Detecting Meaning with Sherlock Holmes[*]

Introduction, Organization
What does it mean to mean?

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Welcome!

➤ In this course we will introduce you to the study of meaning

   ➤ How meaning is built up from words and phrases
   ➤ How meaning depends on context
   ➤ How to critically read texts
   ➤ How to appreciate the historical and cultural context of a text
   ➤ How stories are transformed in different media
   ➤ How meaning changes as it is transmitted in different languages and cultures

➤ Using the Sherlock Homes stories (and films, …) as examples

   ➤ Try to make this as enjoyable as possible
   ➤ Read (and watch) some great stories

Francis Bond

➤ BA in Japanese and Mathematics

➤ BEng in Power and Control

➤ PhD in English on *Determiners and Number in English contrasted with Japanese, as exemplified in Machine Translation*

➤ 1991-2006 **NTT** (Nippon Telegraph and Telephone)

   ➤ Japanese - English/Malay Machine Translation

➤ 2006-2009 **NICT** (National Inst. for Info. and Comm. Technology)

   ➤ Japanese - English/Chinese Machine Translation

➤ 2009- **NTU** (Nanyang Technological University)

   ➤ Cross-lingual representation of meaning

➤ Proud SOB (Sound of the Baskervilles)

➤ Hound of the Internet

➤ High Honours in the 2017 John H Watson Canonical Treasure Hunt (Francis Bond, Margie Deck, Sheila Holtgrieve, Lauren Messenger)[1]

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[1]Alphabetical order

Overview of today

➤ How this course is organized

➤ Why Sherlock Holmes

➤ What is semantics

➤ Why should we be interested in semantics

➤ Syllabus; Administrivia

What do you learn?

Students will learn semantics at an introductory level and they will acquire semantic analysis skills. With these skills and their knowledge of semantic approaches, students will be able to approach natural language data, as well as develop awareness of the inherent connections between semantics and other branches of linguistics. In the second half of the course, we will show how the stories (and other works adapted from them) convey meaning to the reader, as well as how the meaning becomes part of our cultural heritage.

Course Content

This course introduces basic skills in semantic and literary analysis, such as:

➤ Distinguishing word senses

➤ Understanding how meaning is built up compositionally

➤ Understanding how words can convey feelings

➤ Understanding how meaning can be conveyed indirectly

➤ Identify characteristics of modern detective fiction

➤ Understanding how to approach a text in a critical manner

➤ Understanding how to appreciate the historical and cultural context of a text

➤ Understanding how stories are transformed in different media

➤ Understanding how cinematic elements affect our understanding

➤ Understanding how meaning changes as it is transmitted in different languages and cultures

Textbook and Readings

➤ No required text book and not much reading

➤ EXCEPT you must read the three stories assigned

➤ If you want to know more about semantics I recommend

    ➤ Saeed, John (2009). *Semantics*. 3rd Edition. Wiley-Blackwell.
    ➤ Lyons, John (1977) *Semantics*. Cambridge University Press

➤ Between now and next week, I expect you to read the assigned three stories.

Studying meaning

➤ I will teach you about meaning

➤ You will then try to analyze the use of words
  in the Sherlock Holmes stories

  ➤ Word Meaning (sense)
    http://compling.hss.ntu.edu.sg/ntumc/cgi-bin/showcorpus.cgi
    to knock up
  ➤ Word and Sentence Meaning (sentiment)
    Julia and I had no great pleasure in our lives
  ➤ Idioms and metaphors
    to cross someone's path

➤ You must do the three online projects, each is 4–8 hours work
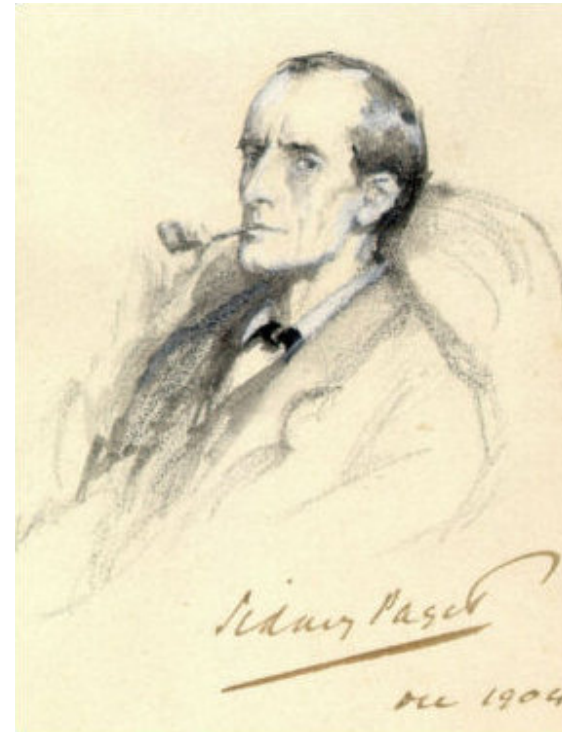
Sherlock Holmes

Why Sherlock Holmes?

