Informal presentation
for computational linguists
who work on events in biomedical texts

Foundations of Events in Linguistics: Vendler 1957

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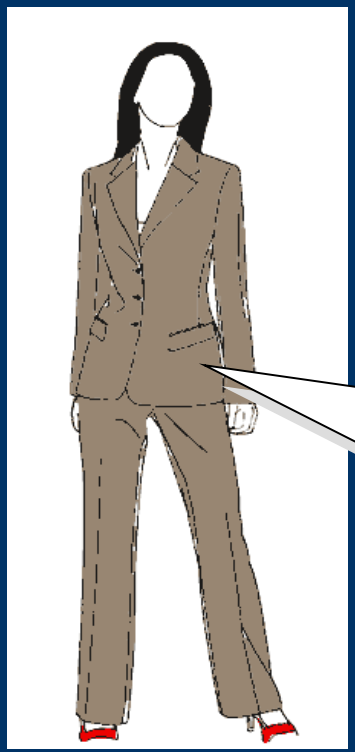
March 31 2010

An example situation

When provoked, Notaden bennetti frogs secrete a proteinaceous exudate, which rapidly forms a tacky and elastic glue.



This material has potential in biomedical applications.

Vendler 1957

- States
- Activities
- Accomplisments
- Achievements

http://gina.openlanguage.ca/research/events/references/vendler-1957-verbs%20and%20times(text).pdf

Activities

- running,
- walking,
- swimming,
- pushing or pulling something,
- etc

Accomplisments

- painting a picture,
- making a chair,
- building a house,
- writing or reading a novel,
- delivering a sermon,
- giving or attending a class,
- playing a game of chess,
- growing up,
- recovering from illness,
- getting ready for something

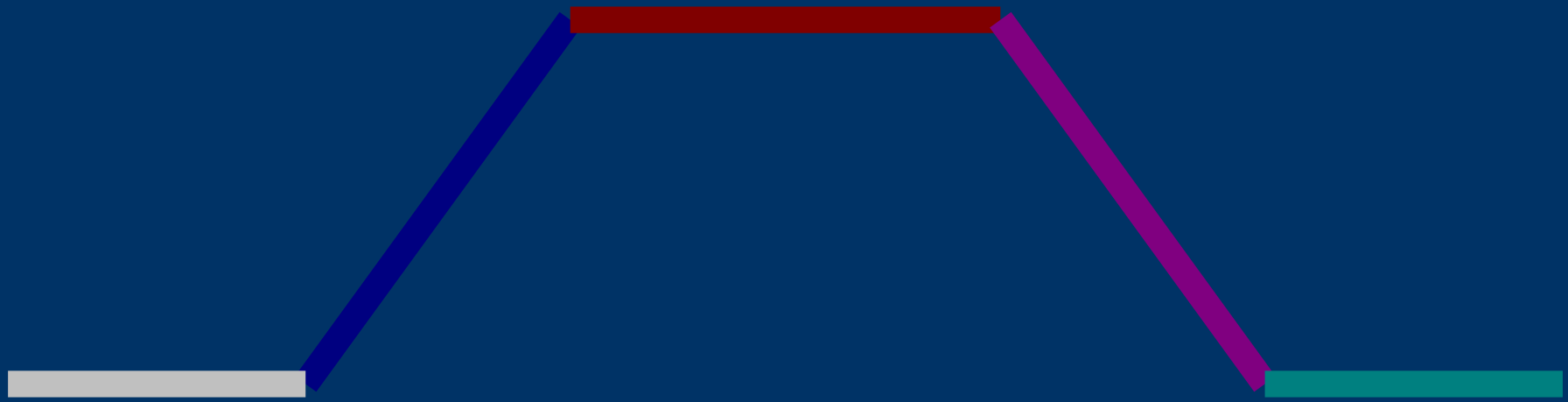
Acheivements

- recognizing,
- realizing,
- spotting and identifying something,
- losing or finding an object,
- reaching the summit,
- winning the race,
- crossing the border,
- starting, stopping, and resuming something,
- being born, or dying

States

- having,
- possessing,
- desiring, or wanting something,
- liking, disliking, loving, hating,
- ruling, or dominating somebody or something,
- knowing or believing things

