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Preparatory course WS2011 - Semantics

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SLIDES: Josef R. Ruppenhofer

Introduction

Semantics

J. Ruppenhofer, A. Palmer

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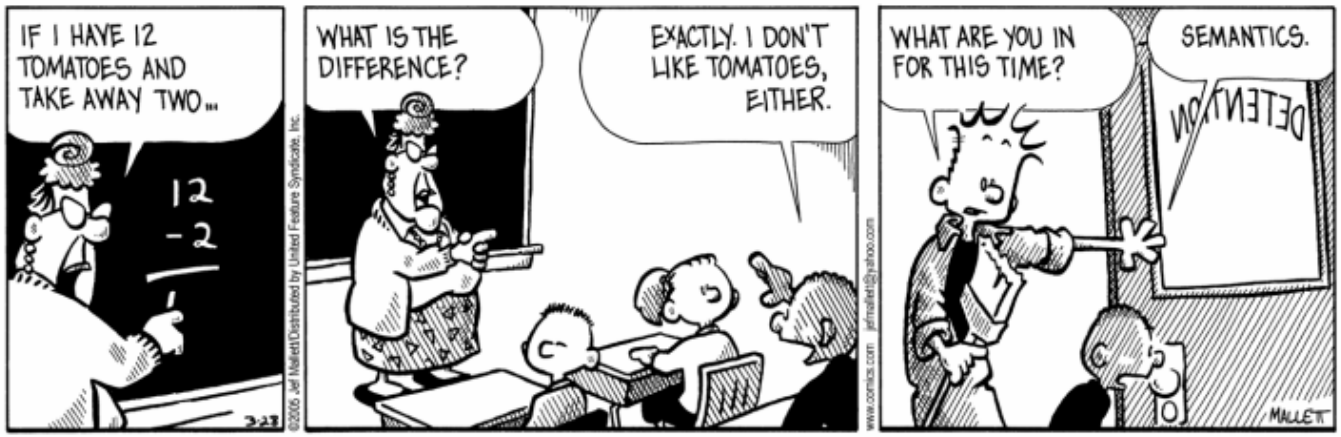

Goals

- Tell you about central ideas in the study of semantics
- Go over different linguistic units whose meaning can be analyzed
- Get to know different approaches to semantic analysis
- See some connections to other fields and talk about applications of semantic analysis

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- Phonetics
- Phonology
- Morphology
- Syntax
- **Semantics**
- Pragmatics

Language as a sign system

- icon: similarity between `signifier` and `signified` (*meow*, *moo*)
- index: signifier closely associated with signified (smoke $\rightarrow$ fire)
- symbol: link between signifier and signified is only conventional

Arbitrariness v. iconicity

- Arbitrariness of the sign (Ferdinand de Saussure): you can't know what a word means from what it looks like; nor can you know what the word for a given concept should be

French	English	German	Hungarian
mur	wall	Mauer	fal
monnaie	money	Geld	pénz
table	table	Tisch	asztal

- Iconicity: some concepts are encoded by words that tend to be more similar than expected across languages (*meow*, *moo*, *sizzle*) because the signs are similar to what they represent

Iconic bits of language: Phonesthemes

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- Phonesthemes are interesting because they appear to be a case where the internal structure of the word is non-compositional; i.e., a word with a phonestheme in it has other material in it that is not itself a morpheme.
- The word onset *gl-* is overrepresented in words related to light and vision (gleam, glisten, glow, glare, glint, glitter, glance, glare)
- Can you come up with other phonesthemes in English?

The job of semantics (and semanticists)

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- Users of language can encode and decode a lot of different meanings, in fact, an open-ended set of meanings
- Semantics tries to discover and describe speakers' knowledge about meanings
- Central question: what is the nature of meaning?

The nature of meaning: 3 major themes/schools of thought

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1. Semantics is about the link between words and things in the world
   - truth conditions
   - sentence meaning
2. Semantics is about the link between words and mental models (of the real or of imaginary worlds)
   - conceptualization
   - lexical meaning
3. Semantics studies language-internal sense relations
   - let philosophers and psychologists worry about conceptualization and the relation to the world

Reference

Nouns "talk about" entities (things in the world)

- Variable vs. constant reference
  - *I*, *you*, *we*
  - *the Pacific Ocean*
- Referents vs. extension
  - entities referred to by an expression on a particular occasion (`the dog`)
  - entities that can possibly be referred to by an expression (*dog*)
- Referring expressions v. Non-referring expressions
  - *if*, *so*, *the*, *at* vs. *cat*, *house*
  - The cat (Felis catus) ... is a small domesticated carnivorous mammal ...