➤ Enjoyable, reasonably straight-forward stories

➤ Close enough to modern English to be readable

➤ Popular enough to be easily available

➤ Old enough to be out of copyright

➤ Widely translated and adapted

➤ Very early examples of fan-fiction and geekery

Who is Sherlock Holmes?

➤ A London-based consulting detective

➤ who solves many cases

➤ with a quirky personality

➤ skilled with disguises

➤ with immense powers of observation and raticionation

➤ and a faithful friend: John Watson

➤ lives on 221B Baker street

Who is Sherlock Holmes in the real world?

➤ A fictional detective, invented by Sir Arthur Conan Doyle

➤ He appeared in a total of 60 stories, published between 1887 and 1927

➤ The four novels and five volumes of short stories now often appear as The Complete Sherlock Holmes and are referred to as **the CANON**

➤ Most of the stories are narrated by Holmes's friend and biographer, Dr. John H. Watson

➤ The stories were popular at the time, and have remained popular

➤ They have been adapted as plays, radio shows, films, tv series, manga and many, many more

What is Sherlock like?

➤ Watch: Sherlock deduces the nature of a man

➤ from *The Red-Headed League* Season 2 Episode 5
Granada Television: 1984–1994

➤ First aired at 9:00 PM in the United Kingdom on Tuesday, 22 September 1985 on ITV

➤ Jeremy Brett as Sherlock Holmes; David Burke as Dr. Watson; Roger Hammond as Jabez Wilson

> "Beyond the obvious facts that he has at some time done manual labour, that he takes snuff, that he is a Freemason, that he has been in China, and that he has done a considerable amount of writing lately, I can deduce nothing else."

Sir Arthur Conan Doyle

➤ **Deputy Lieutenant Sir Arthur Ignatius Conan Doyle**
(22 May, 1859 –7 July, 1930)

➤ a Scottish physician and writer

➤ he also wrote science fiction stories, historical novels, plays and romances, poetry, and non-fiction

➤ he stood for parliament and was a crusader for reform (both in the army and in criminal justice)

➤ he was an ardent spiritualist, and believed you could communicate with the dead.

Doyle's relation to Sherlock Holmes

➤ He preferred his historical fiction to Sherlock holmes

➤ In fact he got so sick of the character he killed him in a short story (*The Final Problem*, 1893)

➤ But he needed the money, so started to write about him again from 1900 (with *The Hound of the Baskervilles*)

➤ The last stories were published in 1926

The inspiration for the character

➤ Doyle's university teacher, Dr Joseph Bell

➤ Bell was born in 1837 into a family of surgeons, and at eighteen accepted a place at the Edinburgh Medical School.

➤ There he was taught how to observe patients very closely; and it was this attention to detail that he practised throughout his life.

   Bell once remarked to an astonished outpatient: "I know you are a beadle and ring the bells on Sundays at a church in Northumberland somewhere near the Tweed." "I'm all that," said the man, "but how do you know? I never told you." The outpatient left, bewildered.

   Bell turned to his students: "Did you notice the Northumbrian burr in his speech, too soft for the south of Northumberland? One

only finds it near the Tweed. And then his hands. Did you not notice the callosities on them caused by the ropes? Also, this is Saturday, and when I asked him if he could not come back on Monday, he said he must be getting home tonight. Then I knew he had to ring the bells tomorrow. Quite easy, gentleman, if you will only observe and put two and two together."

➤ Doyle sent a copy of each Sherlock Holmes story to Bell in Edinburgh.

Hume, Robert (4 November 2011). "Fiction imitates real life in a case of true inspiration". Irish Examiner. http://www.irishexaminer.com/analysis/fiction-imitates-real-life-in-a-case-of-true-ir html Retrieved 19 January 2014.

Introduction to Semantics

What is Semantics

➤ Very broadly, semantics is the study of meaning

  ➤ Word meaning
  ➤ Sentence meaning

➤ Why do we want to study meaning?

