

Mechanisms of Meaning

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Plan for Today

- We will discuss the following two **papers**:
 - * Mirella Lapata (2001) A Corpus-based Account of Regular Polysemy: The Case of Context-sensitive Adjectives, in Proceedings of NAACL, pp. 63-70, Pittsburgh, PA.
 - * Adam Kilgarriff (1997) I don't believe in word senses, Computers and the Humanities, 31:91-113.
- We will discuss the **homework** to be done in the coming couple of weeks (recall that the following two classes are cancelled.)

A Corpus-based Account of Regular Polysemy

Lapata (2001) A Corpus-based Account of Regular Polysemy: The Case of Context-sensitive Adjectives, in *Proceedings of the NAACL*, 63–70, Pittsburgh, PA.

- **Topic under investigation:** polysemous adjective-noun combinations.
- **Approach:** probabilistic model of the polysemous meanings of adjective-noun combinations which acquires such meanings from corpus-based data.
- **Motivation:** according to GL, the adjective binds the telic role of the noun, but theoretical models do not give an exhaustive list of the events a noun can be related to, nor have anything to say about the likelihood of possible interpretations.

⇒ *Example from M. van Lambalgen's guest lecture in LoLaCo course*

A nice example from Michiel van Lambalgen's guest lecture "Logic in a Neuroscience Lab" in the LoLaCo MoL course on Sept 13:

I began the novel in early december.

[reading, writing]

The pupils were very attentive and fascinated by the story.

[explaining]

However some found dictation extremely boring.

[dictating]

A Corpus-based Account of Regular Polysemy

Lapata (2001) A Corpus-based Account of Regular Polysemy: The Case of Context-sensitive Adjectives, in *Proceedings of the NAACL*, 63–70, Pittsburgh, PA.

- **Proposal:** The meaning of adjective-noun combinations can be paraphrased using a verb that instantiates the telic role of the noun. Given an adjective-noun combination, the proposed model exploits the likelihood of any verb to be modified by the adjective/adverb and to take the noun as argument to propose a ranking of possible meanings.
- **Evaluation and Results:** The results obtained with the probabilistic model are compared against human judgements. The output of the model correlates significantly with human intuitions and performs consistently better than a baseline model.

“I don't believe in word senses”

Adam Kilgarriff (1997) “I don't believe in word senses”, *Computers and the Humanities*, 31:91-113.

- **Topic under investigation:** This is a more theoretical paper that tackles foundational issues. How adequate are current [1997] accounts of “word sense”?
- **Motivation:** The problem of Word Sense Disambiguation (WSD) takes for granted the notion of “word sense”. However, existing accounts of such a notion do not seem to be well-founded.
- **Proposal:** Word senses as clusters of usage instances extracted from corpus evidence. Importantly, clusters (senses) are domain- and task-dependent – in the abstract (independently of a particular purpose) they do not exist.

Motivation: What are the problems with existing accounts of word senses according to the author?

- Fact: there is a one-to-many relation between word forms and senses.
- How are the different senses of a word related to one another? The common assumption is that there are basically two options (dif. terms):
 - * unrelated senses: ambiguity; sense selection; (homonymy')
 - * related senses: polysemy; indeterminacy/vagueness; sense modulation
- Given this theoretical distinction, it should be possible to classify pairs of examples as instances of either ambiguity or polysemy.
- However, there isn't a set of criteria or tests that allows us to reliably make such classification (\rightsquigarrow *what are the problems Kilgarriff points out?*)
- Semantic judgements are problematic; psycholinguistic findings may help us out...
- ...but this does not seem to be enough to provide a solid theoretical grounding for the above distinction.

Proposal: switch from subjective to objective methods; from introspective judgements to contexts.

- * Extract concordances for a word (occurrences in context, with the key word aligned)

Part of a concordance for *'handbag'* in the British National Corpus (BNC):

they might a Cartier watch or a Chanel **handbag** . It is the Rolls-Royce of pens; prices could cost you money! If you carry a **handbag** , make sure it has a secure clasp or zip dog worth his salt would bite open a **handbag** to get to the chocolate? " " It 's pieces and could n't even find a **handbag** . Of course now they 're recalling told by men) are about hanging a **handbag** on the pulled-out choke or never being which could nevertheless fit into a **handbag** . The magazine circulated his trousers hit him over the head with a **handbag** and he launched himself instantly at and a baby inadvertently left in a **handbag** at Victoria Station left-luggage office in and out of expensive perfume and **handbag** shops. One or two ruined houses could

You can extract concordances from several English corpora here:

<http://corpus.leeds.ac.uk/protected/query.html>

- * Divide them into clusters corresponding to senses – the inventory of senses will depend on the rationale behind the clustering process.

