Foundations of Linguistics

MSc Cognitive Systems

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Course Details

- Large self-study component
- Approximately biweekly schedule:
  - Reading
  - Do problem sets
  - Meet to discuss readings and problem sets (alternate weeks)
- Exam: Written exam
- Next Meeting: Oct 22
  - present your language (where spoken, how many speakers…)
  - start discussing Morphology

Language Profile

- Pick an “interesting” language (not English/German)
- Find out about its profile
- Present details to class
- develop the language profile throughout the whole semester

- By next Tue: send me your language name by email!

Foundations of Linguistics

Why do we care?

Grammar 1/3

- In modern linguistics, a grammar is viewed as a set of abstract devices, rule systems and principles that serve to characterize the well-formed sentences of a language.

(1) I ate lunch with him. ⇨ well-formed, grammatical

(2) * Lunch with ate I him. ⇨ ill-formed, ungrammatical

Cf. a formal language like html:

```
<meta name="description" content="Die Webseite
  von Tatjana Scheffler.">
```

Grammar 2/3

- Descriptive grammar vs. prescriptive grammar:

(1) John doesn't wanna eat.

- Grammaticality vs. processing difficulty:

(2) The mouse the cat the kid likes caught escaped.

The mouse escaped.
The mouse the cat caught escaped.
The mouse the cat the kid likes caught escaped.

Grammar 3/3

- Grammars of natural languages are psychologically real, they are in our minds, they are part of our cognitive systems.

Linguistic competence

≠

Linguistic performance

Ways of „doing Linguistics“

- **Generative grammar** (-> Noam Chomsky)
  - What do natural languages have in common („universals“)?
  - How can we model man‘s knowledge of language and language processing?
  - Important method: Introspection, intuitive judgement on „grammaticality“
- **Structuralism** (-> Ferdinand de Saussure, Roman Jakobson)
  - Investigate the mechanisms of culturally-transmitted symbol systems
  - How can we describe a linguistic entity/phenomenon in relation to the overall system?
  - Important method: Qualitative analysis of language data
- **Corpus Linguistics** (-> Henry Kucera)
  - What patterns can be observed in language data?
  - How can we model „language use“ for one particular language?
  - Important method: Quantitative analysis of language data („corpora“)

Levels of Linguistic Analysis

Pragmatics – Discourse/Context

Semantics – Meaning

Syntax – Grammar

Morphology – Word Formation

Phonology – Sound System

Phonetics – Sounds

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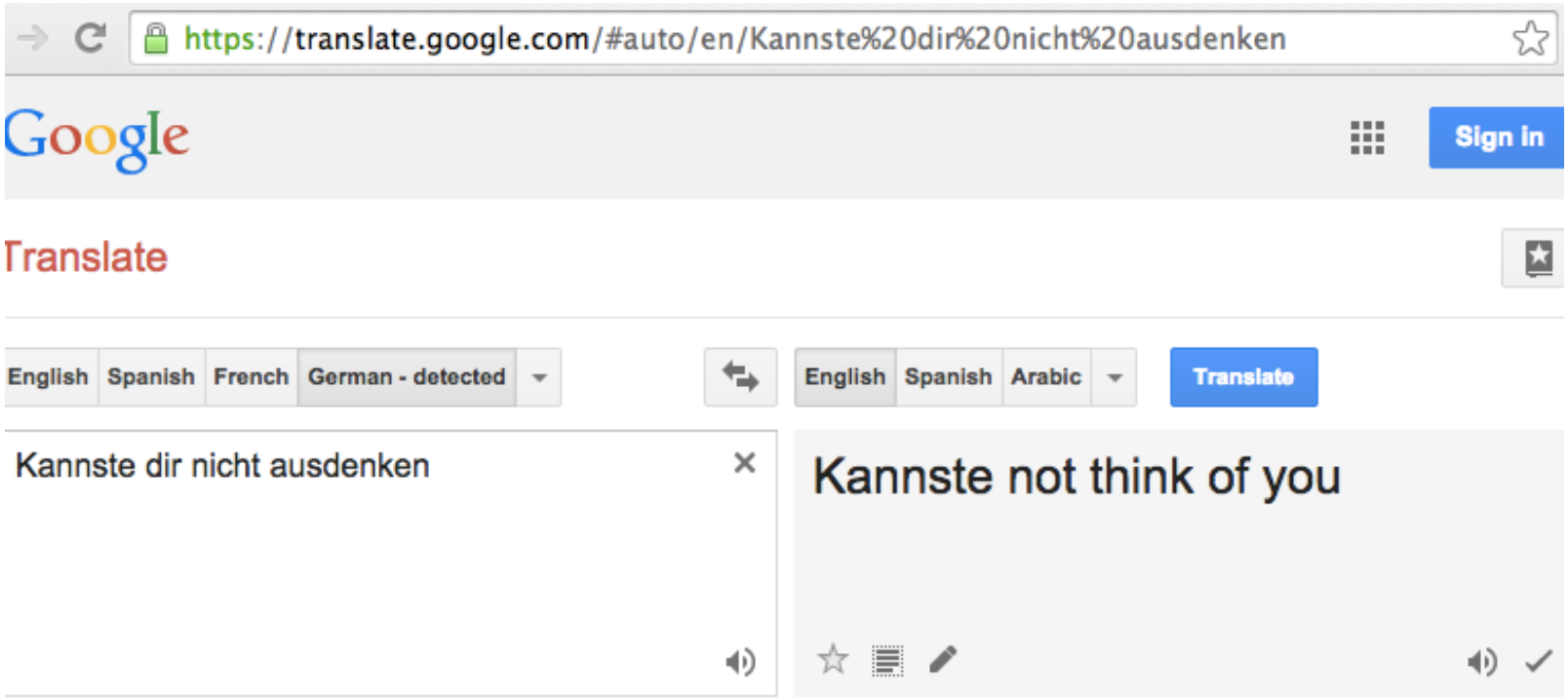
Morphology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Google
Sign in
Translate
English Spanish French German - detected
English Spanish Arabic
Translate
Kannste dir nicht ausdenken
Kannste not think of you

Syntax

Marge is showing Lisa her box of Shattered Dreams (which she keeps in her Disappointment Closet).

