Semantic Theory

Lexical Semantics II

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Davidsonian Event Semantics

- Verbs have an additional event argument, which is not realised at linguistic surface:

  kill(e,x,y)
- In general, n-place event verbs are represented by relations of

  arity n+1.
- Adjuncts express two-place relations between events and the respective "circumstantial information" (a time, a location, ...)

  $\exists$e[kill(e,g,b) $\wedge$ time(e, m) $\wedge$ location(e, p)]

Stative and non-stative verbs

- *Mary kicked John* : "there is a kicking event, in which Mary and John are involved"
- *John knew the answer:* "there is a knowing event, in which John and the answer are involved" (?)
- There are verbs expressing states and verbs expressing events (which we call non-stative for the time being)
  - States: *know, believe, have, desire, love*
  - Events: *run, walk, kick, kill, build a house*
- Only non-stative verbs come with an extra argument:
  - kick(e, x, y)
  - know(x, y)

Stative and non-stative verbs

- Progressive test
  - *John is running*
  - *John is building a house*
  - **John is knowing the answer*
- Manner adverbials
  - *John ran carefully*
  - *John carefully built a house*
  - **John carefully knew the answer*
- Simple present
  - *John runs (has the habit of running)*
  - *John recites poems (has the habit of reciting poems)*
  - *John knows the answer*

Different distributional behavior

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Vendler's Verb Classification

The linguist Zeno Vendler distinguished not only two, but four classes of verbs: States plus three classes of non-stative verbs:

- States: *know, believe, have, desire, love*
- Activities, describing continuous processes without a result state: *run, walk, swim, drive a car*
- Accomplishments, describing gradual events with a specific result: *paint a picture, write a paper, build a house*
- Achievements, describing punctual events consisting in a state change : *recognize, spot, find, lose, reach, die*

Vendler's Verb Classification

- Acomplishments and achievements are sub-classes of "genuine events".
- Activities (also called processes) and genuine events together are occasionally called "eventualities".

Activities and Events

- Constraints on temporal specification:
  - *John painted a picture in an hour*
  - **John walked in an hour*
  - *It took John an hour to paint a picture*
  - **It took John an hour to walk*
  - *John walked for an hour*
  - *?John painted a picture for an hour*

Activities and Events

- *John walked from 8 a.m. to 11 a.m.* ⊨ *John walked from 9 to 10 a.m.*
- *John painted a picture from 8 a.m. to 11 a.m.* ⊭ *John painted a picture from 9 to 10 a.m.*
- *John is living in Saarbrücken* ⊨ *John has lived in Saarbrücken*
- *John is painting a picture* ⊭ *John has painted a picture*
- *John stopped walking* ⊨ *John did walk*
- *John stopped painting a picture* ⊭ *John painted a picture*

Achievements

- **John is noticing a stranger in the room.*
- **John noticed the painting from 9 to 11 a.m.*
- **John stopped noticing the painting.*

- *John noticed the painting in a few minutes.*
- *John is painting a picture* ⊭ *John has painted a picture*
- *John stopped walking* ⊨ *John did walk*
- *John stopped painting a picture* ⊭ *John painted a picture*

Model structure for events

- A model structure with events and temporal precedence is defined as
  - M = (U, E , <, e_0, V),
  - with U∩E = ∅,
  - < ⊆ E×E an asymmetric relation (temporal precedence)
  - e_0∈E the utterance event
  - V an interpretation function like in standard FOL, with D_e = U∪E
- Overlapping events:
  - *e* ∘ *e'* iff neither *e* < *e'* *nor* *e'* < *e*

Model structure for event types

- How can we extend the concept of a model structure such that it captures differences between processes, events, and their subtypes?
- We take a detour which leads us from another another observation about verb classes through the semantics of common nouns back to the Vendler classification.

Plural Noun Phrases

Bill and Mary work ⊨ *Bill works*

Bill and Mary work ⊨ *Mary works*

work(b) ∧ work(m) ⊨ work(b)

work(b) ∧ work(m) ⊨ work(m)

The students work , John is one of the students

⊨ *John works*

∀x(student(x) → work(x)), student(j) ⊨ work(j)

Collective predicates

Bill and Mary met ⊭ *Bill met*

The students met , John is one of the students

⊭ *John met*

The committee met, John is member of the committee

⊭ *John met*

- "meet" is a collective predicate.

Collective predicates

- Collective predicates are only applicable with plural or group NPs. Their semantics cannot be reduced to atomic statements about single standard individuals.
- Examples for collective predicates:
  - *meet, gather, unite, agree, be similar, disperse, disagree, be numerous, ...*
- Distributive or individual level predicates like *work, sleep, eat, tall* apply to singular and plural nouns. A predication with a plural NP "distributes" over the individual objects covered by the NP.

Interpretation of Plural Terms

- In addition to standard individuals, we add "group" or "sum" entities to the model structure universe.
- Singular expressions denote standard "atomic" entities, plural and group expressions denote sums.
- To model the entailment relations between the group and its members, e.g., in the context of distributive predicates, we also add the membership or "individual part" relation to the model structure.