Syntax & Semantics WiSe 2020/2021
Lecture 21: Introduction to Semantics

04/02/2020, Christian Bentz

Overview

Section 1: Organization

Schedule 2021

04/02/2021   **Lecture 21**   Semantics Introduction: Word Meanings
09/02/2021   **Lecture 22**   Propositional Logic
11/02/2021   **Lecture 23**   Predicate Logic
16/02/2021   **Lecture 24**   Syntax & Semantics Interface
18/02/2021   **Lecture 25**   Semantics: Summary
23/02/2021   **Lecture 26**   Overview & Discussion
25/02/2021   **Exam**

Tutorials

Week 10: 08/02-12/02/2021
Week 11: 15/02-19/02/2021
Week 12: 22/02-26/02/2021

Notes:

► The last week before the exam (Week 12: 22/02-26/02/2021) we have optional Q&A tutorials.

Exam

- ▶ The exam will take place **online on moodle**.
- ▶ You will be able to log in between **14:00 and 14:30 on 25th February 2021**.
- ▶ Once you log in you will receive exactly **2 hours** to work on the questions.
- ▶ **16:30** is hence the **hard deadline** where any open exam will be automatically submitted.
- ▶ There will be 5/6 tasks on syntax, 2/3 tasks on semantics, and 1 task with more general questions on both syntax and semantics.
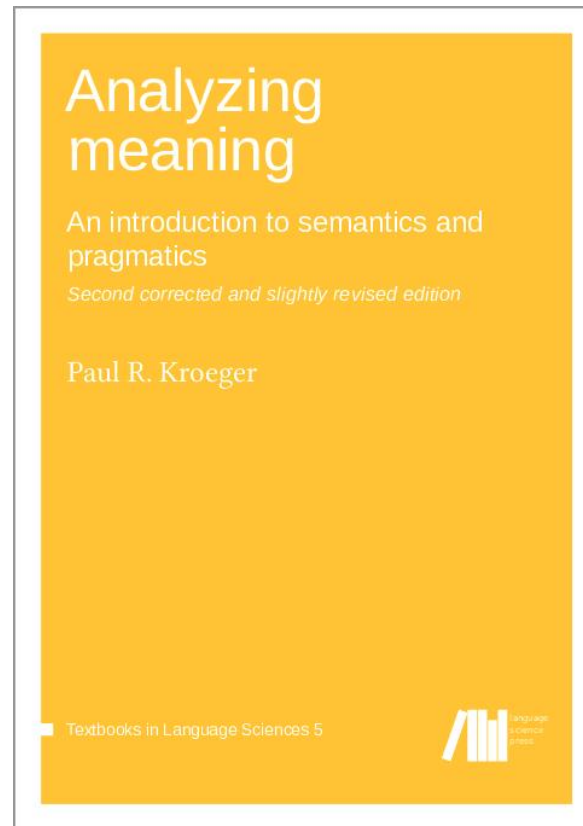
Section 2: Literature

Semantics

Kroeger, Paul (2019). *Analyzing meaning: An introduction to semantics and pragmatics. Second corrected and slightly revised edition.* (Textbooks in Language Sciences 5). Berlin: Language Science Press.

download at: http://langsci-press.org/catalog/book/231

Semantics Lectures

- **Lecture 21**: Semantics Introduction
  Kroeger (2019), Chapters 1-2 and Chapters 5-6.

- **Lecture 22**: Propositional Logic
  Kroeger (2019), Chapter 3-4.
  Zimmermann & Sternefeld (2013), Chapter 7.

- **Lecture 23**: Predicate Logic
  Kroeger (2019), Chapter 4.
  Zimmermann & Sternefeld (2013), Chapter 10 (p. 244-258).

- **Lecture 24**: Syntax & Semantics Interface
  Kearns (2011), Chapter 4.
  Zimmermann & Sternefeld (2013), Chapter 4.

Further Introductions

▶ Gamut, L.T.F (1991). Logic, Language, and Meaning. Volume 1: Introduction to Logic. Chicago: University of Chicago Press.

▶ Heim, Irene & Kratzer, Angelika (2008). Semantics in Generative Grammar. Malden/Oxford/Carlton: Blackwell Publishing.

▶ Kearns, Kate (2011). Semantics. New York/London: Palgrave Macmillan.

▶ Maienborn, Claudia, von Heusinger, Klaus & Portner, Paul (Eds.) (2019). *Semantics theories*. Berlin/Boston: Walter de Gruyter.

▶ Zimmermann, Thomas E. & Sternefeld, Wolfgang (2013). *Introduction to semantics. An essential guide to the composition of meaning.* Berlin/Boston: Mouton de Gruyter.
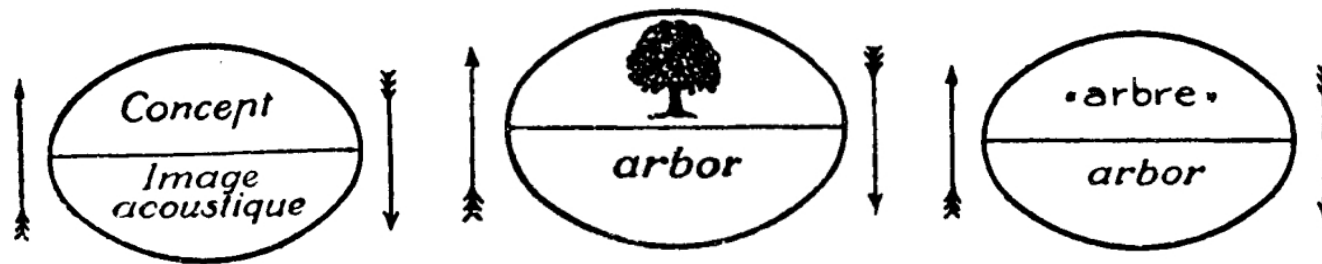
Section 3: Introduction

Form and Meaning: The Roots

"Signifié et signifiant" at three levels:

Level 1: Abstract Relation
Level 2: Concrete Mapping (Denotation)
Level 3: Metalanguage (Translation)

Saussure (1995). Cours de linguistique générale, p. 99.

