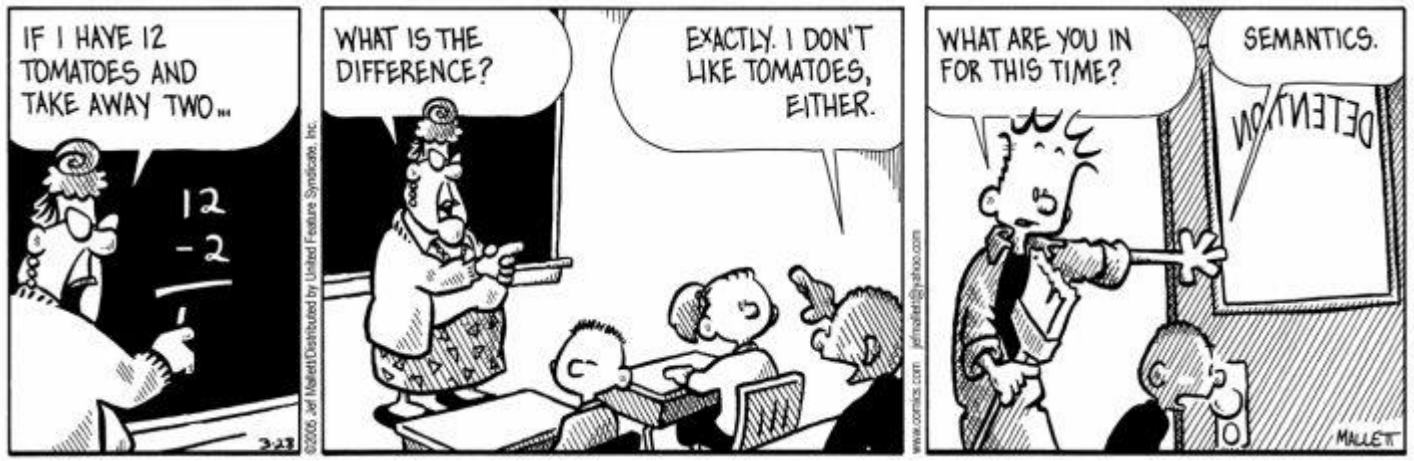
Semantics



Reading: FRH Ch. 4

PLIN0006: Introduction to Language

Semantics

- So far, we've examined mostly **structural** properties of language: the units out of which language is constructed and the ways they combine.
- We haven't given much attention to what people know about the **meaning** of the language they speak/hear/produce.
- **Today's question: What do people know about the meaning of sentences?**
- (We won't spend much time on what people know about the meaning of individual words, for that, see the textbook for discussion and references.)

What do speakers know?

In order to know what a given sentence means, you have to know:

1. What the words in the sentence mean.

2. How the manner in which the words are put together bears upon the meaning of the whole sentence.

Example

- If you don’t know what ‘desiderata’ means, you will not understand the sentence ‘The desiderata are listed in alphabetical order.’

- To understand the difference between

  ‘**John** saw **Mary**’ and ‘**Mary** saw **John**’

  you have to know that the subject of active sentences is the **agent** of the action described by the verb, and that the object is its **patient**.

Truth-conditional semantics

- Two properties go into determining sentence meaning:

    1. Individual words' meanings

    2. The relation between syntax and word-meaning

Truth-conditions

- One way to think about the connection of these properties and sentence meaning is in terms of **truth-conditions*:***
  - To a certain extent, knowing what a given sentence means is knowing the sentence's truth-conditions (the conditions under which it is true).
  - However: This does **not** mean that you have to know whether the sentence is, in fact, true or not! You only have to know what the world **would have to be like** for it to be true.

Example

(1) ‘Daniel Jones wrote a book called The Phoneme.’

- You may or may not know whether this sentence is true.

- But you do know what the world would have to be like for it to be true:

  There must be an individual called ‘Daniel Jones’, and this individual wrote something, that something was a book, and that book is called ‘The Phoneme’.

The problem of novel sentences

- Our knowledge of sentence-meaning must allow us to produce and understand **novel sentences** (sentences never encountered before), e.g. ‘The Doctor misplaced her sonic screwdriver in Shrewsbury.’

→ Since there are an infinite number of sentences, our knowledge of sentence-meaning must allow us to understand an infinite number of sentences.