➤ What kind of knowledge does it take for a speaker to produce language and for a hearer to comprehend language?

Layers of Linguistic Analysis

1. Phonetics & Phonology

2. Morphology

3. Syntax

4. Semantics

5. Pragmatics

6. Stylistics

Do people share a common conceptual system?

➤ What is a **high school**?

➤ What color is **blue**?

➤ What does **verb** mean?

➤ What is **carrot cake**?

Meaning is an open-ended conceptual system

➤ Lexical innovation

    ➤ *Meritocracy* (1958)
    ➤ *LASER* (1960)
    ➤ *WWW*

    ...

➤ Is this association between creating new words and creating new concepts justified?

➤ More creativity

    ➤ *I am so hungry I can eat ten million elephants.*

Meaning is

➤ An intrinsic property of a word

➤ The other words annexed to a word in the dictionary

➤ The connotation of a word

➤ The place of anything in a system

➤ The practical consequences of a thing in our future experiences

➤ That to which the user of a symbol

  ➤ actually refers to
  ➤ ought to be referring
  ➤ believes themself to be referring

➤ That to which the interpreter of a symbol

  ➤ (a) refers
  ➤ (b) believes themself to be referring
  ➤ (c) believes the user to be referring

More Meaning

We can define the meaning of a speech form accurately when this meaning has to do with some matter of which we possess scientific knowledge. We can define the names of minerals, for example, in terms of chemistry and mineralogy, as when we say that the ordinary meaning of the English word *salt* is 'sodium chloride (NaCl)', and we can define the names of plants or animals by means of the technical terms of botany or zoology, but we have no precise way of defining words like *love* or *hate*, which concern situations that have not been accurately classified –and these latter are in the great majority.

(Bloomfield, in *Language* 1933)

➤ But is **salt** really just NaCl?

Determining meaning

Some useful concepts

➢ **Synonymy**: A means the same as B

➢ **Contradiction**: A and B cannot both be true

➢ **Entailment**: if A is true then B must also be true

➢ **Ambiguous**: A has more than one meaning

Meaning in the larger context

➤ Semiotics is the study of interpreting symbols, or **signification**

    ➤ We refer to the **signified**

    ➤ Using a **signifier**   Saussure

➤ Signs can be more or less related to their objects

icon	map or diagram	Children Crossing
index	closely represented	Roundabout
symbol	arbitrary	Stop

Problems with defining meaning

➤ The **grounding** problem and **circularity**

➤ The boundaries of meaning: **linguistic** vs **encyclopedic knowledge**

➤ Regional variation in meaning: **dialects** "the usage or vocabulary that is characteristic of a specific group of people"

➤ Individual variation in meaning: **idiolects** "the language or speech of one individual at a particular period in life"

Metalanguages and Notational Conventions

We use language to talk about language, which can get messy. So we try to use certain words with very specific technical senses.

➤ **technical term** ← remember me!

➤ *word* "gloss" or *utterance*

➤ *lexeme*

➤ `predicate`

Word Meaning and Sentence Meaning

➤ We store information about words in our **mental lexicon**

➤ It is still unclear what exactly a word is!

➤ Words can be combined to form an infinite number of expressions

➤ This building up of meaning is referred to as **composition**

➤ If the meaning of the whole can be deduced from the parts then it is **compositional**

Reference and Sense

➤ Words **refer** to things in the world (like `unicorn`s)

➤ The meaning of a word across different contexts is often referred to as its **sense**

  ➤ Same word can refer to different things
    * English: *I put my money in the bank*
    * English: *I fell asleep at the river bank*
  ➤ Same basic concept can have different boundaries
    * French: *mouton* "sheep/mutton"
    * English: *sheep* vs *mutton*
    * Japanese: *hato* "dove/pigeon"
    * English: *dove* vs *pigeon*

Utterances, Sentences and Propositions

➤ **utterance**: an actual instance of saying (or writing or ...) something

➤ **sentence**: an abstraction, the type of what was said

    (1)   Caesar invades Gaul

➤ **proposition**: a further abstraction, normally ignoring some non-literal meaning

    (2)   `invade(Caesar, Gaul)`

➤ **information structure**: what part of a proposition is emphasized

(3) *Caesar invaded Gaul*

(4) *Gaul was invaded by Caesar*

(5) *It was Gaul that Caesar invaded*

(6) *It was Caesar who invaded Gaul*

Propositions

➢ A logical construct

➢ Abstracts away from grammatical differences

   (7) *John kicked the dog*

   (8) *The dog was kicked by John*

   (9) ジョンが犬を蹴った. *John-ga inu-wo ketta.*

➢ Can be reasoned over (**logic**)

➢ Can be formalized
   `x,y(named(John,x),dog(y),the(y),kick(e,x,y),past(e))`

Video: The Blackberry Sketch

➤ Define the following:

    ➤ *blackberry*

    ➤ *orange*

    ➤ *apple*

    ➤ *date*

➤ How similar are your definitions to the use in the video?