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Core Concept: **Arbitrariness**

"For most words, the relation between the form (i.e. phonetic shape) of the word and its meaning is **arbitrary**. This is not always the case. Onomatopoetic words are words whose forms are intended to be imitations of the sounds which they refer to."
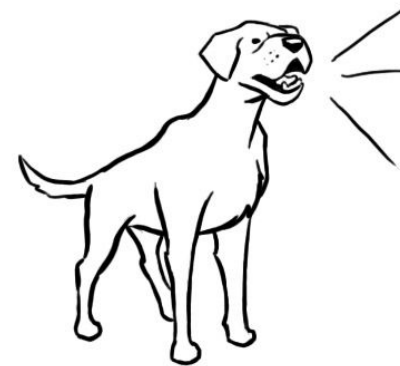
Kroeger (2019). Analyzing meaning, p. 6.

Arbitrary:

dog (English)
shun (Armenian)
cicing (Balinese)
gae (Korean)
aso (Tagalog)
etc.

Onomatopoetic:

bow-wow (English)
haf-haf (Armenian)
kong-kong (Balinese)
mung-mung or
wang-wang (Korean)
etc.

However: Systematic Non-Arbitrariness

"[...] By analyzing word lists covering nearly **two-thirds of the world's languages**, we demonstrate that a considerable proportion of **100 basic vocabulary items** carry strong associations with specific kinds of human speech sounds, occurring persistently across continents and linguistic lineages (linguistic families or isolates). Prominently among these relations, we find property words ("small" and i, "full" and p or b) and body part terms ("tongue" and l, "nose" and n)."

Blasi, Wichmann, Hammarström, Stadler, & Christiansen (2016). Sound-meaning association biases evidenced across thousands of languages.

Table 1. Summary of signals found in the ASJP database

Concept	Positive symbol	Negative symbol
Ash	u	—
Bite	k	—
Bone	k	y
Breasts	u m	a h r
Dog	s	t
Drink	—	a
Ear	k	—
Eye	—	a
Fish	a	—
Full	p b	—
Hear	N	—
Horn	k r	—
I	5	u p b t s r l
Knee	o u p k q	—
Leaf	b p l	—
Name	i	o p
Nose	u n	a
One	t n	—
Red	r	—
Round	r	—
Sand	s	—
Skin	—	m n
Small	i C	—
Star	z	—
Stone	t	—
Tongue	e E l	u k
Tooth	—	b m
Water	—	t
We	n	p l s
You	—	u o p t d q s r l

Positive and negative signals are those that have frequency significantly larger and smaller than expected.

However: Iconicity

Table 1. Some Iconic Associations Found in Ideophones across Languages [20,22]

Form	Meaning	Examples
Reduplication	Repetition, distribution	*goro* : *gorogoro*, 'one : multiple heavy objects rolling' (Japanese) *wùrùfùù* : *wùrùfù-wùrùfù*, 'fluffy : fluffy here and there' (Siwu) *curuk-nu* : *curukcuruk-nu*, 'a sharp prick : many sharp pricks' (Tamil) *kpata* : *kpata kpata*, 'drop : scattered drops' (Ewe)
Vowel quality	Size, intensity	*katakata* : *kotokoto*, 'clattering : clattering (less noisy)' (Japanese) *pimbilii* : *pumbuluu*, 'small belly : enormous round belly' (Siwu) *giṇigiṇi* : *giṇugiṇu*, 'tinkling : bell ringing' (Tamil) *lɛgɛɛ* : *logoo*, 'slim : fat' (Ewe)
Vowel lengthening	Length, duration	*haQ* : *haaQ*, 'short : long breath' (Japanese) *piQ* : *piiQ*, 'tear short : long strip of cloth' (Japanese) *dzoro* : *dzoroo* 'long : very long' (Siwu)
Consonant voicing	Mass, weight	*koro* : *goro*, 'a light : heavy object rolling' (Japanese) *tsratsra* : *dzradzra*, 'a light : heavy person walking fast' (Siwu) *kputukpluu* : *gbudugbluu*, 'chunky : obese' (Ewe)

Dingemanse, Blasi, Lupyan, Christiansen, & Monaghan (2015). Arbitrariness, iconicity, and systematicity in language.

Core Concept: **Combinatoriality**

Two words might be productively combined to yield a new, predictable meaning. *Combinatoriality* is a hallmark of human language (and other communication systems) as it enables the *infinite use of finite means*.

Amharic (amh, Afro-Asiatic)

(1) **zaf**   **təlləq'** näw[1]
     tree.NOM.SG **big**   be.N.3SG
     [NOUN ADJ VERB]

     "The tree is big."
     $big'(tree')$[2]

---

[1] Amharic is normally written in Ge'ez script. This is a transliteration into Latin script based on Leslau (1995).

[2] This is the notation in Müller (2019). The notation in Kroeger (2019) for this example would be BIG(t) – this notation will be used in the semantics part of this course.

However: Idioms

(2)   Kim ha-t   de-n   Wald vor   lauter
       kim have-PRS.3SG ART-ACC.SG forest because.of all.the
       Bäum-en   nicht ge-seh-en
       tree\-DAT.PL not   PTCP-see-PTCP
       literal translation: "Kim hasn't seen the forest because of all the
       trees."
       actual meaning: Kim was so concerned with the details that s/he
       didn't see the overall picture.

In the case of idioms (e.g. *kicking the bucket*), the intended meaning of the sentence is not a *linear combinatorial* derivation of its parts. Rather, a complex meaning is assigned to the whole phrase.

Three "levels" of meaning

1. **Word meaning**: Meaning assigned to individual words.

