Intro to Linguistics – Semantics

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Overview of topics

- What is Semantics
- The Meaning of Words
- The Meaning of Sentences
- Other things about semantics

What to remember and understand:

Semantics, Word meanings (pros and cons for different candidates), Synonym/Antonym, Subordinate/Superordinate term, Meronym/Holonym, Homonym. Compositionality.

1 What is Semantics

Semantics is the part of linguistics that studies meaning in language:

- the meanings of words
- how word meanings combine to give the meaning of a sentence

It is very close to pragmatics and the border is often uncertain. Somebody even considers pragmatics part of semantics.

Generally:

- Semantics deals with literal meaning.
- Pragmatics deals with the intended meaning, with the usage of language, with language in context, etc.

2 The Meaning of Words

Every word has some meaning (some only in context).

What is a meaning of a word? Consider some candidates:

- **Dictionary definition**

transmission:
1a. The act or process of transmitting.
1b. The fact of being transmitted.
2. Something, such as a message, that is transmitted.
3. An automotive assembly of gears and associated parts by which power is transmitted from the engine to a driving axle. Also called gearbox.
4. The sending of a signal, picture, or other information from a transmitter.

But:

- to understand meaning of one word, you have to know the meanings of other words.
- definitions often circular

- **Mental image**

  But:

  - Different people have different mental images of the same words.
  - Usually it is an image of some prototype.
  - It is hard to find mental images for some words (*the, he, aspect*).

- **Reference** – The meaning of a word is the actual thing in the real word. Works for *chair, house*, etc.

  But:

  - *tooth fairy, unicorn*, abstract nouns (*history*), adjectives (*big*), etc.
  - different expressions with the same reference
    Václav Klaus and *the current Czech president* refer to the same object, so in this view, they should have the same meaning. But:
    1. If they had the same meanings, one should be replaceable by the other.
       Peter does not know that Václav Klaus is the current Czech president. – ok
       Peter does not know that Václav Klaus is Václav Klaus. – strange
    2. Intuitively, these expressions have different meaning.

- **Parallel worlds** – works, but quite complicated and not very intuitive. One world says how things really are, the other worlds say how things could be. Meaning of a word is the collection of it's references in all worlds.
  In some worlds, Václav Klaus is the current Czech president, in some he is not. Therefore in this theory, *Václav Klaus* and *the current Czech president* have different meanings, as we want.

2.1 Relations between words

- **synonym** – a word having the same or nearly the same meaning as another word.

  e.g. *gearbox – transmission*, *choice – selection*, *complex – complicated*; *zde – tady* 'here', *ekonomika – hospodářství* 'economy' – *pěkný*, *kromě – mimo* 'except'

  synonym: From Greek: *syn* (*same, together*) + *onoma* (*name*).
  Cf. *synergy, symbiosis, symphony*; *name, nominate, anonymous, pseudonym*

- **antonym** – a word having the opposite meaning as another word.

  e.g *happy* vs. *unhappy*, *heavy* vs. *light*, *long* vs. *short*

  antonym: From Greek: *anti* (*opposite, against*) + *nomen* (*name*).
  Cf. *antibiotic, Antichrist, antivirus*

- **subordinate word** (hyponym) – a word whose meaning is included in the meaning of another word.

  e.g. *red* < *color* (*red* is subordinate to *color*), *pony* < *horse* < *animal*, *tulip* < *flower*

  This is not whole-part relationship, so *page* is *not* subordinate term of *book*.

  hyponym: From Greek: *hypo* (under) + *nomen* (*name*).
  Cf. *hypothermia, hypoallergenic, hypoglycemia, hypothesis, hypothalamus*

- **superordinate word** (hypernym) – a word whose meaning includes meaning of another word. If X is superordinate to Y then Y is subordinate to X.

  e.g. *color* > *red, black, green, ...*; *animal* > *horse, tiger*, ...

  hypernym: From Greek: *hyper* (over, beyond) + *nomen* (*name*).
  Cf. *hyperactive, hypertension, hypertext, hyperbole*

