

729G49 Språk och datorer (VT2024)

Semantics

Linguistics 6

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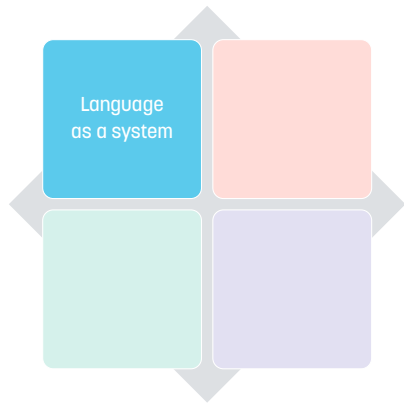
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Based on material from
Mikael Svensson & Evelina Rennes.

Reminder: Language as a system

- **Phonology:** the study of sounds in a language and how they are organized
- **Morphology:** the study of how words are built up from “smallest meaningful units”
- **Syntax:** the study of how words combine to form phrases and sentences
- **Semantics:** the study of the meaning of linguistic expressions



This lecture

■ Introduction to semantics

- What is semantics?
- Semantic features
- Lexical vs. phrasal semantics

■ Lexical semantics

- Lexeme & lemma
- Idioms & ambiguity
- Lexical relations

■ Phrasal semantics

- Thematic roles
- Formal semantics
- Entailment & contradiction

Introduction to Semantics



Semantics (*semantik*) studies what words, morphemes, phrases, and sentences mean.

“*In semantic analysis, there is always an attempt to focus on **what the words conventionally mean**, rather than on what an individual speaker might think they mean, or want them to mean, on a particular occasion. [...] Doing semantics is attempting to spell out **what it is we all know** when we behave as if we share knowledge of the meaning of a word, a phrase or a sentence in a language.*”

— Yule (2020)

Semantics vs. syntax

- Sentences can be syntactically good, but semantically odd.

The hamburger ate the boy.

The table listens to the radio.

The horse is reading the newspaper.



The role of semantics

All linguistic analysis relates to the meaning of an expression.

- **Phonology:** /bil/ and /fil/ have different meanings → /b/ and /f/ are phonemes
- **Morphology:** *bil* is a car, *bilar* is multiple cars → *-ar* is a plural suffix
- **Syntax:** *han såg [mannen med teleskopet]* vs. *han såg mannen [med teleskopet]*; different meanings → different syntactic structures

Semantics vs. pragmatics

Kan du stänga fönstret?

- **Semantics:** conventional meaning, context-independent
 - A question to the addressee about their ability to close the window.
- **Pragmatics:** intended meaning, context-dependent
 - A polite request to close the window.

Componential analysis

	boy	girl	man	woman	horse	stallion
human	+	+	+	+	-	-
adult	-	-	+	+		+
female	-	+	-	+		-

The _____ *is reading the newspaper.*
Noun [+ human]

Prototypes

Which of these is the best example of a “bird”?



- A **prototype** is the “most typical” example of a category.
 - Here: the word *bird*

Lexical vs. phrasal semantics

- **Lexical semantics** (*lexikal semantik*) looks at meaning on a **word level**.
 - Meaning of individual words
 - Semantic relations *between* words
- **Phrasal semantics** (*satssemantik*) looks at meaning on a **sentence level**.
 - Semantic relations between sentences
 - Semantic relations between parts of a sentence
 - Truthfulness of statements

Lexical vs. phrasal semantics

Paul just bought a house.

- **Lexical semantics**

- *Paul* is a name typically referring to a male person.
- *A house* is a type of *building* that people *live in*.

- **Phrasal semantics**

- *Paul* is the agent performing a *buying* action.
- *Paul just bought a house* implies *Paul owns a house*.

Lexical semantics



The aim of lexical semantics

- Describe the **meaning of individual words** in a language.
 - “What is the meaning of *bird*?”
- Describe how word meanings in a language are **related** and **organised**.
 - “How does the meaning of *bird* relate to the meaning of *woodpecker*?”

Orthographic word, lexeme, lemma

- An **orthographic word** (*ortografiskt ord*) is a word form “as it would be written.”
 - *lova, lovar, lovade, lovat, lovas, lovande*
- A **lexeme** (*lexem*) is an abstract unit of meaning.
 - LOVA¹: styra ett fartyg upp mot vinden
 - LOVA²: ge löfte om
 - LOVA³: berömma, prisa
- A **lemma** is a word form chosen to represent a lexeme.
 - Here: *lova*
 - “dictionary form”

Compare: *lova* in SAOB

Lexeme vs. lemma

Han lovade och har man lovat så har man.