   Example: kick; bucket

2. **Sentence meaning**: Meaning derived via combination of word meanings (compositional). "The term **sentence meaning** refers to the semantic content of the sentence: the meaning which derives from the words themselves, regardless of context."

   Example: KICK(j,b), literally "John kicks the bucket."

3. **Utterance meaning** ("speaker" meaning): "The term **utterance meaning** refers to the semantic content plus any pragmatic meaning created by the specific way in which the sentence gets used." Another definition is: "The totality of what the speaker intends to convey by making an utterance."

   Example: *John dies.*

Kroeger (2019). Analyzing meaning, p.5.

Example

Teochew (Soutern Min Chinese, Sino-Tibetan)

(3) Lɯ chyaʔ pa bɔy?
you eat   full not.yet
"Have you already eaten?"

Sentence meaning: "Have you already eaten or not?", i.e. a request for information.

Utterance meaning: Greeting like "hello" or "how are you" in English.

Kroeger (2019). Analyzing meaning, p. 5-6.

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Section 4: The Problem of Reference

Reference

"[...] we will think about how speakers use language to talk about the world. **Referring** to a particular individual, e.g. by using expressions such as *Abraham Lincoln* or *my father*, is one important way in which we talk about the world."

"Philosophers have found it hard to agree on a precise **definition for reference**, but intuitively we are talking about the speaker's use of words to "point to" something in the world; that is, to direct the hearer's attention to something, or to enable the hearer to identify something."

Kroeger (2019). Analyzing meaning, p. 15 and page 17 respectively.

Meaning as Reference

"What is relevant rather to our purposes is *radical translation*, i.e., translation of the language of a hitherto untouched people [...] The utterances first and most surely translated in such a case are ones keyed to present events that are conspicuous to the linguist and his informant. A rabbit scurries by, the native says 'Gavagai', and the linguist notes down the sentence 'Rabbit' or 'Lo, a rabbit') as tentative translation, subject to testing in further cases."

Quine (1960). Word and object, p. 28.

Against Reference: Words as Mental Representations

"It's just a classic error
that runs right through
philosophy and psychology
and linguistics
right up to the moment.
That's the idea that words...
say, meaning-bearing elements,
like, say, "tree" or "person"
or, you know, "John Smith"
or anything...
pick out something
in the extramental world,
something that a physicist
could identify
so that if I have a word...
say, "cow"...
it refers to something,
and a, you know, scientist
knowing nothing about my brain
could figure out
what counts as a cow.
That's just not true."

Noam Chomsky

Semiotic Triangle (Triangle of Reference/Meaning)

"**Semiotics** is the study of the relationship between **signs and their meanings**. In this book we are interested in the relationship between forms and meanings in certain kinds of symbolic systems, namely human languages. The diagram is a way of illustrating how speakers use language to describe things, events, and situations in the world."

Kroeger (2019). Analyzing meaning, p. 16.
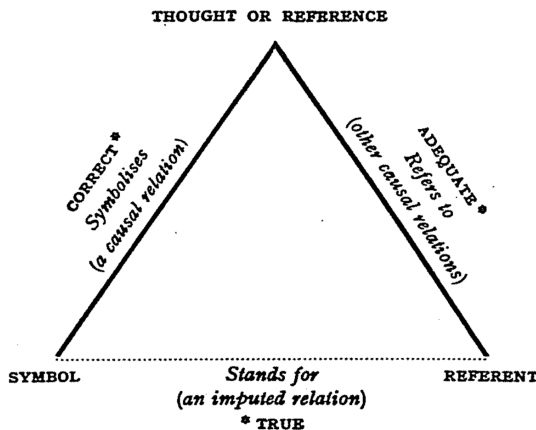
Ogden & Richards (1923). The meaning of meaning, p. 11.
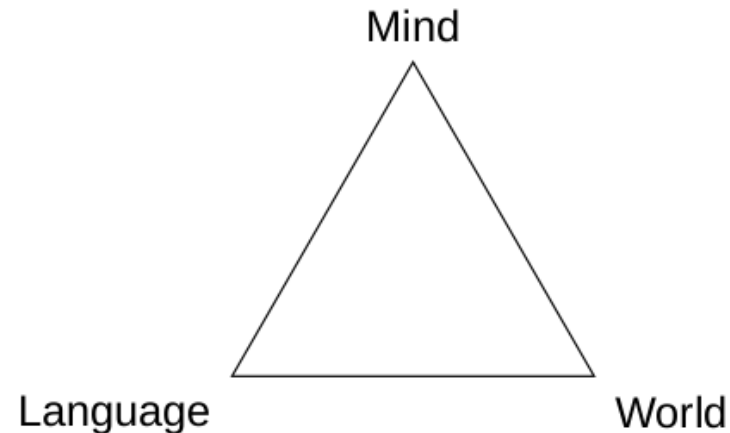
Kroeger (2019). Analyzing meaning, p. 16.

Denotational vs. Cognitive Semantics

"The basic approach we adopt in this book focuses on the link between linguistic expressions and the world. This approach is often referred to as **denotational semantics** [...] An important alternative approach, **cognitive semantics**, focuses on the link between linguistic expressions and mental representations."

Kroeger (2019). Analyzing meaning, p. 17.
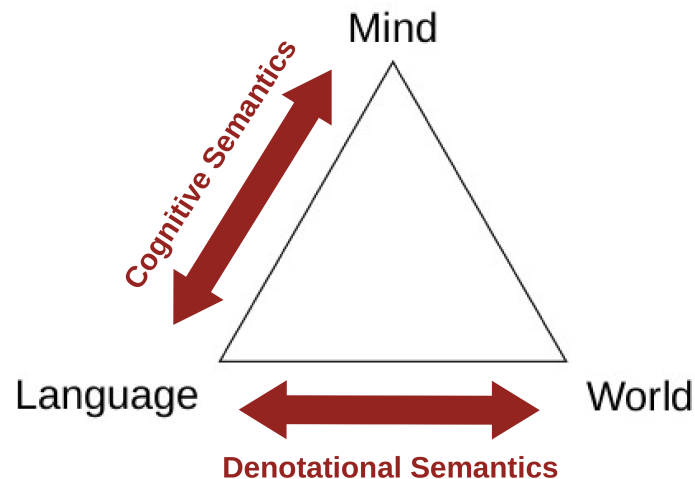
Denotational Semantics: Types of Referring Expressions

"A **referring expression** is an expression (normally some kind of noun phrase) which a speaker uses to refer to something. The identity of the referent is determined in different ways for different kinds of referring expressions."