Reference II

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- Names: don't seem to have a sense but manage to refer. How?
  - Description theory (name is a shorthand for knowledge about referent)
  - Causal theory (people name/baptize entities and adopt and spread the name as a convention)
- Definite descriptions can be treated similarly to names
- Definite descriptions have presuppositions
  - The King of France is bald. (Existence: there is a King of France)

Reference III

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- Quantification: generalizing over ranges or sets
  - All/some/no students enjoyed the lecture.
- Computing the interpretation of sentences with quantified NPs is difficult:
  - Every Parisian doesn't wear a beret.
  - That's why Earle Hagen is a famous composer that nobody, including you, ever heard of.
  - Every boy kissed a girl.
  - A girl was kissed by every boy.

Sense v. reference

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- Sense: intensional, decontextualized (an item in a dictionary has senses)
- Words `denote` their extensions
- Referent: extensional, in-context (what is picked out in the world by a particular expression used by a speaker in a particular context)
- Speakers `refer` to referents

Sentence meaning

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- How does the meaning of sentences relate to the meaning of individual words, or intermediate constituents?
- Compositionality: the meaning of a larger expression is determined by the meaning of the components and the way they are put together

Sentence meaning II

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- The meaning of a sentence is its truth value (1 or 0)
- Knowing the meaning of a sentence tells a speaker what conditions have to hold for the sentence to be true (truth conditions)
- Most sentences are true only in particular contexts. But some are always true (tautologies) and some are always false (contradictions):
  - Boys are male human beings.
  - Squares are round.

Sentence meaning III

- Entailment: one sentence A entails another B, if whenever A is true, B is also true, in all conceivable circumstances
  - Barack Obama is the president of the US.
  - Barack Obama is a US citizen.
- Entailment is usually asymmetric, and negation reverses entailment:
  - Barack Obama is not a US citizen.
  - Barack Obama is not the president of the US.
- Paraphrase: Two sentences are synonymous, if they entail each other.
- Contradictory: two sentences can't both be simultaneously false or true
  - Bill is dead v. Bill is alive

Sentence meaning IV

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- Presupposition: if sentence A presupposes B, then B holds whether A is true or false
  - The mayor will open the new school this afternoon.
  - The mayor won't open the new school this afternoon.
  - There is a mayor.

Ambiguity

- Units of language may have more than one meaning.
- At the level of phrases and sentences, we can have structural ambiguity
  - I saw the man with the telescope.
  - I wanted him gone by midnight.
- Thus, the meanings of a larger unit depend on the components and the way they are put together.

The man with the telescope


```
(ROOT
(S
(NP (PRP I))
(VP (VBD saw)
(NP (DT the) (NN man))
(PP (IN with)
(NP (DT the) (NN telescope))
)
)
)
)
```

```
(ROOT
(S
(NP (PRP I))
(VP (VBD saw)
(NP
(NP (DT the) (NN man))
(PP (IN with)
(NP (DT the) (NN telescope))
)
)
)
)
```

Compositional semantics

- Basic ideas: parts of a sentence refer to sets of (ordered n-tuples of) entities
- Combining meanings consists of deriving sets from given sets, or doing set intersection or union
- Pat kissed Kim.
  - transitive verb (`kissed`): the set of pairs of individuals X and Y such that X Verb-ed (kissed) Y
  - transitive verb+object (`kissed Kim`): the meaning of [$_{VP}$ VP NP] is the set of individuals X such that X is the first member of any pair in the meaning of V (`kissed`) whose second member is the meaning of NP (`Kim`)
  - saturated verb phrase+subject (`Pat kissed Kim`): the meaning of [$_{S}$ NP VP] is this truth condition: if the meaning of NP is a subset of the meaning of VP (a set of individuals), then S is true otherwise it is false.

Anomaly: compositional failure

- words have no meaning
- meanings can't be combined by available rules (Colorless green ideas sleep furiously)
- idioms can't be (fully) composed
- metaphor: understanding something about one domain of experience based on the structure of another
  - His argument collapsed.
  - That theory has no foundation.
  - The theory needs more support.
- metonymy: evoking something through a contiguous element of experience
  - I am parked across the street. (driver for car)

Terminology: Utterance, sentence, proposition

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- Utterance: linguistic unit of production
- Sentence: abstract grammatical elements obtained from utterances
- Proposition: logical representation of semantic content, abstracting over:
  - `Voice`: Tony wrecked my car; My car was wrecked by Tony.
  - `Information structure`: It was my car that Tony wrecked; The thing that Tony wrecked was my car; What Tony wrecked was my car.
  - `Speech act`: Did Tony wreck your car? Tony wrecked your car.