- Same **lexeme**, same **lemma** (*lova*)

Han lovade att han skulle lova upp båten.

- Different **lexemes**, both with the same **lemma** (*lova*)

Collocations

- A **collocation** is a sequence of words that often occur together.
- Which words can or cannot be used together is often **lexically** determined.

*ruttna ägg ↔ *ruttet smör*

**härskna ägg ↔ härsket smör*

borsta tänderna

**putsa tänderna*

Idioms

- **Idioms**, or **idiomatic expressions** (*idiomatiska uttryck*), are fixed phrases with fixed meanings that cannot be inferred from their parts.

Han köpte ris i säcken.

Han köpte grisen i säcken.



Ambiguity and vagueness

- **Lexical ambiguity** (*tvetydighet*) can arise if there are multiple lexemes for one word.
 - *Jag såg en torsk.*
 - *Jag såg en torsk i fiskdisken.* (TORSK¹: fisk)
 - *Jag såg en torsk på Malmskillnadsgatan.* (TORSK²: sexköpare)
- **Semantic vagueness** (*vaghet*) is the phenomenon where words are intentionally underspecified in some aspect of their meaning.
 - *De förflyttade sig 500 meter.* — underspecified in “manner”
 - *De sprang/gick/åkte bil/cyklade/ålade/simmade/red 500 meter.*

Lexical relations

- **Lexical relations** describe the meaning of lexemes in relation to each other.
- The most commonly used lexical relations are:
 1. **Homonymy & Polysemy**
 2. **Synonymy & Antonymy**
 3. **Hyponymy & Hypernymy**

Homonymy & polysemy

- **Polysemy** (*polysemi*): words that have multiple **related** meanings
 - Vår skola instiftades på medeltiden. ← institution
 - Vår skola vann i skoltävlingarna. ← elever som bevista institutionen
 - Han bor mittemot skolan. ← byggnaden

- **Homonymy** (*homonymi*): words that have **unrelated** meanings, but “look” the same
 - En fil är ett verktyg av härdat stål.
 - Hur skickar man en stor fil genom nätet?

Compare: *skola* in SAOB

Homonyms

same spelling

same pronunciation

|

|

- Some homonyms are both **homographs** and **homophones**.

- *fil* (plural *filar*) ↔ *fil* (plural *filer*)

- *fara* (noun) ↔ *fara* (verb)

- Some homonyms are **only homographs**.

- *köra* (framföra fordon) ↔ *köra* (sjunga i kör)

- *anden* (i flaskan) ↔ *anden* (i dammen)

- *tomten* (på julen) ↔ *tomten* (vid huset)

Homonymy or polysemy?

krona



polysemous
(with each other)

homonymous
(with the other two)

Synonymy & antonymy

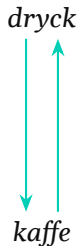
- **Synonymy (*synonymi*)**: words that have **approximately identical** meanings
 - *kvinna–dam, träffas–mötas, frisk–rask–kry*
 - But: *kvinnokamp* ≠ *damkamp*
- **Antonymy (*antonymi*)**: words that have **“opposite”** meanings
 - Classic example: *varm–kall*
 - But: “opposite” can be interpreted in different ways...

Types of antonymy

- **Complementary antonyms** (*komplementära/binära motsatser*)
 - gift–ogift (“inte gift”), levande–död (“inte levande”)
- **Gradable antonyms** (*gradmotsatser*)
 - smal–tjock, varm–kall, glädje–sorg
 - lite tjock, mycket varm, but not *lite död
- **Reversives** (*reverser*) are actions that happen in opposite directions
 - komma–gå, hämta–lämna
- **Converses** (*konverser*) describe the same situation/relation from opposite directions
 - leverera–mottaga, låna–låna ut, lärare–student

Hyponymy & hypernymy

- **Hyponym:** more specific meaning (*'underordnade begrepp'*)



- **Hypernym:** more general meaning (*'överordnade begrepp'*)

- We can construct a hierarchy of words through hyponymy.
 - *djur* → *ryggradsdjur* → *fågel* → *tätting* → *svala* → *hussvala*
 - *fågel* is a hyponym of *djur*; *fågel* is a hypernym of *svala*



Phrasal semantics

(Satssemantik)



The aim of phrasal semantics (*satssemantik*)

- Describe the **meaning of phrases and sentences** in a language.
 - “What is the meaning of *the ball* in the sentence *I kicked the ball*?”
- Describe how sentences in a language are **related**.