- ► Proper names (*Mao Zedong*)
- ► "Natural kind" terms (*the octopus*, *humans*, *methane*)
- ► Deictic elements (indexicals: *you*, *here*, *now*)
- ► Anaphoric elements (*George$_i$ ... he$_i$ ...*)
- ► Definite descriptions (*this book*, *the sixteenth president*)
- ► Indefinite descriptions (*a cowboy*)

Kroeger (2019). Analyzing meaning, p. 18.

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Section 5: Word Meanings

Three "levels" of meaning

1. **Word meaning**: Meaning assigned to individual words.

2. **Sentence meaning**: Meaning derived via combination of word meanings (compositional).

3. **Utterance meaning** ("speaker" meaning): "The term **utterance meaning** refers to the semantic content plus any pragmatic meaning created by the specific way in which the sentence gets used."

Kroeger (2019). Analyzing meaning, p.5.

Variable Reference

Even if we assume that reference between forms and meanings is generally possible (i.e. denotational semantics), then there is still the problem of **variable reference**, i.e. *ambiguity*, *indeterminacy* and *vagueness*.

```
                        Variable Reference
                 Ambiguity    Indeterminacy    Vagueness
      Lexical Ambiguity    Structural Ambiguity    Referential Ambiguity
   Polysemy    Homonymy
Systematic    Non-systematic
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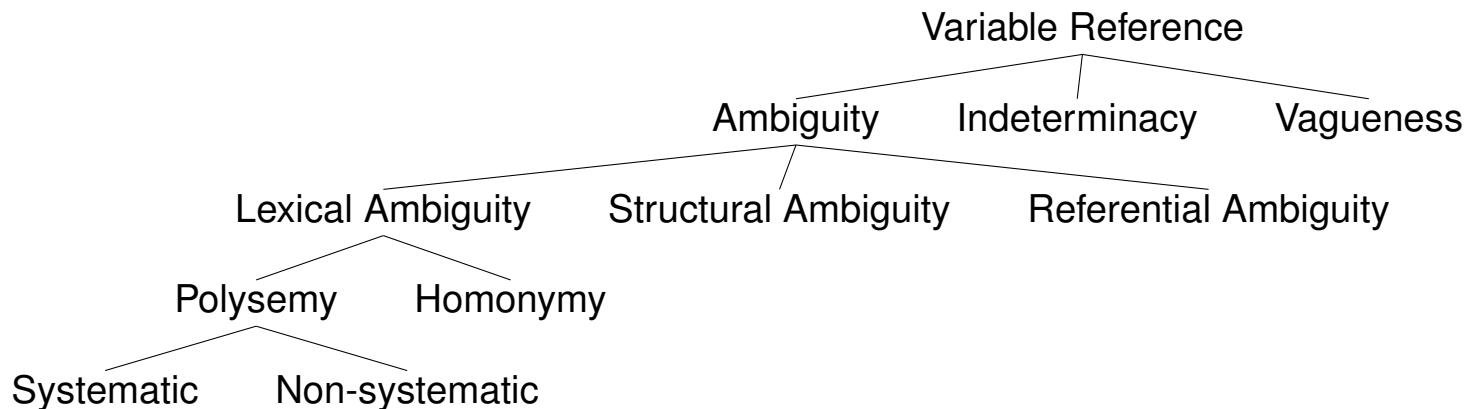
Ambiguity

Lexical Ambiguity

"It is possible for a single word to have more than one sense. [...] Words that have two or more senses are said to be **ambiguous** (more precisely, **polysemous** [...])."

Kroeger (2019). Analyzing meaning, p. 23

(4)   A boiled egg is hard to *beat*.

(5)   The farmer allows walkers to cross the field for free, but the bull *charges*.

beat, verb
Sense 1: to strike or hit repeatedly
Sense 2: to win against
Sense 3: to mix thoroughly
etc.

https://dictionary.cambridge.org/dictionary/english-german/beat

Ambiguity

Word(s)   Sense(s)

beat ○ —— ● to hit
         —— ● to win against
         —— ● to mix

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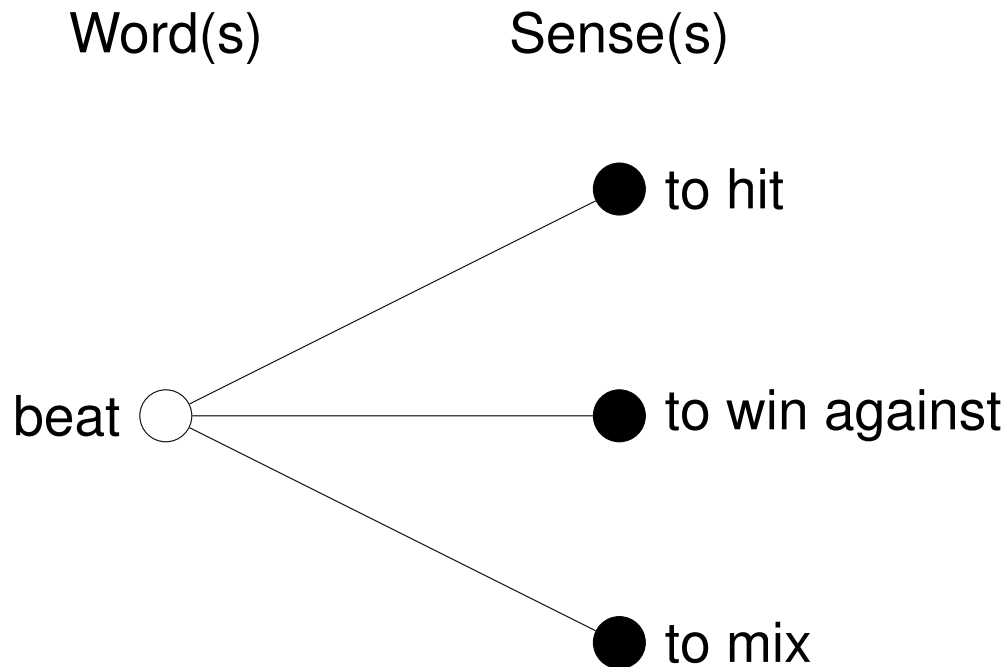
Structural Ambiguity

In the case of **structural ambiguity**, "the two senses (or readings) arise because the grammar of the language can assign two different structures to the same string of words, even though none of those words is itself ambiguous. [...] syntactic structure makes a crucial contribution to the meaning of an expression. "

Kroeger (2019). Analyzing meaning, p. 23-24.

(6) Two cars [were reported stolen] [by the Groveton police] yesterday.

(7) Two cars [were reported] [stolen by the Groveton police] yesterday.

(8) One morning I [shot an elephant] [in my pajamas].

(9) One morning I shot [an elephant in my pajamas].

Referential Ambiguity

The usage of anaphoric expressions (or other types of NPs) with ambiguous antecedents is called **referential ambiguity**.

Kroeger (2019). Analyzing meaning, p. 24.