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Mental representations

- There is more to meaning than denotation
  - The evening star is the morning star.
- What is the nature of mental representations of word meanings?
  - images? (dog, car; ?war, ?democracy)
  - concepts?
    - But then what is a concept? A propositional description? How can you find out?
  - if you're pessimistic about this line of research $\rightarrow$ referential theory
  - else, stick with conceptual semantics

Concepts

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- Only some concepts are `lexicalized` by single words
- The ones that aren't probably aren't as broadly useful
- The acquisition of concepts by children is an important problem (are some concepts innate?)
- Approaches to describing concepts
  - Necessary and sufficient conditions
  - Prototypes
- Concepts are interrelated

Componential analysis, Feature semantics

- Necessary and sufficient conditions used to describe concepts

	Male	Female
ovine	ram	ewe
equine	stallion	mare
bovine	bull	cow

- But: for some concepts it's very difficult to come up with such features
- Also, speakers talk about things they can't properly define

Prototypes

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- foster mother (legally appointed caregiver)
- adoptive mother (legal guardian)
- birth mother (birthing event)
- nurturing mother (versus wet nurse)
- genetic mother (dna-donor)

Concept relations

- Conceptual hierarchies (is-a)
- We can think of the attributes of the concepts as either necessary and sufficient conditions or as prototypical properties
- Research by Rosch and colleagues has shown that there is a `basic level` of categorization; e.g. dog is basic level while dachshund is subordinate and canine is superordinate
  - simpler, shorter words
  - children learn them faster
  - used more frequently
  - used in spontaneously naming objects

What is the relationship between lexicalized concepts and general reasoning abilities?

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- linguistic relativity: lexicalized concepts impose restrictions on possibly ways of thinking
- language of thought hypothesis:
  - there is thinking that does not use linguistic knowledge (e.g. rotating geometrical figures in your head)
  - based on that, hypothesis that thinking and speaking use altogether different representations
  - also, language is underspecified: speakers mean more and hearers understand more than the words say
  - speakers of all languages may use a shared language of thought, mentalese

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Literal vs. non-literal meaning

Speakers cannot always be taken 'literally' at their word.

Figures of speech

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- Speakers often speak figuratively.
- For instance, they may exaggerate (hyperbole):
  - I'm hungry.
  - I'm starving.
  - I could eat a horse.
- The best-known figures of speech are metaphor and metonymy

Metonymy

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- A speaker accesses one concept by a "contiguous" one
  - The White House said ... (Place for people in place)
  - The tuna sandwich wants to pay. (Food for customer in restaurant)
- Metonymies are not always available
  - #Two days later I saw the tuna sandwich in the pub down the street.

Metaphor

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- Understanding one domain in terms of *parts of* the structure of another
- Poetic metaphor is just an extreme and noticeable case of this

Metaphor II

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- Some metaphors are very deeply entrenched and they are not perceived anymore.
  - I **wasted** an hour on this project.
  - Do you have 10 minutes to **spare**? I'd like to show you something.
  - I've **invested** too much time to stop now.
  - You need to **use** your time more wisely.
  - My wheels ended up in the snow and I **lost** 10 seconds.
- Metaphorical uses don't carry all the inferences of the source domain
  - #Can you loan me 2 hours?

Idioms

- Idioms are by definition non-compositional
- The degree of non-compositionality varies
- In quite a few cases (with historical knowledge) we can understand the `motivation` of idioms
  - kick the bucket
  - let one's hair down
  - drop the ball

"Don't ask me. I don't know what 'my country 'tis of thee' means, either."

Ambiguity and vagueness

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- Vagueness: context adds information that is not specified by the sense
- Ambiguity: context biases the sense selection of one of several distinct senses
  - do so (He caught a mole in his garden and I did so, too. He'll be tried for espionage soon.)
  - Zeugma
  - substitutions with sense related items

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Polysemy v. monosemy

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Does a word have more than one meaning? Are two particular uses covered by the same word sense?