Representing meaning

➤ One of our goals will be to represent meaning

➤ There are various ways to do this

  ➤ Syntactic trees
  ➤ Logical forms
  ➤ Thesauri and Ontologies
  ➤ Translation
  ➤ Paraphrasing

  Can you think of others?

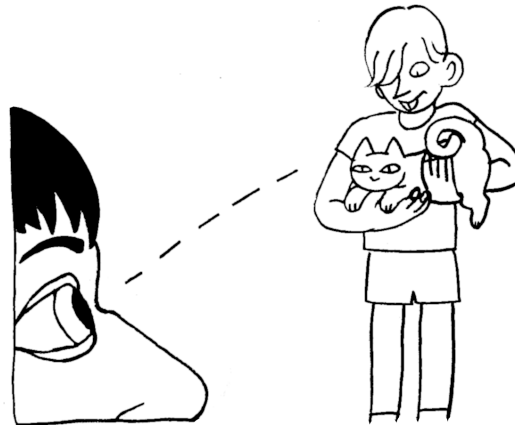➤ At the end of this course you should be able to use these to describe many aspects of meaning

Also vector space, description, images, video, …

Language is normally under-specified

We get words:

I saw a kid with a cat.

We want meaning:

I saw a kid with a cat[1]

S
- NP
  - I
- VP
  - V:see
    - saw
  - NP
    - DET
      - a
    - N̄
      - N
        - kid
      - PP[together]
        - with a cat
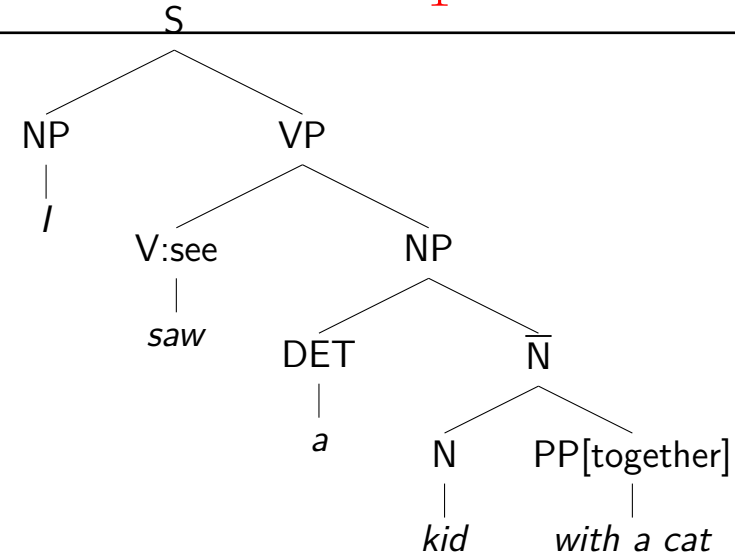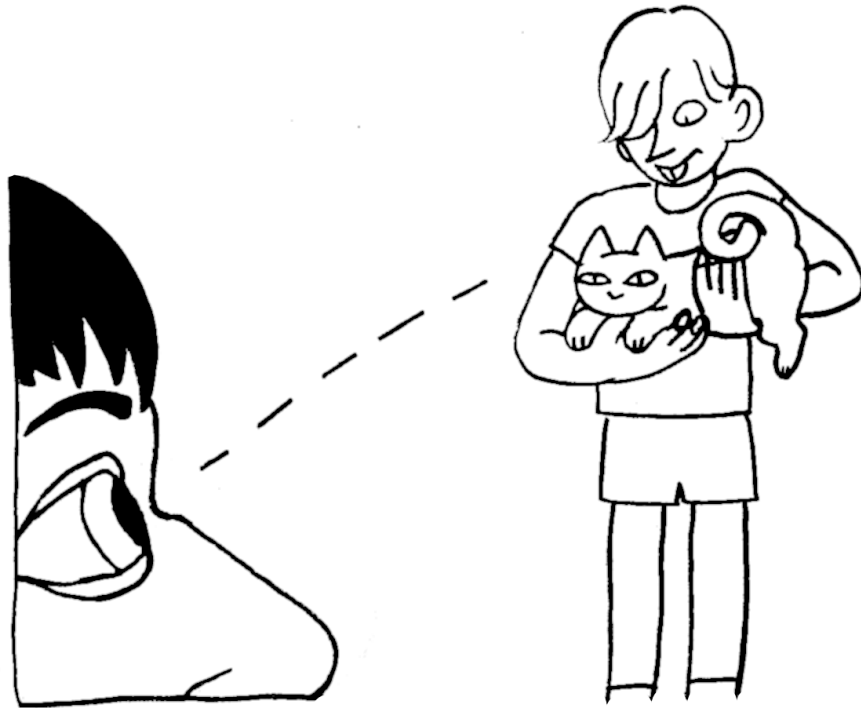
see(I, kid: past); with(kid, cat)