(10)   Adams$_{i(?)}$ wrote frequently to Jefferson$_{i(?)}$ while he$_i$ was in Paris.

(11)   [$_{NP}$ My student] has won a Rhodes scholarship.

Polysemy versus Homonymy

"Two types of lexical ambiguity are traditionally distinguished: **polysemy** (one word with multiple senses) vs. **homonymy** (different words that happen to sound the same). Both cases involve an ambiguous word form; the difference lies in how the information is organized in the speaker's mental lexicon."

Kroeger (2019). Analyzing meaning, p. 89.

Ambiguity (Polysemy)

Word(s)   Sense(s)

beat — to hit / to win against / to mix

Ambiguity (Homonymy)

Word(s)   Sense(s)

can ○ ──────────── ● to be able to

can ○ ──────────── ● a type of container

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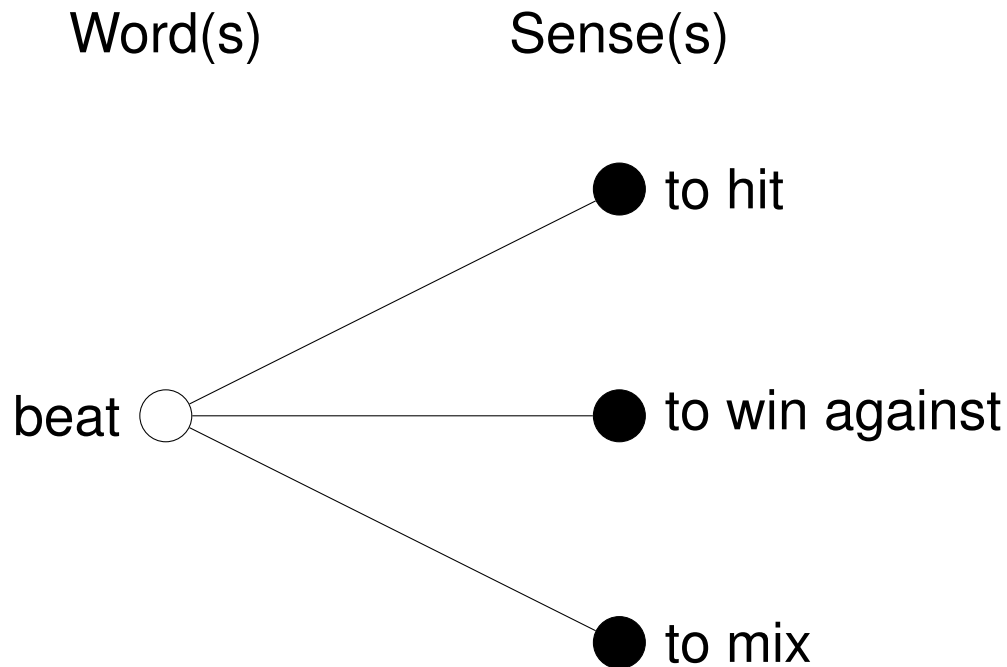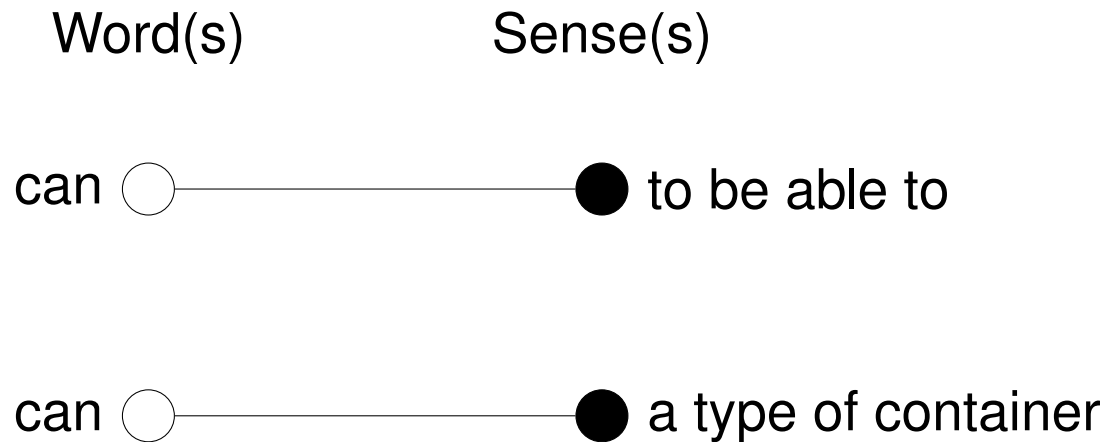
Distinguishing Polysemy and Homonymy

"The basic criterion for making this distinction is that in cases of **polysemy**, the two senses are felt to be "related" in some way; there is "an intelligible connection of some sort" between the two senses. In cases of **homonymy**, the two senses are unrelated; that is, the semantic relationship between the two senses is similar to that between any two words selected at random."

Kroeger (2019). Analyzing meaning, p. 89.

Criteria for Polysemy

1. Semantic **feature**/**component sharing** (e.g. *foot* as bodypart and length measurement)
2. **Figurative extension** (e.g. *a road runs*)
3. Existence of a **primary sense** (e.g. the primary sense of *foot* is the body part)
4. **Etymology** (i.e. reconstructing the lexical sources, a method mostly used in dictionaries)

Kroeger (2019). Analyzing meaning, p. 90.

A note on the "Etymological Fallacy"

"A particular manifestation of the failure to respect the distinction of the **diachronic** and the **synchronic** in semantics ... is what might be called the **etymological fallacy**: the common belief that the meaning of words can be determined by investigating their origins. The etymology of a lexeme is, in principle, synchronically irrelevant."

Kroeger (2019). Analyzing meaning, p. 91, citing Lyons (1977: 244).

Comment: It is true that "speakers may or may not know where certain words come from historically, and their ideas about such questions might be mistaken". However, for deciding the question of whether we are dealing with homonymy or polysemy when word forms are ambiguous, historic information (if available) is probably the only hard evidence to decide the question, and this is why lexicographers use etymological information.

Example: Etymology

Old English   Modern English

cunnan (to know) ◯————————◯ can (auxiliary)

canne (cup) ◯————————◯ can (type of container)

Systematic or Regular Polysemy