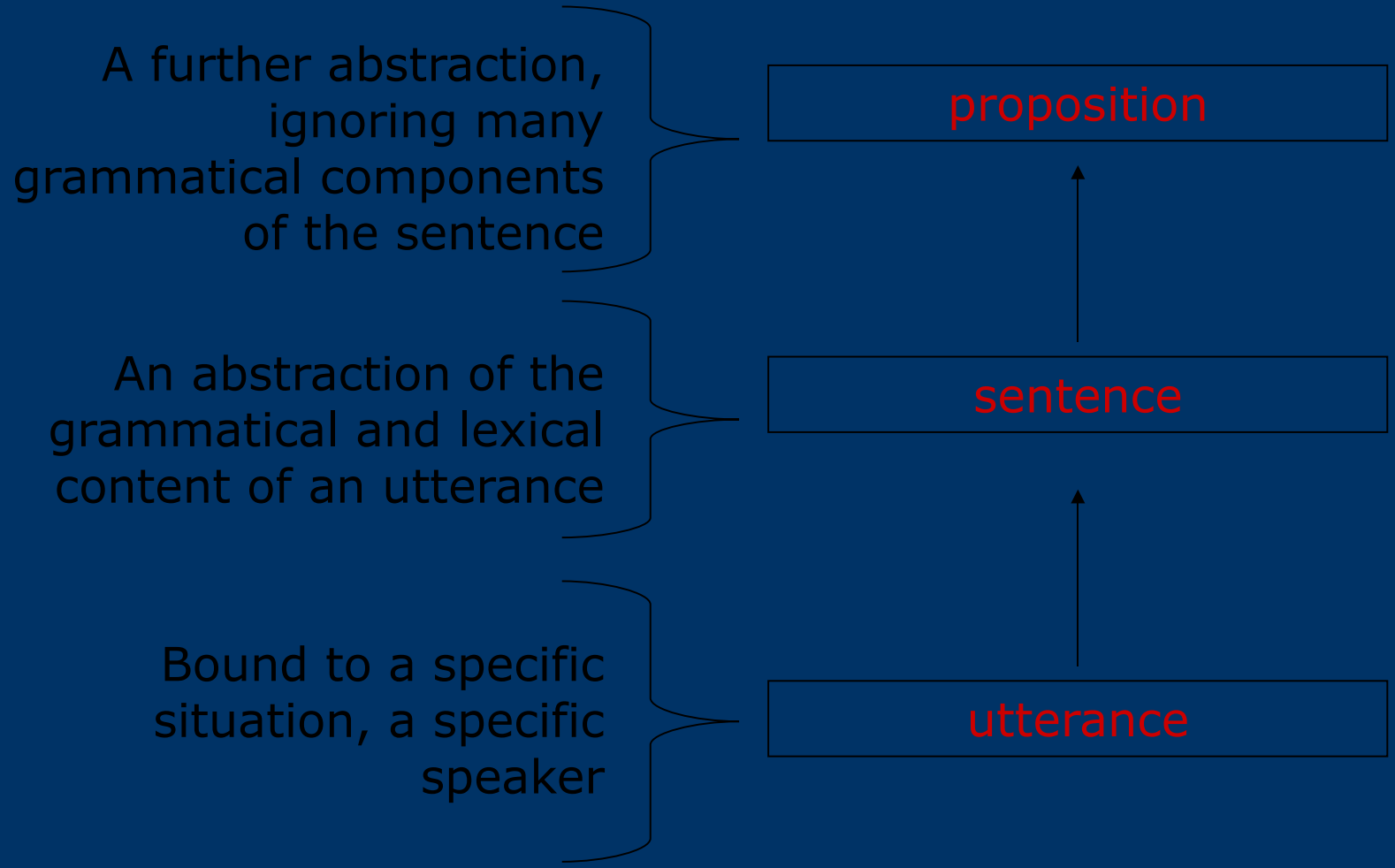
What are the features?



Where are the features encoded?

- Lexical semantics
- Type of direct object (a mile, 2 miles vs miles)
- Prepositions (for 2 hours, in 1 hour)
- Verb forms (be verb+ing, have verb+en, verb+ed, verb, verb+s, verb+nominalization)

