“Sentences mean things because words have meanings, and grammar rules build meanings of sentences from meanings of words”

but

some words have multiple meanings, so it must be word *senses*, not words, that we build sentence meanings from.

**Overview**
- Ordinary people and word senses
- Lexicographer’s perspective
- Theoretical perspective
- An argument

**How do ordinary people manage?**
She got up and went into the kitchen. "Want a drink?" she called. "No thanks", I said, "but could you bring me a glass of water?"
Margaret Atwood, *The Edible Woman* 1969

'Of course, once upon a time a tomato was a tomato'

**Explicit directions**

Obstruction, *in a urodynamic sense*, implies a high pressure and a low flow
He is also, *in that double-edged English sense*, clever
She was, *in the best sense*, an old-fashioned family doctor

**Context**

Sotheby's is to auction an *icon* used in 16th century Russia to assist women in childbirth
Diana was easily the most influential fashion *icon* of the 20th century, exhibiting flair and a dash of daring
When you use the mouse to drag an *icon* to a new position, the sonic feedback continues

**Some provisional conclusions**

- Multiple readings are possible
- Misunderstandings are rare, therefore...
- there are clues that people pick up easily

**Overview**

- Ordinary people and word senses
- Lexicographer’s perspective
- Theoretical perspective
- An argument
Lexicographer’s perspective

- Why is it important?
  - Find them in dictionaries
  - Lexicographers put them there

Lexicographer’s perspective

- What dictionaries do
- What lexicographers do
  - Two useful ideas
    - regular polysemy
    - metaphor
  - Formal and contextual clues

Lexicographer’s perspective

Tasks

- Analysis:
  - what senses does word \( w \) have?
  - when does word \( w \) have sense \( s \)?
- Synthesis: make it clear in definition

What dictionaries do

**keen** adj
1. Having a fine, sharp cutting edge or point.
2. Intellectually acute; penetrating; trenchant.
4. Sharp; vivid; strong: “His entire body hungered for keen sensation, something exciting” (Richard Wright).
5. Intense; piercing: a keen wind.
6. Pungent; acrid: A keen smell of skunk was left behind.
7. Ardent; enthusiastic: a keen chess player.


What dictionaries do: assumptions and problems

- a set of numbered senses: ‘keen’ has 7 meanings’
- each sense is discrete, with clear boundaries
- each sense is mutually exclusive: if in context \( C \) word \( W \) is sense 3, it cannot also be sense 6
- ‘Dictionaries traditionally record vocabulary as if meaning is something independent, inherent, and unique to an item’ (Moon 1987:86)
- no explanation of when word \( w \) has sense \( s \)

What dictionaries do:

**tip** noun
1. the pointed or rounded end or extremity of something slender or tapering [...]
- **verb** attach to or cover the end or extremity of...
- **PHRASES on the tip of one’s tongue** used to indicate...
- **tip** verb 1 overbalance or cause to overbalance so as to fall or turn over...
  - **it is tipping down** Brit. rain heavily
- **noun** 1 Brit. a place where rubbish is left [...]
- **tip** noun 1 a sum of money given to someone as a way of rewarding them for their services ...
  - **tip** noun 2 a small but useful piece of practical advice [...]
  - **PHRASES tip someone off** give someone information...
What lexicographers do

- based on etymology
- based on unrelatedness of meanings:
  - tip = pointed end
  - tip = rubbish dump
  - but...
- does it help?

1: money for waiter and helpful advice are same homograph
2: where to look for on the tip of ones tongue, it’s tipping
down, to tip someone off ...

Finding senses: what lexicographers do

- tip, which will be used to take a party of under-privileged children to
  - from outside. You are invited to a party and after a couple of drinks you
  - could be reaching agreement with all parties concerned, as to which event
  - jack people... I have certainly been
  - party to one or two discussions amongst
  - These should be discussed before entering into the retail
  - British successes in Perth The small party of British players competing in
  - security and secrecy than any Tory Party Conference: it seems that bootl

Metaphor and the activation of ‘meaning potentials’

icon 1 a picture or figure of a holy person, used in the worship of the Eastern branches of Christianity (LDOCE1 1978)

icon 1 a picture or figure of a holy person, used in the worship of the Eastern branches of Christianity

icon 1 a small sign or picture on a computer screen that is used to start a particular operation

small picture, object of worship

small picture
WSD for lexicographers: *Formal clues*

(1) Morphology

**hang**: usual past tense *hung*, 'specialized' past tense *hanged* (=execute by hanging)

**appendix**: plural *appendices* (=at end of book/report)

(2) Grammar

**Transitivity, countability, optional and obligatory complements**

<table>
<thead>
<tr>
<th>Verbs</th>
<th>Clauses</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>borrow</em></td>
<td>some sugar/someone’s car companies were forced to <em>borrow</em></td>
</tr>
<tr>
<td><em>emails</em></td>
<td>waiting for me</td>
</tr>
<tr>
<td><em>email</em></td>
<td>with a huge volume of</td>
</tr>
<tr>
<td><em>oaks</em></td>
<td>a forest of</td>
</tr>
<tr>
<td><em>oak</em></td>
<td>a table made of</td>
</tr>
<tr>
<td><em>crawl</em></td>
<td>an ant <em>crawling</em> across the table</td>
</tr>
</tbody>
</table>