"A number of authors have distinguished between **regular** or **systematic polysemy** vs. **non-systematic polysemy**. Systematic polysemy involves senses which are related in recurring and predictable ways. [...] The kinds of patterns involved in systematic polysemy are similar to patterns which are associated with derivational morphology in some languages."

Kroeger (2019). Analyzing meaning, p. 91.

English nouns	English verbs	German nouns	German verbs
hammer	to hammer	Hammer	hämmer-n
saw	to saw	Säge	säge-n
paddle	to paddle	Paddel	paddel-n
plow	to plow	Pflug	pflüge-n
chain	to chain	Kette	an-ketten

Disambiguation:
The "one sense at a time" principle

"The **context**[3] of the utterance usually singles out ... the *one* sense, which is intended, from amongst the various senses of which the word is potentially capable."

Kroeger (2019). Analyzing meaning, p. 94, citing Cotterell & Turner (1989: 175).

rare (uncommon)		ferns grow on the	steep (unreasonable)	banks (institution)
			steep (slope)	banks (river)
rare (slightly cooked)			steep (soak thoroughly)	banks (row of instruments)
				etc.

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[3]Note: We might further distinguish between **co-text** and **context**, where the former refers to the words preceding or following the word to be disambiguated, whereas the latter refers more generally to our knowledge about the world.

Indeterminacy

Indeterminacy

A type of variable reference, i.e. a word can have variability in its reference despite having a single defined sense. That is, the sense is **indeterminate** with regards to a particular dimension of meaning.

Kroeger (2019). Analyzing meaning, p. 81.

cousin, noun
Sense: a **son or daughter** of one's uncle or aunt.

https://dictionary.cambridge.org/dictionary/english-german/cousin

Note: The term *cousin* in English does not further specify the gender of the person referred to. Hence, it is indeterminate with regards to natural gender. In German, the natural gender is determined by the gender of the article and a suffix (*der Cousin/ die Cousin-e*).

Vagueness

Vagueness

A word is **vague** if the "limits of its possible denotations cannot be precisely defined."[4]

Kroeger (2019). Analyzing meaning, p. 81.

tall, adjective
Sense: (of people and thin or narrow objects such as buildings or trees) **higher than normal**

https://dictionary.cambridge.org/dictionary/english-german/tall

Note: The question here is "what is a *normal* height under which exact conditions?". In fact, this question can be answered precisely by statistics (e.g. more than two standard deviation above average), but humans do not necessarily use such words in a statistically precise way.

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[4]Vagueness is sometimes also contrued as a cover term including indeterminacy as a sub-type. However, here the two are argued to be different concepts.

Example

Height Distribution of Players in EPL by position
English Premier League - season 2018/19

Data Source: © STATS
@itsmevidhya_k 14/11/2018
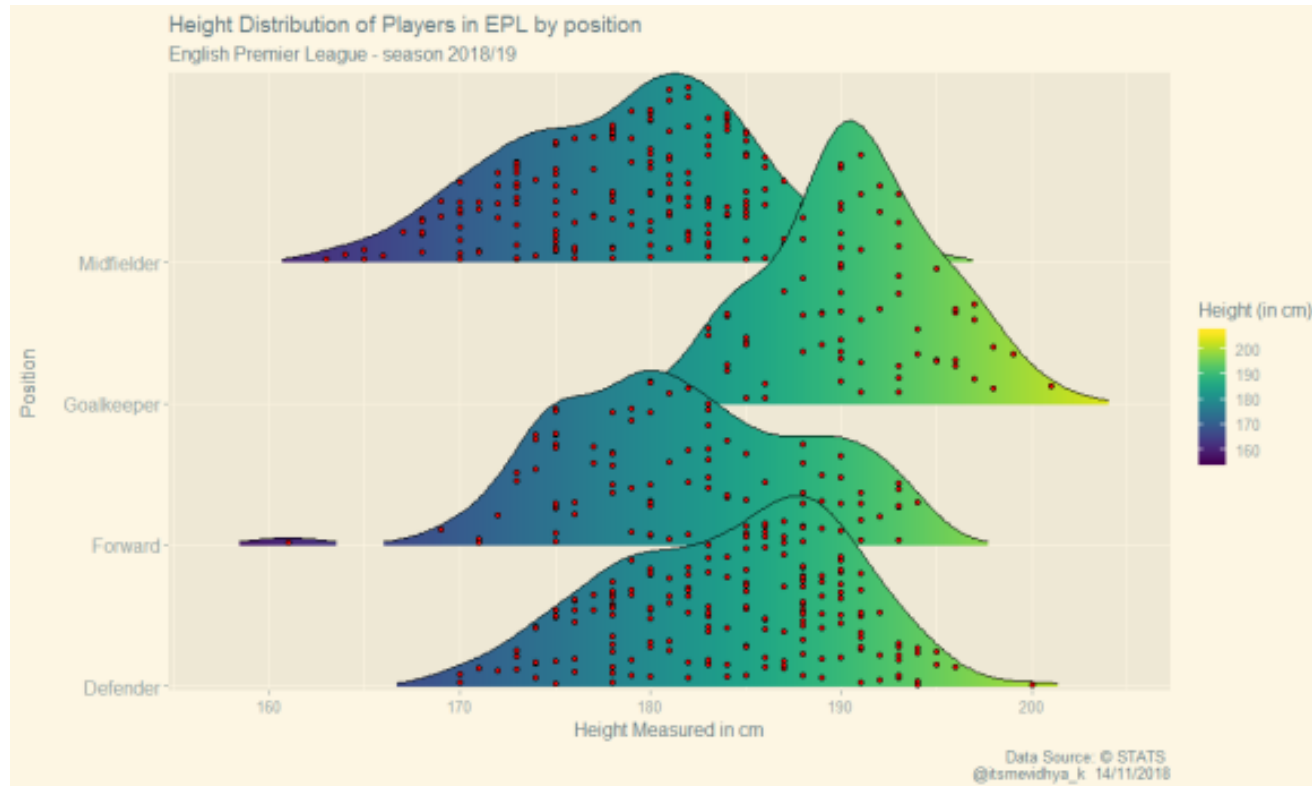