- Zeugma test
  - #I didn't **buy** his car or his argument.
  - # I **know** the answer and a guy who can help you.
- Stability in translation across multiple languages
  - Bank/Banken - banque - bank_money
  - Bank/Bänke - banc - bench
  - (Fluss)Ufer - berges/rive de la rivière - (river) bank

Polysemy v. homonymy

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- Polysemy: related senses of the same phonological word
  - Even our recent **move** to more comfortable Asuncion hadn't really changed that situation (relocation)
  - Yet one should not forget that the real motive behind the government's **move** was to abide by international laws and regulations (step, measure, action)
- Homonymy: unrelated senses of the same phonological word
- Sometimes homonyms are distinguished from homographs
  - Homonyms: talk - torque (or: to/too/two)
  - Homographs: ear (of corn) - ear (body part)

Semantic and lexical relations

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- synonymy
- hyponymy/troponymy
- meronymy/scripts
- causative/inchoative/stative
- antonyms

Synonymy

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- Extensionally and intensionally equivalent
- Paraphrases
- *tap*, *faucet*

Is-a: Hyponymy/hypernymy

- dog is a `hyponym` of animal
- animal is a `hypernym` of dog

Troponymy

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- Loosely speaking, this is hyponymy for verbs
- The relation between two verbs where one conveys a meaning which is a particular case of the meaning of the other. For example, *to amble* is a troponym of *to move*; *to write* is a troponym of *to communicate*, etc.
- Troponym hierarchies usually aren't as deep as hyponym/hypernym hierarchies.

Opposites I: Complementaries

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- Complementaries exhaustively divide a conceptual domain into two mutually exclusive compartments
- if one does not hold, the other must
  - true/false
  - open/shut
  - dead/alive
  - pass/fail [exam]
  - hit/miss [target]

Opposites I: Complementaries, continued

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- Complementary predicates (true/false) give rise to predications that are Contradictions (That is true/false)
- They are mostly verbs and adjectives
- Verbal complementaries often have a joint relation to a third presupposed predicate
  - Reversive: be born → live v. die; start → keep on v. stop
  - Interactives: command → obey v. disobey; request → grant v. refuse
  - Satisfactives: aim → hit v. miss; compete → win v. lose
  - Counteractives: attack → defend v. submit; charge → refute v. admit
- Adjectival complementaries are usually not gradable

Opposites II: Antonyms

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- Gradable antonyms: rich v. poor; fast v. slow
  - mostly adjectives
  - domain not strictly bisected, intermediate terms (e.g. neither long nor short)
  - middle of region/default value usually is not lexicalized (e.g. average length)
  - degrees of some variable property (from 0 to ∞)
  - terms relative to type of entity (small for an elephant >> large for an ant)

Opposites III: sub-types of antonyms

- Important distinction: comparatives v. pseudo-comparatives
  - Pseudo-comparatives
    - This box is heavy.
    - This box is heavier than that one.
    - ?This box is light but it's heavy.
    - This box is light but it's heavier than that one.
  - True Comparatives
    - It's hot today.
    - It's hotter today than yesterday.
    - ?It's cold today but it's hot.
    - ?It's cold today but it's hotter than yesterday.

Opposites IV: sub-types of antonyms

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- Polar antonyms: each member of the opposition has a pseudo-comparative
  - It's short but it's longer than that one.
  - It's long but it's shorter than that one.
- Overlapping antonyms: one member has a pseudo-comparative, the other a true comparative
  - ?John's a good kid, but he is worse than Bill.
  - John's a bad kid, but he is better than Bill.
- Equipollent antonyms: both members have a true comparative
  - ?It's hot but it's colder than yesterday.
  - ?It's cold but it's hotter than yesterday.

Opposites V: directional antonyms

- antipodals (zenith, nadir; attic, cellar)
- counterparts (ridge, groove; hill, valley)
- reversives/reverses
  - rise, fall; ascend, descend; expand/contract
  - tie/untie; fill/empty; appear/disappear
- converses/viewpoint alternatives (belong to v. own; employer v. employee)

Excursus: WordNet

- Lexical resource created at Princeton University
- Organizes English vocabulary in syn(onym)sets and connects these sets via various types of relations
- Very widely used in computational linguistics/NLP
- $ wn bachelor -synsn
  Synonyms/Hypernyms (Ordered by Estimated Frequency) of noun bachelor
  2 senses of bachelor
  Sense 1
  bachelor, unmarried man
  => man, adult male

  Sense 2

  knight bachelor, bachelor-at-arms, bachelor

  => knight

Causative - inchoative -stative

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- x CAUSE y to BECOME z
  - kill.v - die.v - dead.a
  - dry.v - dry.v - dry.a/dried.a
  - moisten.v - moisten.v - moist.a

Meronymy

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- Meronym (Part) - Holonym (Whole)
  - toe - foot
  - tire - car
  - lens - glasses

Meronymy II

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- Test for meronymy: an x is a part of a y; a y has x/ xes.
- Physical objects & regions in physical space: the part whole relationship is very clearly transitive: if x is part of y, and y is part of z, then x is part of z.
- Most discussions of meronyms are restricted to examples of Ns denoting physical objects. Can other parts of speech stand in a part - whole relationship?