Truth-conditions and novel sentences

- That we can understand novel sentences implies that we must have knowledge of the truth-conditions of sentences we've never heard before.
- Clearly, we can't have stored the truth-conditions of all these sentences stored in long-term memory – after all, we've never heard them before!
- **How do we know the truth-conditions of these sentences?**

Compositionality

- Answer: **Semantic rules**.

- Semantic rules tell us how to compute the meaning of sentences on the basis of:

    1. The meaning of the words they contain, and
    2. The manner in which these words are combined.

- The ability to infer the meaning of a larger entity from the combination of the meaning of its parts is known as **compositionality**.

Semantic rules: Intransitives

- Example: ‘McCawley smokes.’

⟦McCawley⟧ = McCawley

⟦smokes⟧ = {**x** | **x** smokes}

[$_S$ [$_{NP}$ John] [$_{VP}$ smokes]]

- **Semantic Rule #1:** For a sentence of the form **[$_S$ [$_{NP}$ α] [$_{VP}$ β]]**,

S is True **iff** ⟦**α**⟧ ∈ ⟦**β**⟧.

Novel intransitives

- Because of Semantic Rule #1, you know how to compute the truth-conditions of novel **intransitive sentences**.

- Example: ‘Dana Scully smiles.’
  - ⟦Dana Scully⟧ = Dana Scully
  - ⟦smiles⟧ = {**x** | **x** smiles}
  - **[$_{S}$ [$_{NP}$ Dana Scully] [$_{VP}$ smiles]]**

Semantic rules: Transitives

- Example: ‘Mulder loves Scully.’
  - ⟦Mulder⟧ = Mulder
  - ⟦Scully⟧ = Scully
  - ⟦loves⟧ = {⟨x, y⟩ | x loves y}
  - **[$_S$ [$_{NP}$ Mulder]** [$_{VP}$ **[$_V$ loves] [$_{NP}$ Scully]]]**

- **Semantic Rule #2:** For a sentence of the form **[$_S$ [$_{NP}$ α]** [$_{VP}$ **[$_V$ β] [$_{NP}$ γ]]]**,

  S is True **iff** ⟨⟦**α**⟧,⟦**γ**⟧⟩ ∈ ⟦**β**⟧.

Situational Truth

- Sentences can be categories based on their truth-conditional properties:

- **Situational Truth**: The truth of a sentence depends on the way the world is.
  - e.g. ‘Chandler House is in London’; ‘Chandler House is in New York’; ‘Chomsky taught at MIT’; ‘Chomsky didn’t teach at MIT’.

- **Tautology and Contradiction**: The truth can be determined strictly on the basis of word-meaning plus semantic rules.
  - e.g. ‘Bachelors are (un)married men’; ‘John Lennon is John Lennon(/Travolta)’; ‘Triangles have 3(/4) sides.’

Inter-sentential relations

As speakers, we know that pairs of sentences may be related to one another in various ways.

For example, we know that the following two sentences cannot be true *simultaneously*:

(1) I am in London.

(2) I am not in London.

Our truth-conditional account of sentence-meaning gives us a nice way of characterising such relations.

Entailment

- **Entailment:**

  Sentence A **entails** Sentence B **iff** whenever A is true, B is true.

- Example:
  - ‘John owns a blue house’

    entails

  - ‘John owns a house’

Synonymy

- **Synonymy:**

Sentences A and B are **synonymous iff** A entails B and B entails A.

- Example:
  - ‘John saw Mary’

    is synonymous to

  - ‘Mary was seen by John’

Contradictions

- **Contradiction:**

  Sentences A **contradicts** Sentence B **iff**

  A entails the negation of B, and B entails the negation of A.

- Example:

  - ‘John is a bachelor’

    is contradictory to

  - ‘John is married’

Summary (1)

- To know the meaning of a sentence, speakers must minimally know:

1. What words mean

2. What the relationship between words means

Summary (2)

- In order to compute meaning from this, speakers use:
  - Semantic evaluations (e.g. ⟦John⟧, ⟦swims⟧) to compute the referents/interpretation of constituents' meaning.
  - Semantic rules to compute the truth values of sentences
- This can be modelled with set theory and propositional logic.
- We saw that sentences can be categories and related based on semantic properties, e.g. as **tautology**, **contradiction**, **synonymous**, **entailment**, …