“I don't believe in word senses”

Adam Kilgarriff (1997) “I don't believe in word senses”, *Computers and the Humanities*, 31:91-113.

Conclusions:

- The basic units to characterize word meaning are occurrences of words in context.
- Word senses are reduced to abstractions over clusters of word usages.
- The rationale behind clustering is domain dependent: word senses can only be defined relative to a set of interests.

Homework for Coming Weeks

- **Homework 1:** Summary of the CSL talk on Wednesday.
- **Homework 2:** Semantic annotation exercise.
- **Homework 3:** Next topic starting on Monday 11 October: psychological theories of concepts and word meaning.
 - * Readings: selected chapters from Murphy (2002) *The Big Book of Concepts*
 - * Student presentations: need to decide who presents what.

Homework 1

- Attend the talk by Stefan Evert on “Distributional Semantic Models” [Computational Linguistics Seminar on Wed 22, 4pm].
- Write a summary of the talk. It should include two parts
 - * an objective summary of the contents of the talk where you do not give your opinion, and
 - * a critical comment where you do give your opinion.
- Practical matters:
 - * Minimum 1 page; maximum 2 pages.
 - * Sent to me via email (raquel.fernandez@uva.nl) as a PDF attachment with your name (e.g. raquel-summary.pdf)
 - * Due on **Monday 27 September**.

Homework 2

Semantic Annotation Exercise:

Adapted from an exercise designed by Gemma Boleda; Computational Lexical Semantics (ESSLLI 2009).

- Hands-on exercise on semantics judgements regarding one type of semantic relation
- Task: decide, for each sentence in a data set, whether two nouns bear the semantic relation Content-Container.
- Actual task in a competition on Semantic Evaluation: SemEval-1 in 2007. See <http://www.senseval.org/> and <http://semeval2.fbk.eu/> for the latest SemEval this year.

- * The `<e1>apples</e1>` are in the `<e2>basket</e2>`.
Content-Container(e1, e2) = **true**
- * The `<e1>silver</e1>` `<e2>ship</e2>` usually carried silver bullion bars, but sometimes the cargo was gold or platinum.
Content-Container(e1, e2) = **true**
- * Summer was over and he knew that the `<e1>climate</e1>` in the `<e2>forest</e2>` would only get worse.
Content-Container(e1, e2) = **false**

Semantic Annotation Exercise: Instructions

- Download the data set and the guidelines from the course website (further examples of positive and negative instances in the guidelines).
- Read the definition of the semantic relation carefully, and annotate the data set according to it:
 - * create a text file or a spreadsheet file;
 - * make sure you use one line per item in the data set;
 - * use the label **true** if the relation holds and **false** if it doesn't.
- Your annotation file will look like this:

```
true  
true  
false  
...
```

Each line corresponds to one sentence in the data set. Use only one label per line (do not include the sentence number).

- Name your annotation file with your name (e.g. raquel-annotation.txt)
- Due on **Monday 4 October**, sent via email as an attachment (text, excel or open office format).

Semantic Annotation Exercise: Instructions

- Do it independently without discussing among yourselves!!
- There are no “correct” and “incorrect” answers.
- We will calculate the *inter-annotator agreement* among yourselves and with respect to a *gold standard* in class.
- Make a note of those examples where you were doubtful between **true** and **false**. What was the problem?
- In those cases where you chose **false**, which semantic relation would have been appropriate? Here are a few possibilities:
 - * Cause-Effect (e.g., virus-flu)
 - * Instrument-Agency (e.g., laser-printer)
 - * Product-Producer (e.g., honey-bee)
 - * Origin-Entity (e.g., rye-whiskey)
 - * Theme-Tool (e.g., soup-pot)
 - * Part-Whole (e.g., wheel-car)
- We will discuss this in the next class.

Homework 3

Readings and presentations of selected chapters from
Murphy (2002) *The Big Book of Concepts*, MIT Press.

- Chapter 2: Typicality and the Classical View of Categories
 - * we need a volunteer to present this on Monday 11 October
- Chapter 3: Theories
 - * we need a volunteer to present this on Monday 18 October
- Chapter 11: Word Meaning
 - * we need a volunteer to present this on Monday 18 October

Course Evaluation:

- Homework 25%
- Presentations of readings 25% (1 or 2 presentations per head)
- Final paper + presentation 50%