Member - Aggregate pairs

- fish - shoal
- sheep - flock
- worshipper - congregation
- ship - fleet

Portion/Unit extractors

- head of cattle
- lump of coal
- strand of hair
- spot of tea/coffee/wine

Derivational relations

- -er/-or (agent-like participant): observer, rider, negotiator
- -ee (undergoer-like participant): employee, signee
- observe_watch - observation, observatory
- observe_comply/adhere - observance

Encoding v. decoding

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- Encoding: start with concepts or things and asks how people talk about them (onomasiology)
- Decoding: start with words and looks for their meanings (semasiology)
- Dictionaries traditionally take the decoding view
- *In theory*, doing a full lexical analysis from an encoding point view should lead to the same result as doing it from a decoding point of view

Meaning components

- Based on the observation that lexical relations hold between lexical items, hypothesis that there are smaller components that make up word meanings

woman	female	adult	human	
bachelor	male	adult	human	unmarried
spinster	female	adult	human	unmarried
wife	female	adult	human	married

Uses of meaning components

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- Modeling meaning relations (Katz)
- Relation to syntactic and morphological processes (see below, Levin)
- View on human conceptual structure (Jackendoff)

Modeling lexical relations with meaning components

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- Spinster is a hyponym of woman
- A lexical item P can be defined as a hyponym of Q if all the features of Q are contained in the feature specification of P

Katzian decomposition

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- Assumptions
  - recursive semantic rules
  - semantic compositionality
- Semantics works as follows
  - give specifications of meanings of lexical items
  - give rules showing how the meanings of lexical items combine into larger and larger units
  - do this a universally applicable metalanguage

Katzian decomposition II

- Dictionary
  - bachelor N
  - a (human) (male) [one who has never been married]
  - b (human) (male) [young knight serving under the standard of another knight]
  - c (human) [one who has the first or lowest academic degree]
  - d (animal) (male) [young fur seal without a mate in the breeding season]

Katzian decomposition III

- Projection rules: how to combine meanings
  - we amalgamate lexical entries moving up the tree
  - main constraint on the amalgamation are selectional restrictions
    - colourful ADJ
    - a (colour) [abounding in contrast or variety of bright colors] < (physical object) or (social activity)>
    - b (evaluative) [having distinctive character, vivideness, or picturesequeness] < (aeshtetic object) or (social activity)>

Cognitive semantics

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- key assumption: there is no separation of linguistic knowledge from general thinking or cognition
- cognitive semantics is aligned with functional linguistics, in distinction to formal syntax/semantics where
  - language is seen as an autonomous cognitive faculty, encapsulated from other cognitive abilities
  - and distinct levels of linguistic analysis are also assumed to be encapsulated (e.g. autonomy of syntax)
- as a consequence, in cognitive semantics meaning is more encyclopaedic
- no strict semantics-pragmatics division
- different units of analysis: syntax has meaning
- interest in grammaticalization (how grammatical items such as auxiliaries develop)

Cognitive semantics II

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- denies tenets of objectivist semantics
  - that meaning is based on truth and reference
  - that truth consists in the correspondence between symbols and states of affairs in the world
  - that there is an objectively correct way to associate symbols with things in the world
- holds that we have no access to reality independently of human categorization and that the structure of reality as reflected in language is a product of the mind

Central topics of cognitive semantics

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- metaphor, metonymy
- image schemas
- mental spaces
- perspective, viewpoint, focus, figure/ground

Example: Active zones

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- If an entity participates in a situation, often certain parts of it are more involved in it than others.
- There are some clear cases where there is no active zone: `The Earth moves around the Sun`.
- But in most others, a closer look reveals that an understanding of an active zone is needed
  - cigarette **in** mouth
  - brush **in** glass jar
  - beer **in** the fridge

Active zones II

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Generative lexicon I

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- Observation: contrastive v. complementary ambiguity
  - I walked along the **bank** of the river —Bill robbed a **bank**. (Contrastive ambiguity)
  - Mary had a little **lamb** —I don't eat **lamb**
  - John crawled through the **window** —The **window** is closed
  - I painted the **door** —Sue came through the **door**

Generative lexicon II

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- Constitutive role: what the entity is made of
- Formal role: factors pertaining to the entity's perceptual identification (shape, size, etc.)
- Telic role: purpose of the entity
- Agentive role: how was the entity created, or what brought it about

Generative lexicon III

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- novel
  - I burnt that novel.
  - Bill read the novel in one sitting.
  - Miller wrote the novel in 1987.
  - That novel is so fat that I can use it as a door stop.