(3) Gradability: ‘pertainyms’ vs. descriptive/evaluative

<table>
<thead>
<tr>
<th>Nouns</th>
<th>Adjectives</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>conventional</em> young man</td>
<td>He’s so <em>conventional</em></td>
</tr>
<tr>
<td><em>conventional</em> oven</td>
<td><em>My oven is so conventional</em></td>
</tr>
<tr>
<td><em>medieval</em> cathedral</td>
<td>*The cathedral is positively <em>medieval</em></td>
</tr>
<tr>
<td><em>medieval</em> working conditions</td>
<td>Working conditions were positively <em>medieval</em></td>
</tr>
</tbody>
</table>

(4) Selectional restrictions

What can you *forge*?
- alliances, relationships, links
- metal objects
- passports, bank notes, signatures

What can *crawl*?
- insects, snakes
- people
- babies
- your skin, a building, an area ...

More narrowly ...
- what can *taxi*? (only planes)
- who can *abdicate*? (only heads of state)

(5) Collocation

*They borrowed *heavily* to finance the new stadium*

*They borrowed *freely* from Japanese artistic conventions*

*Rooney *scored* all three goals*

*Rooney *achieved/attained* all his goals*

(6) Lexical relations

**synonymy, antonymy, hyponymy**

*They escaped* from the jail  *→*  *they got free*

*Gas escaped* from the pipe  *→*  *it leaked out*

*We escaped* without injuries  *→*  *we were unharmed*

*borrow* a book (from library)  *→*  *return it*

*borrow* someone’s calculator  *→*  *give it back*

*borrow* money from the bank  *→*  *repay it/pay it back*

*There was a fire in the *bank*  *→*  *She got a top job in a *bank*  *→*  *a building  *→*  *an institution*
(7) Equivalents in other languages

<table>
<thead>
<tr>
<th>English</th>
<th>French</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shall I cook</td>
<td>préparer, faire</td>
</tr>
<tr>
<td>the dinner</td>
<td>cuire, laisser cuire</td>
</tr>
<tr>
<td>Cook</td>
<td>cuire</td>
</tr>
<tr>
<td>the pasta/peas in salted water</td>
<td>Spanish</td>
</tr>
<tr>
<td>There's a pub on the corner of the street</td>
<td>esquina</td>
</tr>
<tr>
<td>There's a chair in the corner of the room</td>
<td>rincón</td>
</tr>
</tbody>
</table>

Finding senses – summary

- A range of criteria, including:
  - morphology, syntax, valence etc
  - collocation and collocational networks
  - lexical relations
  - translation equivalents
  - regular polysemy, metonymy, metaphor ...
- Depends on dictionary:
  - size
  - target users' reference needs/reference skills
  - Occam's razor: no more complex than it needs to be

Overview

- Ordinary people and word senses
- Lexicographer’s perspective
- Theoretical perspective
  - Quine’s challenge
  - Ambiguity and vagueness/indeterminacy
  - Selection and modulation
  - Ambiguity tests
  - Experiment
- An argument

Quine’s challenge

What is a word sense?

“No entity without identity”
(W. v. O. Quine)
- Are word senses a respectable part of a theoretical vocabulary?
- Only if we can give a decent answer to the question:
  - is this the same word sense as that?

Basics

- Different = *split* = ambiguous = polysemous
- Same-sense = *lump*=vague/indeterminate
- USAGE: token (eg in corpus, in context)
- READING, potential sense, candidate for sense-hood
- SENSE only where there is ambiguity

Indirect indications

- Morphology: hang-hanged vs. hang-hung
- Synonym: green-innocent vs. green-ecological
- Antonym: light-heavy vs. light-dark
- Translation: drug-drogue vs. drug-médicament
- Not *semantic*
- Only semantic evidence is decisive
Selection vs modulation (1)

From Cruse 1986.
- polish the car (reading of car = A+B1)
- service the car (reading of car = A+B2)
- hoover the car (reading of car = A+B3)

car is GENERAL
Context explains all of difference
There is a viable general sense, A.
context MODULATES rather than SELECTS