see ⊂ perceive
kid ∼ child
with ⊂ together

I saw a kid with a cat$_2$
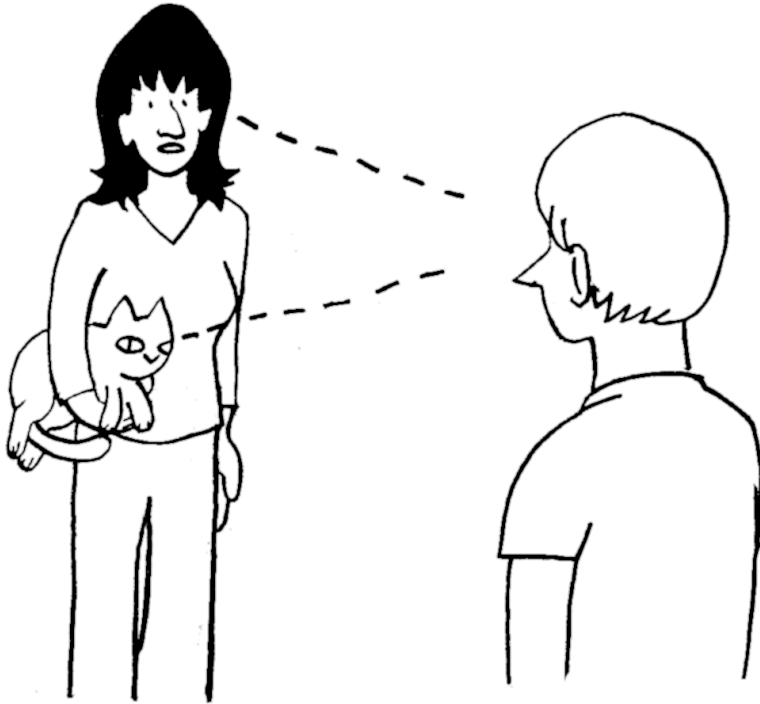
S

NP   VP

I

V:see   NP   PP[together]

saw   DET   N   with a cat

a   kid

```
see(I, kid:  past)  with(I, cat)

see ⊂ perceive
kid ~ child
with ⊂ together
```