Generative lexicon IV

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- the four roles are not always equally important (*toy* mostly telic)
- not readily applied to natural kinds: what is the agentive role of *hydrogen*?
- some aspects of entities are not readily subsumed by the four roles (safe **beach**)
- even some of the canonical four roles do not always seem to be filled (good **mountain** [to climb])

Syntax-semantics relationship

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- How tight is it? What can you learn/infer from the one about the other?
- Distributional hypothesis ("You shall know a word by the company it keeps" Firth 1957)
  - if words occur with similar words in a window of context, they are likely to share some meaning
  - if words occur in the same kind of syntactic contexts, they are likely to share some meaning
- Clustering of verbs into groups (syntax $\rightarrow$ semantics)

Levin's verb classes

- Example: touch - hit - break - cut
  - cut-verbs: chip, clip, cut, hack, hew, saw, scape, scratch, slash, snip
  - This set of verbs is grouped because its members participate in particular syntactic alternations
    - Carol cut the bread —Carol cut at the bread (Conative alternation)
    - Carol cut the bread —*The bread cut. (Causative/inchoative alternation)
    - Carol broke the twig —*Carol broke at the twig (Conative alternation)
    - Carol broke the twig —The twig broke (Causative/inchoative alternation)
- "The lexical knowledge of a speaker of a language must include knowledge of the meaning of individual verbs, the meaning components that determine the syntactic behavior of verbs, and the general principles that determine behavior from verb meaning." (Levin 1993:11)

Meaning beyond single words: Multi-word expressions

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- Idioms: (kick the bucket; by and large)
- Named entities: Coca cola; die Süddeutsche Zeitung; Agence France Presse
- Support constructions: verbs or prepositions that are selected by nouns which carry the semantic weight

Support constructions

- Support: the governed, not the governor is the semantic heavyweight
  a. Please extend my **thanks** to your family.
  b. The chancellor will make an **announcement** tonight.
  c. The mayor gave a **speech** at the opening ceremony.
  d. The house was on **fire**.
  e. The painting is in **possession** of the museum.
- Test: what is e.g. sentence (a) about, extending or thanking?

Meaning beyond words

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- Sentence structures have meaning as well
  - Why paint your house purple?
  - What's that scratch doing on the table?
  - Him a doctor?
- the core grammar of English doesn't generate these and/or
- these items have a conventional interpretation that cannot be derived

Thematic roles, semantic roles

What are the roles of the entities in the situation being discussed?

- Agent, Patient, Location, Source, Path, Goal, Instrument, Location, Beneficiary
  - [Sue^{Agent}] **hit** [Fred^{Patient}]
  - [Bill^{Agent}] **put** [the book^{Patient}] [on the table^{Goal}]
- Predicates, esp. Verbs, and Thematic role grids
- Linking of Thematic roles and Grammatical roles

Problems with roles

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- Distinguishing roles
- The roles don't all co-occur, so a flat list is misleading
- How many roles do you need, how far do you need to stretch definitions?
  - Your car is **similar** to mine in color.
  - We **overestimated** the cost by 20%.

Entailment-based role definition

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- Proto-agent
  - volitional involvement in the event or state
  - sentience (and/or perception)
  - causing an event or change of state in another participant
  - movement relative to another participant

Entailment-based role definition II

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- Proto-patient
  - undergoes change of state
  - incremental theme
  - causally affected by another participant
  - stationary relative to movement of another participant

Linking thematic roles to grammatical functions

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- In sentences with Subject and Object, link participant with most proto-agent properties to Subject
- In sentences with Subject and Object, link participant with most proto-patient properties to Object
- If more than one participant qualifies as Subject/Object, then it will be possible to use either as Subject/Object
- Non-discreteness: proto-roles do not classify arguments of a verb exhaustively; a given participant can have both proto-agent and proto-patient properties

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- Semantics of understanding: what does a speaker have to know to use an expression competently?
- Concepts analyzed as profiles viewed against a Base/Domain
- Similarity to scripts in AI (Schank and Abelson)
- FrameNet: a computational lexicography project based on frame semantics

Frame Semantics

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- How many senses of tall and low do you need to talk about these examples?
  - tall - short person
  - tall - low building
  - high - low branch

Frame Semantics

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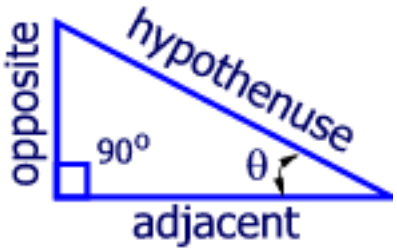
- How many senses of tall and low do you need to talk about these examples?
  - tall - short person (extension from ground)
  - tall - low building (extension from ground)
  - high - low branch (distance to ground)

Frame Semantics

- hypothenuse, radius



- vegetarian, bachelor

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- My dad wasted most of the morning on the bus.