Note: A height of 190cm is relatively tall for an English Premier League midfielder, but only average for a English Premier League goalkeeper.

https://itsmevidhyak.wordpress.com/2018/11/14/height-distribution-of-players-in-epl/

Indeterminacy versus Vagueness

There are three charactersitics of vagueness which distinguish it from indeterminacy:

▶ **Context-dependence**: While the denotation of a vague word (e.g. *tall*) depends on the context (i.e. English Premier League Midfielder vs. Goalkeeper), the denotation of an indeterminate word does not depend on context (e.g. the family relationship indicated by *cousin* does not change according to context).

▶ **Borderline cases**: vague words display borderline cases due to their gradability (e.g. is 180cm tall for a EPL midfielder?), while for indeterminate words there is usually no disagreement (e.g. there is usually no disagreement about whether sb. is sb. else's cousin).

▶ **"Little-by-little" paradoxes**: due to the gradability of vague words, it is hard (impossible?) to determine when a certain denotation is justified (e.g. when exactly does a person with hair become a bald person?).

Indeterminacy versus Vagueness

"Another property which may distinguish vagueness from indeterminacy is the degree to which these properties are preserved in translation. Indeterminacy tends to be **language-specific**. There are many interesting and well-known cases where pairs of translation equivalents differ with respect to their degree of specificity."

Kroeger (2019). Analyzing meaning, p. 83.

English

Mandarin Chinese

uncle ○
- ○ bóbo (father's elder brother)
- ○ shushu (father's elder brother)
- ○ guzhàng (father's sister's husband)
- ○ jiùjiu (mother's brother)
- ○ yízhàng (mother's sister's husband)

Another Example

English   Tzeltal (Mayan, Mexico)
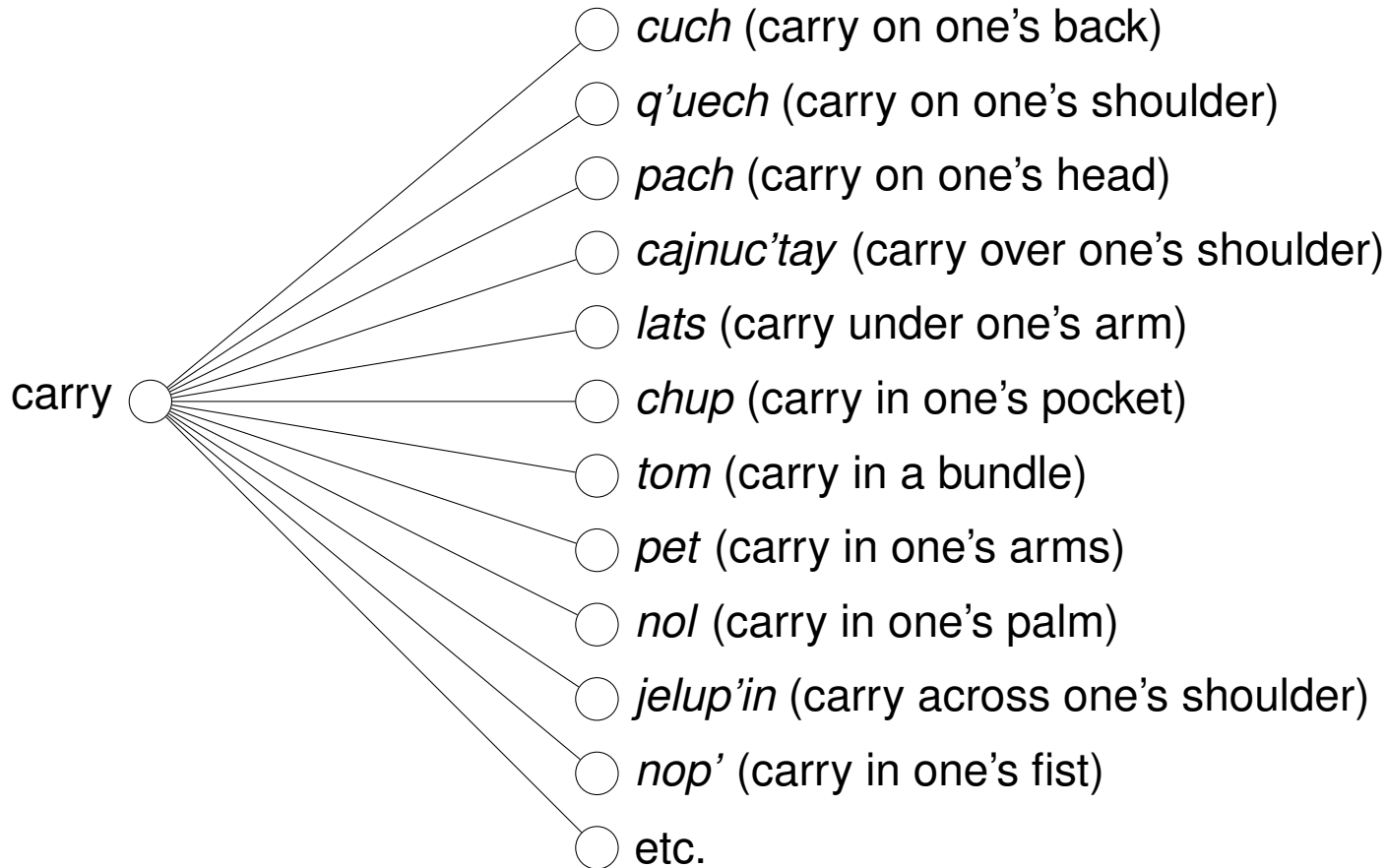
○ *cuch* (carry on one's back)

○ *q'uech* (carry on one's shoulder)

○ *pach* (carry on one's head)

○ *cajnuc'tay* (carry over one's shoulder)

○ *lats* (carry under one's arm)

carry ○

○ *chup* (carry in one's pocket)

○ *tom* (carry in a bundle)

○ *pet* (carry in one's arms)

○ *nol* (carry in one's palm)

○ *jelup'in* (carry across one's shoulder)

○ *nop'* (carry in one's fist)

○ etc.

Tests for Types of Variable Reference

Ambiguity vs. Vagueness/Indeterminacy

There are a range of tests proposed in the literature which are based on the fact that senses of ambiguous words are **antagonistic**, meaning that they cannot apply simultaneously:

► Zeugma Test
► Identity Test
► Sense Relations Test
► Contradiction Test

Kroeger (2019). Analyzing meaning, p. 84.

Zeugma Test

"A clash or incompatibility of senses for a single word in sentences containing a co-ordinate structure [...] is often referred to using the Greek term **Zeugma** (pronounced ['zugmə])."

Kroeger (2019). Analyzing meaning, p. 85.

(12)   On his fishing trip he *caught* three trout and a cold.