Thematic roles (also called semantic roles)

- Lexical verbs define **thematic roles** (*tematiska roller*) for their required constituents.
 - *sparka* [AGENT, THEME]
- These roles are the same regardless of how they are expressed grammatically.

Kalle *sparkade* *bollen*
AGENT THEME
subject direct object

Bollen *sparkades av* *Kalle*
THEME AGENT
subject rection/
prep. object

Common thematic roles (I)

- **AGENT**: the entity that performs the action
 - *Dennis skalade potatisen.*
- **PATIENT**: the entity that is affected/changed by the action
 - *Dennis skalade potatisen.*
 - *Olle krossade stenen.*
- **THEME (tema)**: the entity that is involved in, moved by, or described by the action
 - *Olle kastade stenen.*
 - *Bollen ligger i gräset.*

Note: some frameworks don't make a distinction between PATIENT and THEME, and call both of them THEME.

Common thematic roles (II)

- **EXPERIENCER** (*upplevare*): an entity that has a feeling, perception, or state
 - Jag känner mig nervös.
 - Han hörde sirener.
- **INSTRUMENT**: what is used by an agent to perform an action
 - Han lämnade av henne med sin bil.
- **LOCATION**: the place where an entity is located
- **SOURCE**: something from which an entity moves
- **GOAL**: something that an entity moves to

Thematic roles vs. grammatical functions

- Semantic roles often **correlate with grammatical functions**.
 - The **AGENT** or **EXPERIENCER** is often the **subject**.
(common exception: passive constructions)
 - The **PATIENT** or **THEME** is often the **direct object**.
 - An **INSTRUMENT** is often a **prepositional object**.
- Roles can be used to describe the **relation between a verb and its arguments**.
 - *sparka* requires an **AGENT** and a **THEME**
- There's a **large variety** in which semantic roles are used and how they are defined!

Formal semantics

- A common issue in semantics is **circularity**: we “use language to describe language”
- **Formal semantics** uses tools from mathematical logic to “formalize” meaning.

Alla igelkottar är vänner med en giraff.

$$\forall x [\text{IGELKOTT}(x) \Rightarrow \exists y (\text{GIRAFF}(y) \wedge \text{VÄN}(x, y))] \quad (1)$$

$$\exists y [\text{GIRAFF}(y) \wedge \forall x (\text{IGELKOTT}(x) \Rightarrow \text{VÄN}(x, y))] \quad (2)$$

- In (1), there can be different giraffes; in (2), it is one and the same giraffe.

Scope ambiguity

All that glitters is not gold.

- Sentences like these are examples of **scope ambiguity**.
- Most often, they relate to the scope of **quantifiers** (such as *all* or *every*) or **negation**.

$$\forall x[\text{GLITTER}(x) \Rightarrow \neg \text{GOLD}(x)] \quad (3)$$

- “If something glitters, then it is not gold.” (??)

$$\neg[\forall x(\text{GLITTER}(x) \Rightarrow \text{GOLD}(x))] \quad (4)$$

- “It is not the case that if something glitters, it is (always) gold.” ← intended meaning

Phrasal relations

- **Truth conditions** can be used to describe relations between sentences.
- **Entailment**: If “A is true” implies “B is true”, then A **entails** B.
 - *Kalle slutade röka. \Rightarrow Kalle rökte.*
 - *Några killar spelar fotboll. \Rightarrow Några människor spelar fotboll.*
- **Contradiction**: If A and B can't be true at the same, they **contradict** each other.
 - *Mannen kontrollerar soldatens uniform. $\Rightarrow \Leftarrow$ Mannen sover.*
- In other cases, A and B are **neutral** with respect to their truth values.

Wrapping Up



Wrapping up

Before the seminar

Do the following exercises:

- *Övningsuppgifter* from the website