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- My dad wasted most of the morning on the bus.
- My father wasted most of the morning on the bus. (strictly kinship)

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- My dad wasted most of the morning on the bus.
- My father wasted most of the morning on the bus. (strictly kinship)
- My dad spent most of the morning on the bus. (neutral attitude)

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- My dad wasted most of the morning on the bus.
- My father wasted most of the morning on the bus. (strictly kinship)
- My dad spent most of the morning on the bus. (neutral attitude)
- My dad wasted most of the morning in the bus. (bus is stationary)

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- During World War I, Ronald Reagan's birth mother dropped his analog watch into the sound hole of the acoustic guitar.
- What makes this sentence odd?

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- During World War I, Ronald Reagan's birth mother dropped his analog watch into the sound hole of the acoustic guitar.
- What makes this sentence odd?
  - fertility treatments are not available

Frame Semantics

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- During World War I, Ronald Reagan's birth mother dropped his analog watch into the sound hole of the acoustic guitar.
- What makes this sentence odd?
  - fertility treatments are not available
  - there are no digital watches

Frame Semantics

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- During World War I, Ronald Reagan's birth mother dropped his analog watch into the sound hole of the acoustic guitar.
- What makes this sentence odd?
  - fertility treatments are not available
  - there are no digital watches
  - there are no electric guitars

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- Coot is the name of a bird that spends very little of its time {on land/on the ground}
  - Land/Sea
  - Ground/Air
- My uncle likes to eat {roe/caviar}.
- The rest of my family do eat {flesh/meat}.

FrameNet

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- Studies how concepts are expressed (encoding view)
- Groups words that evoke the same background knowledge
- Analyzes the players and props in the situations and relations it studies
- Roles are defined per frame; generalization happens through frame relations (e.g. is-a)

Outline

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Tense, Aktionsart and Aspect

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- Tense: location of a situation with respect to a reference point (past, present, future)
- Lexical Aktionsart/situation type: internal temporal nature of the situation
- Grammatical aspect: grammatical focussing on components of the internal temporal nature of the situation

Features of situation types

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- Static: is the situation dynamic or static?
- Durative: does the situation last for some time?
- Telic: does the situation culminate in a goal/result state?

Situation types/Aktionsarten

	Static	Durative	Telic
states	+	+	n/a
activity	-	+	-
accomplishment	-	+	+
achievement	-	-	+
semelfactive	-	-	-

Aktionsart: Examples

- Bill **loved** cake. (State)
- My dog **played** with the ball. (Activity)
- My mom **knitted** a sweater for me. (Accomplishment)
- Peter **arrived** at 2 pm (Achievement)
- The gate **banged**. (Semelfactive)

Aktionsart $\neq$ Aspect

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- I **ate** candy all afternoon. (Activity)
- *I **ate** the candy all afternoon.
- *I **ate** candy in an hour.
- I **ate** the candy in an hour. (Accomplishment)

Modality

Modality comprises linguistic devices that serve to realize commitment to, or belief, in a proposition.

- Epistemic modality: commitment to, or belief in, the proposition
  - John went home.
  - John didn't go home.
  - It is certain that John went home.
  - It is probably that John went home.
  - It is likely that John went home.
  - It is possible that John went home.
  - John went home for sure.
  - John definitely went home.
  - Maybe John went home.
  - Possibly John went home.

Epistemic modality II

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- I know that John went home.
- I believe that John went home.
- I think that John went home.
- John must have gone home.
- John could have gone home.
- John might have gone home.

Deontic/Root modality: obligation/permission

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- You must repay the loan.
- You should repay the loan.
- You need to repay the loan.
- You ought to repay the loan.
- You can go to the bathroom.
- You may go to the bathroom.

Terminology: Mood vs. Modality

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- Mood (e.g. subjunctive v. indicative) is the term used for the function of morphologically distinctive forms that are used to signal modality.
- Mood is commonly marked on verbs.
- It is a concept distinct from grammatical tense or grammatical aspect, although these are often conflated in the morphology of a language.

Evidentiality

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- What is the source of information for a speaker's (level of) belief in a proposition?
  - I saw that he was very annoying.
  - I heard that she was very annoying.
  - She's very annoying, so they say.
  - I'm told she's very annoying.
  - It seems she's very annoying.
  - Allegedly, she's very annoying.
- In some languages, evidentiality must be marked obligatorily.

Deixis

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- Person (I, you, we)
- Temporal (past, present, future)
- Spatial (here, there; come, go)
- Textual deixis (I didn't say that.)
- Social deixis (Du/Sie; tu/vous)

Example

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- Arrest the man on the queen's **right**.
- Arrest the man to the **right** of the queen.