I saw a kid with a cat$_3$


```
                    S
                   / \
                 NP   VP
                 |   /  \
                 I  V:saw  NP
                    |      / \
                   saw   DET  N
                    |     |    / \
                    a    N  PP[together]
                         |       |
                        kid   with a cat
```
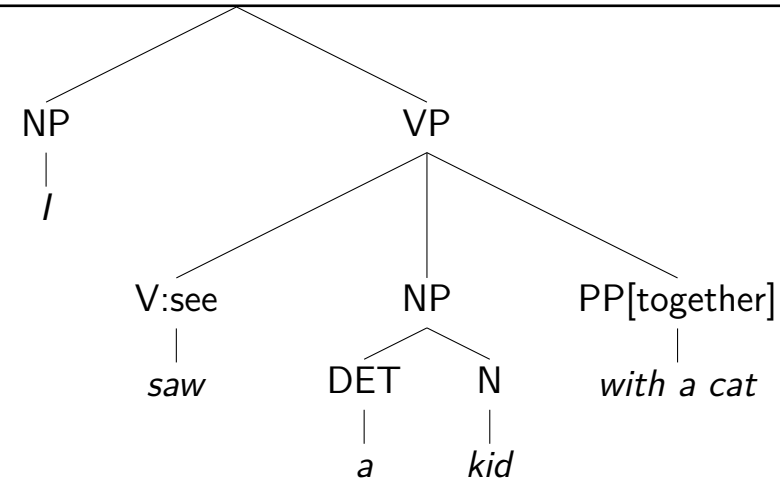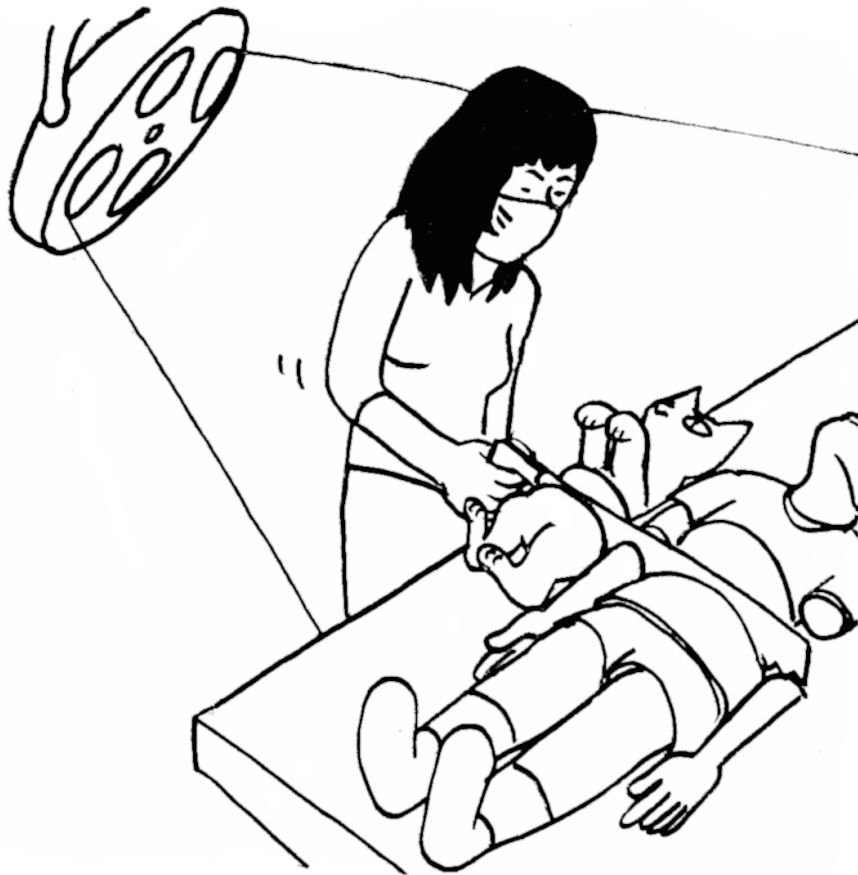
saw(I, kid: pres); with(kid, cat)

saw $\subset$ cut
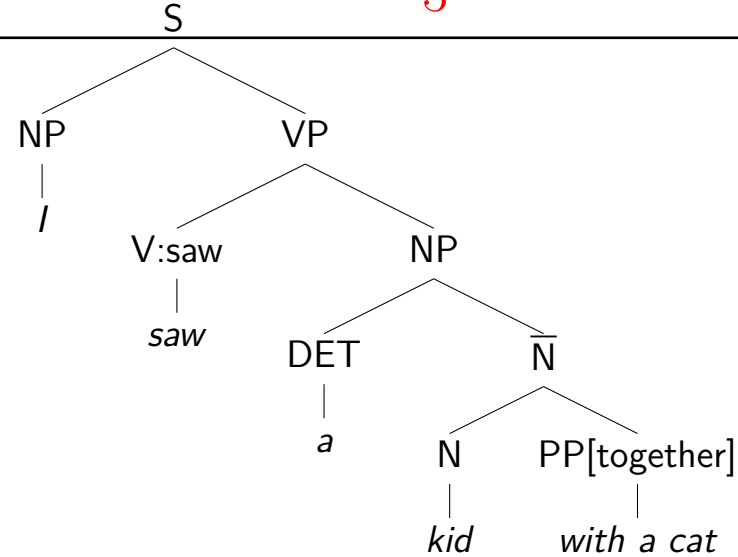kid $\sim$ child
with $\subset$ together