Levels of abstraction

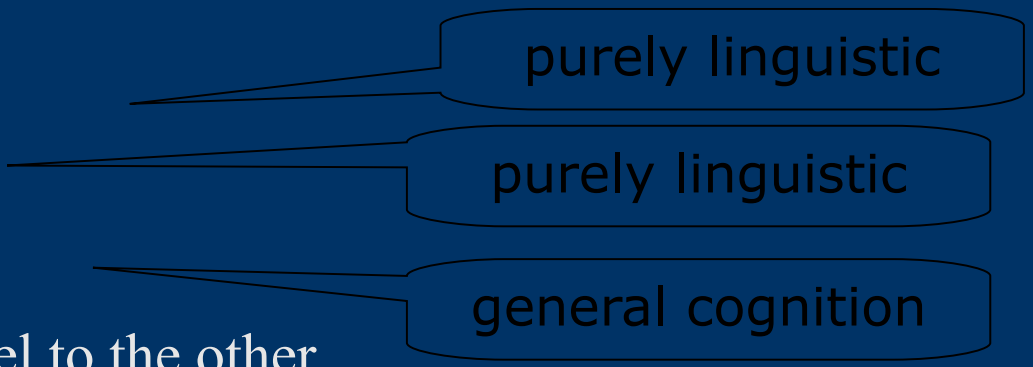


Sentences vs. propositions

- A sentence is a linguistic construct. From a linguistic point of view, these are different sentences:
  - John stole the meat pie.
  - The meat pie was stolen by John.
- A proposition is a logical construct, which abstracts away from grammatical differences.
- If we simplify things, we could view the above sentences as expressing the same proposition:
  - “There is an x, and there is a y: x is a meat pie and y is a person called John, and y stole x”
  - Logicians would express the above using some form of notation.

Conceptual structure and language

- Presumably, words and constituents map to conceptual elements.
- E.g. Jackendoff (2002) proposes a three-level theory of language:
  1. phonological structure
  2. syntactic structure
  3. conceptual structure



  - Rules to map from one level to the other.
  - The rules mapping from linguistic to conceptual structure define an interface between language and other cognitive functions.

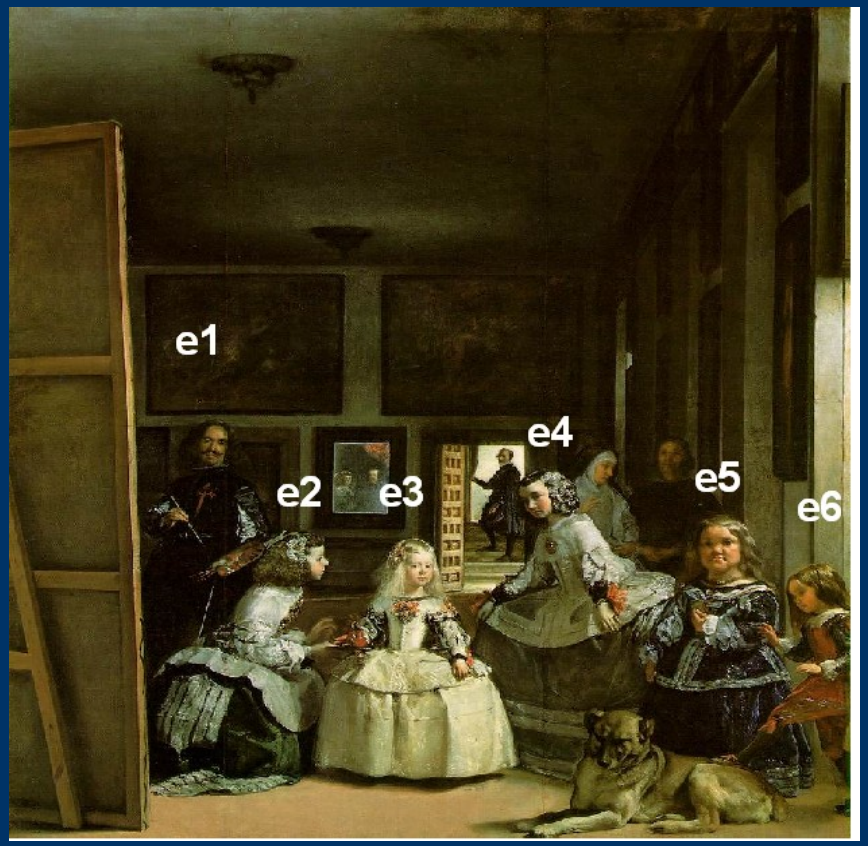
Other theories

- Other theories (*contra* Jackendoff), propose a level of semantic structure which is “properly” linguistic.

- This intervenes between conceptual structure and linguistic structure.