Semantic universals

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- Color names (Berlin & Kay)
- Semantic primes (Wierzbicka)
- Sapir-Whorf hypothesis

Information structure

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- aka information packaging, thematic structure
- conveying information: establishing new relations
- topic - focus

Coherence and cohesion

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- Coherence: the story, information hangs together thematically, causally
- Cohesion: cohesive elements help to make texts comprehensible; the use of explicit linguistic devices to signal relations between sentences and parts of texts

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Resources & Contact

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- WordNet: http://wordnet.princeton.edu/
- Inventories of semantic roles along with annotated corpus data
  - FrameNet: http://framenet.icsi.berkeley.edu
  - PropBank: http://verbs.colorado.edu/ mpalmer/projects/ace.html
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Reference/referring

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- Which NPs refer?
  - Kim will bake **a cake** for his birthday party.
  - Patty used to live in **Dublin**.
  - He didn't see **anybody** on his hike.
  - That party was **the bomb**!
  - Last Monday, he got hit by **a bus**.
  - Bill wants to marry **a Norwegian**.

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- How many different lemmas do these senses represent?
  - plant.n: living vegetal organism
  - plant.n: machinery used in industry
  - plant.n: something concealed so that its later discovery will implicate someone
  - plant.n: Snooker. A position where the cure ball can pocket a ball by striking an intervening ball

Lexical semantics exercises II

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- How many different lemmas do these senses represent?
  - stay.n: the act of staying in a place
  - stay.n: the suspension or postponement of a judicial sentence
  - stay.n: Nautical. a rope or guy supporting a mast
  - stay.n: anything that supports or steadies
  - stay.n: a thin strip of metal, plastic, bone, etc used to stiffen corsets

Lexical semantics exercises III

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- Classify the lexical relations among the members of these pairs
  - safe.a/secure.a ; sick.a/ill.a; strong.a/weak.a; buyer.n/seller.n
  - open.v/shut.v; salt.n/pepper.n; assemble.v/dismantle.v; hot.a/cold.a
  - car.n/tire.n; move.v/amble.v; freeze.v/frozen.a

Lexical semantics exercises IV

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- Ambiguity or vagueness? How many readings do you get, and how many are distinct?
  - Kim keeps complaining about her new case.
  - Harry tied the knot.
  - She can't bear children.
  - Bill uses the same computer as I do.
  - That woman is wearing my dress.

Lexical semantics exercises V

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- Describe the meaning relations between the verbs in bold
  - The high winds **raised** the water level.
  - The water level **rose**.
  - Bill **tried** to win the election.
  - Bill **managed** to win the election.
  - Harry **bought** the car from Sue.
  - Sue **sold** the car to Harry.

Meaning components

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- Try to define the following container words using components
  - jug, jar, pot, bottle, tub, can, glass, vase, urn, tank, tureen
- Some components to start with: material, purpose, shape

Aktionsart and aspect

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- Categorize the aktionsart of the verb and the sentence's aspect
  - We **reached** the summit at 2 pm.
  - I **knocked** for 5 minutes.
  - Mom has been **painting** all afternoon.
  - I **saw** right then that he didn't like my cat.
  - I've been **writing** him for years.

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- Consider the superordinate category FURNITURE.
- What are the basic level objects that belong to this category?
- Which items of furniture are more and which are less prototypical?

Context dependence: home

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- Whose home are we talking about?
  - When will you come home?
  - When will you go home?
  - Sheila went home yesterday.
  - Sheila went home with Schwarz yesterday.
  - I took some documents home last night.
  - Pat took Kim home after the party.
  - Bill took Sue home with him after the party.

Metaphors: Theories as Buildings

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- Earlier we saw examples of this metaphor:
  - That's a shaky argument.
  - You need to buttress your theory with better arguments.
- Which properties of buildings don't map?
  - parts: rooms, windows
  - function: storing, housing
- The metaphor, more narrowly, seems to be that the validity of an argument is the structural integrity of a building

Derivational morphology: what to list in the lexicon

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- Assume that the lexicon holds only idiosyncratic information, and further assume that the -er/-or affix derives agentive nouns.
- Which of the following nouns are generated by the agentive noun rule? and which ones would you need to list?
- Check how dictionaries actually treat these items.
  - debtor, actor, salt shaker
  - orator, narrator, beaker
  - sneaker, loner, speaker

Acquiring lexical information

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- Your mission: describe an algorithm for automatically recognizing in large corpora hyponyms, co-hyponyms and hypernyms of the word *chair*