Selection vs modulation (2)

Is there a general component A of the meaning of bank such that
- rob the bank: (reading of bank = A+B1)
- climbed up the bank (reading of bank = A+B2)
- Can the difference between meanings be explained by the difference between contexts
  - rob vs climb up the?
- No
context SELECTS rather than MODULATES

Semantic tests

Zwicky and Sadock, 1975: various tests
including
- Yes/no
- zeugma
- crossed readings

Format

WORD: identify sense distinction
R1: opp. of cat (R1)
R2: opp. of bitch (R2)
TEST: devise test sentence/scenario
RESULT: is test sentence/scenario OK?
could it occur?
is it plausible/funny/strange?
INFERENCE: implication of result (Same or Different)

YES/NO test (1)

WORD:  hand
R1:  left hand
R2:  right hand
TEST:  Did he raise his hand?
  - Yes (he raised his right hand)
  - No (he didn't raise his left hand)
RESULT:  Not OK
INFERENCE:  S(ame)
Zeugma
- Greek for “yoke”
- She came out in spots and a bath chair
- He caught three trout and a cold
There is only a joke if the word is ambiguous (D)
- based on "one meaning per instance"

CROSSED READINGS (1)
1. Two times R1 possible
2. Two times R2 possible
3. One of each (the "crossed reading")??
   - WORD: bank
     R1: river
     R2: money
   - TEST: Mary blew up a bank and so did John (robbers or dambusters?)
   - RESULT: Crossed reading not possible
   - INFERENCE: D

CROSSED READINGS (2)
- WORD: hand
  R1: left
  R2: right
  - TEST: Mary put up her hand and so did John
  - RESULT: Crossed reading OK
  - INFERENCE: S

CROSSED READINGS (3)
- WORD: crate
  R1: tray with partitions (milk, beer)
  R2: wooden box (chickens, car parts)
  - TEST: John's offering came in a crate, and so did Peter’s.
  - RESULT: Crossed reading not possible
  - INFERENCE: DECISION:

Limitations of tests
- Syntactic compatibility
- Nothing to say about collocations, multi-word units
- “divide and rule”
- Multiple test sentences: might disagree
- How hard you look...
- No reference to dictionary size, style
  - different starting point
  - “sense divisions should be clear and rational”
  - fig, glosses in examples
  - subsenses

Do the tests deliver?
- Textbook cases vs use in anger

Desiderata
- Clear cases: consistent with intuition
- Unclear case: resolves the issue
Experiment

- Find difficult cases
  - one dict says ‘split’, another says ‘lump’
- Find lexicographers to be ‘experimental subjects’
- Teach lexicographers how to use tests
- Lexicographers apply tests to difficult cases
- Did it help?

Experiment

- Training sessions/experiments performed at Chambers-Harrap, Collins, CUP, Macquarie

Findings

- in some cases, they add useful evidence
- often inapplicable/irrelevant
- Can they answer our question, *is this the same word sense as that?* No

Back to the lexicographer

- They are the experts
- Answer to Quine
  - This (corpus instance) is the same word sense as that (corpus instance) if and only if the lexicographer puts them in the same meaning-group

Do lexicographers *find* word senses

-or do they create them?

“The numbered lists of definitions found in dictionaries have helped to create a false picture of what really happens when language is used” (Hanks 2000)

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Words and word senses (1)

“Sentences mean things because words have meanings, and grammar rules build meanings of sentences from meanings of words”

*but*

some words have multiple meanings, so it must be word *senses*, not words, that we build sentence meanings from.
Words and word senses (2)

- automatic thesauruses
  - words

- manual thesauruses
  - simple hierarchy is appealing
  - homonyms

- "crane is-a machine vs crane is-a bird"
- "aha! objects must be word senses"

Problems

- Theoretical
- Practical
Wittgenstein

Don’t ask for the meaning, ask for the use

Practical

Problems

- Practical
  - A thesaurus is a tool
  - if the tool organises words senses you must disambiguate before you can use it
  - Automatic disambiguation (WSD):
    - state of the art 65%

  “To use this tool, first replace one third of your input with junk”

Avoid word senses

“Sentences mean things because words have meanings, and grammar rules build meanings of sentences from meanings of words”

but

some words have multiple meanings, so it must be word senses, not words, that we build sentence meanings from.
Meaning potential

- The premise was wrong:
  - What could be more obvious than the platitude that “dog” means “dog” and “house” means “house”? This reasonable and simple view serves us well in everyday life and is widely shared. And yet there is considerable evidence that it is deeply wrong … forget notions like “meaning of an expression” and think instead of the “meaning potential” of a language form. Fauconnier and Turner, in Ed. Nerlich et al 2003, p79.