I saw a kid with a cat$_4$


```
                            S
                   ┌────────┴────────┐
                  NP                 VP
                   │          ┌───────┼────────┐
                   I        V:saw    NP      PP[together]
                            │      ┌──┴──┐        │
                           saw    DET    N     with a cat
                                   │     │
                                   a    kid [goat]
```
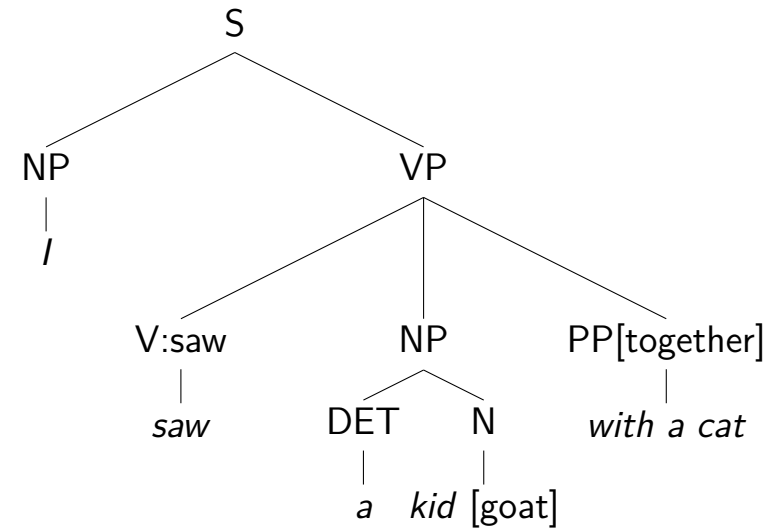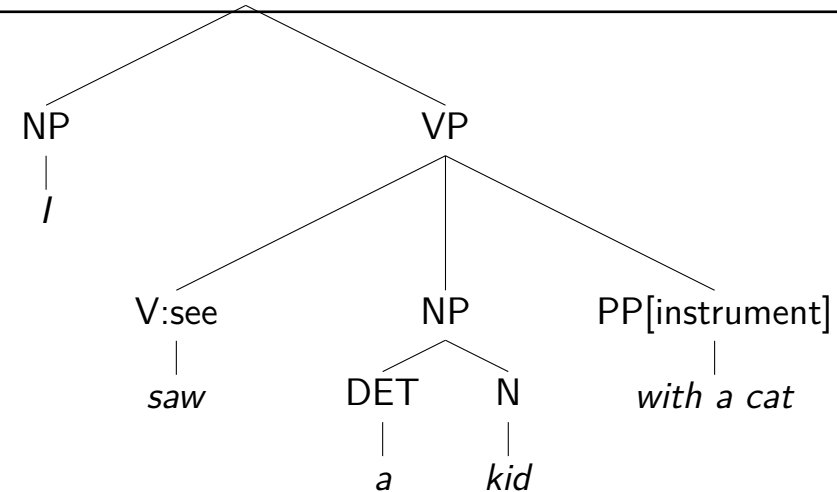
saw(I, kid: present) with(I, cat)

saw $\subset$ cut
kid $\sim$ young goat
with $\subset$ together

I saw a kid with a cat$_5$


```
                        S
              ┌─────────┴─────────┐
             NP                   VP
              │          ┌────────┼──────────┐
              I        V:see      NP      PP[instrument]
                         │      ┌──┴──┐        │
                        saw    DET    N     with a cat
                                │     │
                                a    kid
```

see(I, kid: past) with(I, cat)

see ⊂ perceive
kid ∼ child
with ⊂ instrumental

We can also use translations

(10) 我 看到了 一个抱着 猫 的 孩子
      wǒ kàndàole yīgè bàozhe māo de háizi.
      I   saw   one holding cat   's child

   I did see a child holding a cat

(11) 我 抱着 猫 看到了 一个孩子
      wǒ bàozhe māo kàndàole yīgè háizi
      I   holding cat   saw   one child

   I holding a cat did see a child

(12) 我 鋸鋸一个孩子 和 他/她 的 猫
      wǒ jù   yīgè háizi hé tā/tā   de māo
      I   saw one child and he/she 's cat

   I saw a child and their cat

(13)　我　和　一只　猫　鋸锯一只　小　　山羊

wǒ hē　yīzhǐ māo jù　yīzhǐ xiǎo　shānyáng

I　and one　cat　saw one　small goat

I and a child saw a young goat

(14)　我　用　　一只　猫　看到了　一个孩子

wǒ yòng yīzhǐ māo kàndàole yīgè háizi

I　use　one　cat　saw　　one　child

Using a cat, I did see a child

Your turn: try to paraphrase — translate into English
aim to be unambiguous, even if slightly disfluent

Summary

➤ Syllabus; Administrivia

➤ What is semantics?