Note: The fact that we can create a zeugma here with the two senses of *catch*, suggests that the senses are *antagonistic*, and hence catch is *lexically ambiguous*.

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Identity Test

"This test makes use of the fact that certain kinds of **ellipsis** require **parallel interpretations** for the deleted material and its antecedent."

Kroeger (2019). Analyzing meaning, p. 85.

(13)   John saw her *duck*.

(14)   John saw her *duck*, and so did Bill.

(15)   John saw her *cousin*, and so did Bill.

Note: duck can mean here *lower her head* or *water fowl*. In the latter example, both interpretations are still possible, however, the interpretations have to be identical, i.e. either both John and Bill saw her *lower her head*, or both saw her *water fowl*. In the case of *cousin*, however, it could be (arguably?) two cousins with different genders.

Sense Relations Test

"Distinct senses will have different sets of synonyms, antonyms, etc. [...] this test is not always reliable, because contextual features may restrict the range of possible synonyms or antonyms for a particular use of a word which is merely vague or indeterminate."

Kroeger (2019). Analyzing meaning, p. 87.

(16)   It is *light*.

(17)   No, it is *dark*.

(18)   No, it is *heavy*.

Note: *light* can mean here *brightly coloured* or *has little weight*. The first sense is an antonym of *dark*, the second sense is an antonym of *heavy*.

Contradiction Test

"If a sentence of the form *X but not X* can be true (i.e. not a contradiction), then expression must be ambiguous."

Kroeger (2019). Analyzing meaning, p. 87-88.

(19) They are not *children* any more, but they are still my *children*.

(20) It is *light*, but not *light*.

(21) He is my *cousin*, but not my *cousin*.

Note: *children* is used here in two distinct senses, i.e. *offspring* and *preadolescent person*, hence, there is no strict contradiction. The second example might be somewhat of a marked usage, but it is strictly speaking no contradiction, if we assume two distinct senses of *light*. Contrast this with the same structure for *cousin*, which now gives rise to a contradiction.

Summary

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▶ The mapping between **form and meaning** is typically seen as **arbitrary** and **combinatorial**. However, deviations from these principles (iconicity, idioms) are common.

▶ Whether words, phrases, sentences **directly refer** to things in the "real world" is one of the most longstanding debates in philosophy and linguistics. As a consequence, there is a divide between **cognitive semantics** and **denotational semantics**.

▶ There are generally **three different levels of meaning**: words, sentences, and utterances.

▶ In assigning meaning to words, we have to deal with the concepts of **lexical ambiguity**, **polysemy**, **indeterminacy** and **vagueness**.

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Thank You.

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