- **meronym** – denotes part/member of something.

  e.g. *page* is a meronym of *book*, *wheel, engine, ...* are meronyms of *car*

  meronym: From Greek: *meros* (*part*) + *nomen* (*name*).
  Cf. *polymer, merit*

- **holonym** –opposite of meronym

  holonym: From Greek: *holon* (*whole*) + *nomen* (*name*).
  Cf. *hologram, holistic, catholic, holocaust*

- **homonym** – a word having a different meaning, but the same form as another word.

  e.g. *bear* (verb) vs. *bear* (noun, animal), *bank* (institution) vs. *bank* (river bank)

  kolej 'rail' vs. *kolej* 'dormitory', *jí* 'eats' vs. *jí* 'she$_{dat}$', *ženou* 'woman$_{inst}$' vs. *ženou* 'hurry/herd$_{3pl}$'

It is possible to distinguish homophones (same sound) and homographs (same spelling)

homonym: From Greek: *homos* (*same*) + *nomen* (*name*). *homogeneous, homosexual*. Not related to *homo sapiens*.

Homonymy and synonymy – complementary notions

- synonyms – the same meaning, different forms.
- homonyms – the same form, different meanings.

Semantic network (Wordnet) – a special kind of dictionary – words are organized into a network, where different relations connect synonyms, different antonyms, etc. Useful for translators or computational linguistics.

3 The Meaning of Sentences

Knowing the meaning of words is not enough to understand the meaning of a sentence:

- Two sentences with the same words can mean something different:

  (1) a. *A tourist eats a tiger.*
  b. *A tiger eats a tourist.*

- Two sentences with some of the words different can mean the same:

  (2) a. *A tiger eats a tourist.*
  b. *A tourist is eaten by a tiger.*

You must know that in English:

- In active sentences, the one who does something precedes the verb.

  (3) *A tiger eats a tourist.*
  eater eaten

- In passive sentences, the one who does something follows the verb and has a preposition *by*.

  (4) *A tourist is eaten by a tiger.*
  eaten eater

There are many rules like that that help you to get the meaning of the sentence out of the meaning of the words. You know them for your native language unconsciously, but you have to learn them for foreign languages.

The Principle of Compositionality: The meaning of an expression is a function of the meanings of its parts and of the way they are syntactically combined.

Note: Each of the key terms in the principle of compositional is a theory-dependent term.

Entailment: $\phi \models \psi$ iff (if ϕ is true then ψ must be true)

Basic ideas of Montague grammar

1. Syntactic categories correspond to semantic types. E.g. S to Proposition, N to property of entities, V to properties of events
2. Lexicon specifies the semantics and syntax of basic expressions.
3. Syntactic rules correspond to semantic rules (e.g. function application may correspond to function application)

4 Other things about semantics

4.1 Things modern semantics studies

- tense and aspect – different languages use different tenses/aspects to express the same thing.
- ellipsis – *John read the paper before Bill did.*
- determiners – different languages use determiners in different way
- relation between semantics, pragmatics and intonation
- etc.

It is closely related to formal logic.

4.2 Examples of Applications

Where semantics can be helpful:

- In the creation of dictionaries and thesauruses – both necessary for improving knowledge of your native language or in learning foreign languages.
- In teaching computers to process language:
  - Web and library searches – When trying to repair a car transmission we do not want web sites about information transmission.
  - Machine translation – We probably want to translate *bank* differently in *investment bank* and in *West Bank*.
  - Automatic creation of manuals, etc. – You describe the semantics of the text, and then a program creates corresponding texts in several languages.

4.3 If you want to know more

- English Wordnet at Princeton: `http://www.cogsci.princeton.edu/~wn/`

  Search – http://www.cogsci.princeton.edu/cgi-bin/webwn – First search for some word (*vegetable*) then search for synonyms, antonyms, hypernyms, etc.
- The Global WordNet Association: `http://www.globalwordnet.org`

  Wordnets in various languages.
- B. Partee's course in formal semantics: `http://people.umass.edu/partee/MGU_2007/MGU07_formal_semantics.htm`