➤ Why should we be interested in semantics?

➤ What is meaning?

➤ Meaning as an open ended conceptual system

➤ Semantic problems and solutions?

Administrivia

Coordinator Francis <u>Bond</u> `<bond@ieee.org>` !`<fcbond@ntu.edu.sg>`

Details will all be online:

`http://compling.hss.ntu.edu.sg/courses/hg8011/`

Assessment: On-line analysis

1. Disambiguation (15%: individual work)
   Identify and annotate word meaning for your own passage of one of the stories using wordnet as the sense inventory.

2. Comparison (15%: group work)
   Compare and contrast your annotations with other annotators; re-annotate based on your discussion and leave comments for at least five words.

3. Sentiment (15%: individual work)
   Identify and annotate sentiment for phrases from your own passage.

4. Idioms and Metaphors (15%: individual work)
   Identify and annotate idioms and metaphors from your own passage.

On-line Analysis

You will be assigned two short passages: one already annotated, and one not. During class discussions and for the projects you should try to find examples from these.

Your homework this week is to read the following three stories, all linked to from the main page:

➤ SPEC *The Adventure of the Speckled Band* by Doyle, Arthur Conan (1892)
➤ DANC *The Adventure of the Dancing Men* by Doyle, Arthur Conan (1903)
➤ REDH *The Red-Headed League* by Doyle, Arthur Conan (1891)

Next week I will reveal the endings and you need to know the stories to follow the discussions.

Assessment: Quizzes (40%)

➤ Quiz 1 (20%)

  ➤ Identifying characteristics of modern detective fiction
  ➤ Identifying and analyzing key passages and characters from the assigned texts
  ➤ Demonstrating an understanding of how narrative (and literary) devices function in Sherlock Holmes' short stories
  ➤ Considering how cultural and historical contexts shape and influence the stories
  ➤ Understanding how popular culture takes, reshapes and extends

➢ Quiz 2 (20%)

➢ Identifying and analyzing key scenes and characters from the assigned videos

➢ Demonstrating an understanding of how narrative (and literary) devices function in Sherlock Holmes' short stories

➢ Demonstrating an understanding of how video differs from text in how stories are structured

➢ Considering how cultural and historical contexts shape and influence the stories

Extra Credit

➤ If you submit a correction that gets accepted for one of the resources we use then it shows good mastery of the material

➤ you can get 1-5% extra credit (depending on the size/difficulty) Mark $n \propto 10^{n-1}$ lines of code/documentation

➤ You can't go over 100%

➤ A correction can involve

➤ fixing an error in transcription or annotation
  ∗ spelling error
  ∗ wrong sense
  ∗ error in the dictionary

➤ making the documentation easy to read

➤ pointing out an error in a translation

Student Responsibilities

By remaining in this class, the student agrees to:

1. Make a good-faith effort to learn and enjoy the material.

2. Read assigned texts and participate in class discussions and activities.

3. Submit assignments on time.

4. Attend class at all times, barring special circumstances (see below).

5. Get help early: approach us when you first have trouble understanding a concept or homework problem rather than complaining about a lack of understanding afterward.

6. Treat other students with respect in all class-related activities, including on-line discussions.

Attendance

1. You are expected to attend all classes.

2. Be on time - lateness is disruptive to your own and others' learning.

3. Valid reasons for missing class include the following:

   (a) A medical emergency (including mental health emergencies)
   (b) A family emergency (death, birth, natural disaster, etc).

   You must provide documentation to the student office.

4. There will be significant material covered in class that is not in your readings. You cannot expect to do well without coming to class.

5. If you miss a class, it is your responsibility to get the notes, any hand-outs you missed, schedule changes, etc. from a classmate.

Remediation and Academic Integrity

1. No late work will be accepted, except in the case of a documented excuse.

2. For planned, justified, absences on class days or days on which assignments are due, advance notice must be provided.

3. Cheating will not be tolerated. Violations, including plagiarism, will be seriously dealt with, and could result in **a failing grade for the entire course**.

4. Refer to the University Honour Code:
   http://academicintegrity.ntu.edu.sg/

5. As always, use your common sense and conscience.

The winning strategy

➤ Read the stories before class (and after again, if necessary)

➤ Work together: make study groups

➤ Tasks: Discuss as much as you want, write up your own answers

➤ Exams: No discussion

➤ Ask questions ... early and often!