Reference

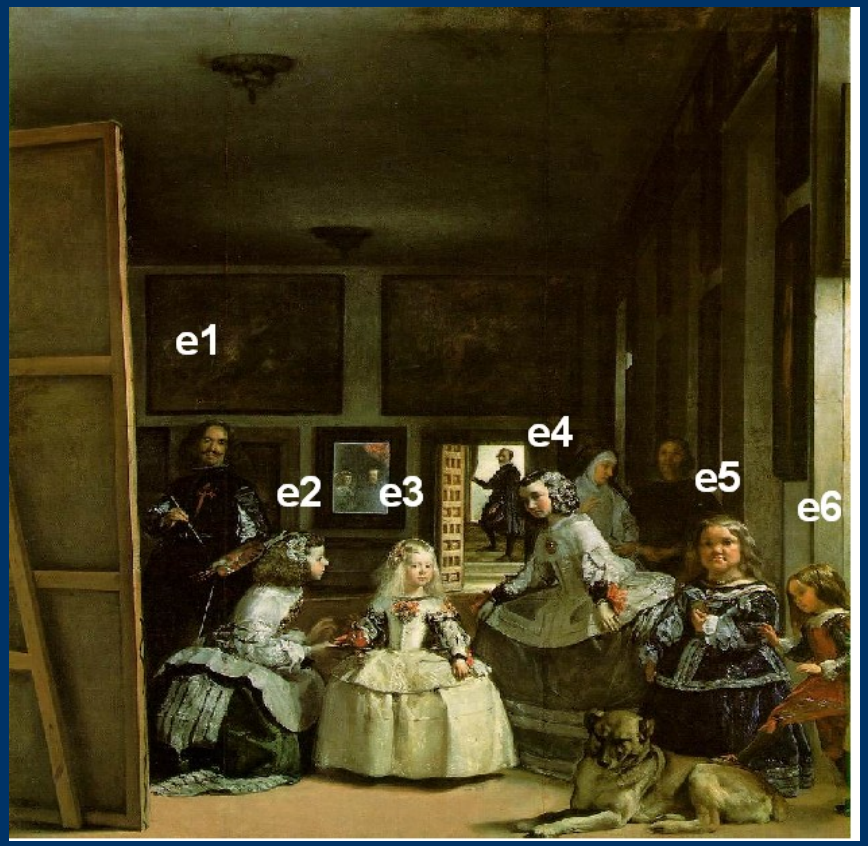
- Imagine you're standing in front of this painting. Your partner asks:
- Which of those figures is the Princess of Spain?
- You know that it's the figure marked "e3"



Diego Velazquez, *Las Meninas*
(Museo Prado, Madrid)

Reference

- There are many ways to reply:
  - the girl in the white dress
  - the girl in the middle
  - the person being tended to by the kneeling maid



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Reference

- These different expressions mean different things, have different content.

- However, they all pick out the same entity in this context (the Princess of Spain).
  - i.e. they **refer** to the princess of Spain

- In a different context, *the girl in the white dress* could pick out something different.
  - Sometimes, it can fail to pick out anything.

Reference

- an action on the part of a speaker
- it is context-bound
- but how do we pull it off?

Meaning and grammar (I)

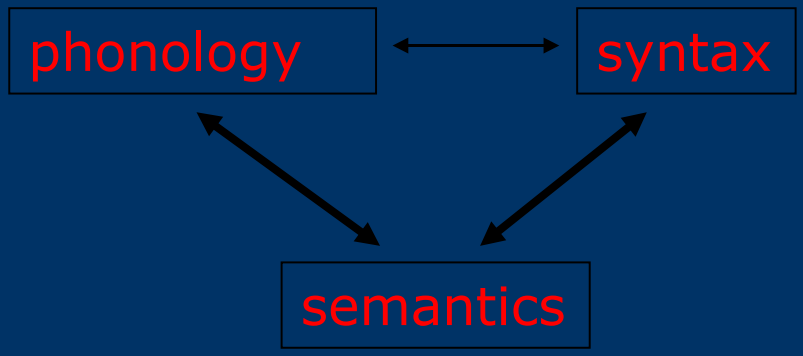
- Generative grammar divides the language faculty into modules:

- This view emphasises distinct roles played by different components.

- There is a separate component for meaning.

Meaning and grammar (II)

- An alternative view, found for example in Cognitive Grammar, argues that meaning is inseparable from the other components.
- In this framework, people often argue also that linguistic knowledge and encyclopaedic knowledge cannot be separated.



Semantics in relation to philosophy

- Philosophical concerns:
  - Ontology:
    - the nature of reality, what is “out there”
  - Epistemology:
    - How we come to perceive and know about “what is out there”
- Semantics must account for:
  - How words and sentences relate to “things” and “situations”
  - How we come to know those relationships.
- In fact, a lot of work in semantics is influenced by work in philosophy.