Lisa: Mom, it's not too late to unshatter your dreams! Martha Graham danced well into her 70s!
Marge: You mean she danced well, into her seventies, or danced, well into her seventies?
Lisa: Well, she danced into her seventies!

(The Simpsons, via Heidi Harley)

Semantics

"What's your sister doing?"

"She's painting a cow."

Semantic knowledge

SEMANTICS

LEXICAL
Simple units

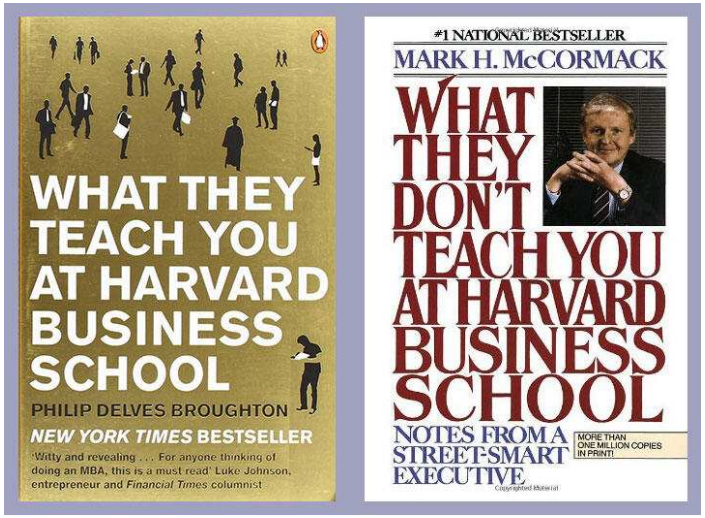
- Features
- Semantic fields
- Characterization in terms of Model Theory
- Word embeddings

COMPOSITIONAL
Complex units

- Procedure to derive the meaning of complex units from that of simple units
- Semantic parsing

Pragmatics

@James_Kpatrick: These two books contain the sum total of all human knowledge



Semantics vs Pragmatics

- **Semantics**: What does a sentence / an utterance mean „generally“, i.e. independent of context

- **Pragmatics**: What does a sentence / an utterance mean in a particular context
  - the situation of uttering
  - the preceding linguistic context

Linguistic Knowledge

- The meaning of a complex expression does not only depend on its lexical units but also on the way these are combined syntactically and phonologically.

(1) a. The panic among the visitors caused a stampede.

b. A stampede caused the panic among the visitors.

(2) a. I only gave ANNA a book. ⇨ "only Anna"

b. I only gave Anna a BOOK. ⇨ "only a book"

Linguistic Knowledge

- Semantic-pragmatic knowledge is productive. We understand utterances that we have never heard before.

(1) I saw a pink whale in the parking lot.

cf. Addition of two new numbers:

(2) 1437,952 + 21,84

Linguistic Knowledge

- Knowledge of the meaning of the lexical units and of the combination procedure is by and large unconscious (as opposed to that in arithmetic operations).

- Beispiel 1: Partikel *ja*

(1) Der Tatort letzte Woche spielte ja wieder in Münster.

Why bother?

(1) a. Kim sent Pat Chris.

b. Kim sent Pat to Chris.

c. Kim was sent to Pat by Chris.

d. Kim was sent Pat by Chris.

(2) a. 田中　が　ライオン を　食べた。
Tanaka ga raion wo tabe-ta
Tanaka NOM lion ACC eat-PST
'Tanaka ate the lion.' [jpn]

b. 田中　を　ライオン が　食べた。
Tanaka wo raion ga tabe-ta
Tanaka ACC lion NOM eat-PST
'The lion ate Tanaka.' [jpn]

c. 田中　が　ライオン に　食べられた。
Tanaka ga raion ni tabe-rare-ta
Tanaka NOM lion DAT eat-PASS-PST
'Tanaka was eaten by the lion.' [jpn]

d. 田中　が　ライオン に　ケーキ を　食べられた。
Tanaka ga raion ni keeki wo tabe-rare-ta
Tanaka NOM lion DAT cake ACC eat-PASS-PST
'The lion ate the cake (to Tanaka's detriment).' [jpn]

(3) a. Kim gave Sandy a book.

b. Kim gave a book to Sandy.

c. A book was given to Sandy by Kim.

d. This is the book that Kim gave to Sandy.

e. Which book do you think Kim gave to Sandy?

f. It's a book that Kim gave to Sandy.

g. This book is difficult to imagine that Kim could give to Sandy.

~7000 languages

- all current NLP methods are worse for non-English
- not only due to sparser data
- in some ways, many languages are genuinely 'harder' than English:
  - free word order, scrambling
  - rich morphology, prefixing, etc.
  - spelling systems
  - sounds
  - …

Thank you

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