Semantics in relation to psychology

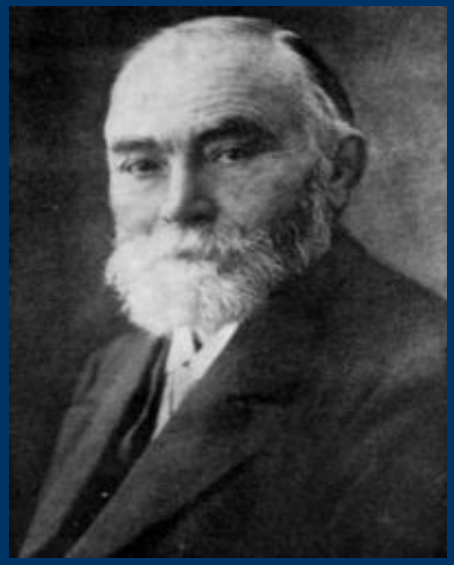
- Psychologists have long been interested in the nature of concepts:
  - Concepts are the basic building blocks with which we think
  - How are concepts organised?
  - How are they acquired?
- Concepts are often assumed to underlie the meanings of words.
- Results from psychology have often informed semantic theory.

Semantics vs. pragmatics

- Many linguists make a distinction between
  - Literal/conventionalised meaning
    - "core meaning", independent of context
    - This belongs to semantics proper
  - Speaker meaning & context
    - What a speaker means when they say something, over and above the literal meaning.
    - This and other "contextual" effects belong to pragmatics
- NB. The distinction between semantics and pragmatics is not hard and fast
  - Is the context-dependent meaning of *you* a matter for semantics or pragmatics?

Frege

- German philosopher and mathematician
- Considered to be one of the founding fathers of modern semantic theory and logic.
- Formalised the distinction between sense and denotation in an article
  - *Uber Sinn und Bedeutung (1892)*
  - "On sense and denotation"



Gottlob Frege

1848-1925

Definiteness & Specificity & Quantification

- Entities
- Predicates

Indefinite expressions

- Prototypically, these are NPs with an indefinite article (“a”).
- But also:
  - Come up and see me sometime.
  - Some chappie called the other day.
  - Certain people are just obnoxious.
  - This driver she met was kind of cute.

Specific vs. non-specific

- To get the door to open, you have to say a word.
- Has at least 2 readings:
  - …you have to say any word that comes to mind. (non-specific)
  - …you have to say a special word that the speaker may or may not know. (specific)

Definites vs. specific indefinites

- Like definite NPs, specific indefinites carry the suggestion that the identity of the entity is relevant.
  - *...you have to say a word*
  - not any word, but a specific word will do the trick
- However, with a specific indefinite, the speaker is not signalling to the hearer that identification is essential.

Markers of specificity

- In English, *a certain* is often used to mark specific indefinites:
  - *A certain woman is said to have married him in secret.*
- In Maltese, the determiner *wieħed/waħda* (“one”). Compare:
  - Ġie wieħed raġel.
    came-3SgM one-M man
    A (certain) man came.
    - *wieħed* used before the noun marks specificity
  - Ġie raġel wieħed.
    came-3SgM man one
    One man came.
    - *wieħed* after the noun is a numeral

Grammatical markers of specificity

- Evidence that specificity is linguistically relevant comes from languages where it is marked grammatically.
- French:
  - Marie cherche un homme qui peut lui faire l'amour douze fois par jour.
    - = Mary's looking for a (specific) man who can make love to her a dozen times a day.
  - Marie cherche un homme qui puisse lui faire l'amour douze fois par jour.
    - = Mary's looking for a (some/any) man who can make love to her a dozen times a day.

Grammatical markers of specificity

- Turkish signals specificity via the direct object marker on the noun:
  - Bir kelime söyledi.
    - = S/he said a word.
    - (non-specific: s/he said any word)
  - Bir kelimeyi söyledi.
    - = S/he said a word.
    - (specific: there is a particular word s/he said)

Some observations

- The tiger is a friendly beast.
- Tigers are friendly beasts.
- A tiger is a friendly beast.

- Are generics the same as universally quantified sentences?
  - All tigers are friendly beasts

- Apparently not. They allow exceptions.

Exceptions with generics

- All tigers are friendly beasts.
  - This is true if, and only if, every tiger in the world is a friendly beast.

- Tigers are friendly beasts.
  - This can still be true if there are some tigers who are unfriendly.
  - It has the flavour of a generalisation which tolerates exceptions.