Types and properties of eventualities

Event semantics and adverbiaal modification

Class II
Some why’s

(1) a. Right now, I’m **reading** a book.
   b. Right now, I **know** the answer.

(2) a. I stopped **writing**. I’ll finish it tomorrow.
   b. I stopped **loving** X. *I’ll finish it tomorrow.
   c. *I stopped **reaching the top of the mountain**. *I’ll finish it tomorrow.

(3) If: I **was standing** and **reading a book**, then:
    you know I **stood**, but not if I **read the book**.
History

• The interest for the verbal aspect goes back to Panini and Aristotle.
• ‘Models’ of one language applied to another, contamination by all kinds of other semantic components (argument structure, mood, tense).
• Starting in the 1950’s, attempts to isolate the temporal dimension of the verbal meaning.
1957: Vendler’s classes

• Properties of the temporal structure of VPs (not lexical verbs) – before tense.

• Four classes:

  1. States (static situations):
     (4) Berit loves/owns/knows a Thai restaurant.

  2. Activities (dynamic unbounded):
     (5) Nino sang/swam/pushed a cart.
Vendler’s classes

• Accomplishments

(6) Veronika sang a song/built a house/swam to the island/pushed a cart to the shop.

• Achievements

(7) Jutta touched the lamp/reached the top/found her purse/arrived at noon.
(Inner) aspect

• The internal temporal constituency of a situation.
• Situations may lack temporal structure (e.g. adjectival modification); eventualities: situations with a temporal structure (Rothstein 1999).
• Outer aspect: an (external) temporal relation between an eventuality and some other time.
Inner vs. outer aspect


(9) a. Marina had dismantled her pen.

b. Marina was dismantling her pen.
The traditional notion of telicity

- Telos: a point an eventuality must reach to be properly realized, the culmination point (phase transition, termination...).
- Telic eventualities specify (at least) two components: a change affecting some entity and a stage the affected entity reaches at the end of the (relevant segment of the) change.
Examples: telic eventualities

(10) a. Giorgos made a sand castle.

b. Roberta heated the water to 50\(^{0}\)C, and continued to heat it.
Examples: atelic eventualities

(11) a. The excavated artifact resembled a dragon.

(12) a. Janneke played piano.
    b. Water poured from the tap.
Minimal ingredients

1. an entity,
2. its property,
3. a scale of values for the property,
4. a change of this value along the scale,
5. a specific final (scalar) value of the property.
• states: 1-2; processes: 1-4;
• accomplishments: 1-5; achievements: 1, 2, 5.
An interval of a scale in time

• The change targets a scalar value of a property of the affected entity (Hay et al.)

• Is the change monotonic or not?
• Is there a starting point?
Telicity tests I

• The temporal adverbial modification test (the *for/in test): *for-modification combines only with atelic, and *in-modification only with telic eventualities.

(13) a. Wieneke RAN for 20 minutes/*in 20 minutes.
    b. Wieneke RAN TO HER OFFICE in 20 minutes/*for 20 minutes.
Telicity tests II

• The progressive/imperfective test:

(14)a. John was putting a bag into the closet. \(\neg/\rightarrow\) John put a bag into the closet.
   b. Mary was running. \(\rightarrow\) Mary ran.

(15)a. John is putting a bag into the closet. \(\neg/\rightarrow\) John has put a bag into the closet.
   b. Mary is running. \(\rightarrow\) Mary has run.

(16)a. */#John is knowing how tall he is.
   b. */#John is owning his computer.
Telicity tests III

• The conjunction test: atelic eventualities, but not the telic ones, are ambiguous when modified by a conjunction of two modifiers specifying two adjacent intervals as the reference time

(17)a. John put a bag into the closet on Friday and on Saturday.
(NON-AMBIGUOUS: 2 putting eventualities)

   b. Mary ran on Friday and on Saturday.
(AMBIGUOUS: 1 or 2 running eventualities.)
Telicity tests IV

- The aspectual verbs test, sensitive to Vendler’s classes.
  18) a. John stopped knowing the solution. (only unacc.)
    b. *John finished knowing the solution.
    c. John stopped running. (agentive)
    d. *John finished running.
    e. John stopped putting the bag into the closet.
    f. John finished putting the bag into the closet.
    g. *John stopped reaching the top of the mountain.
    h. *John finished reaching the top of the mountain.
Other tests

• Vendler’s “At what time did... ?” (a progressive effect for atelic and a perfect effect for telic), “… by/till…”

• Homogeneity test (for t1>t2, VP in t1 entails VP in t2, or Vendler’s progressive viewpoint holding at all the subintervals of an accomplishment, but not of an achievement)

• The *almost*-test (nearly finished vs. didn’t quite do it), the *gradually*-test.
Telos or quantity?

• The traditional notion of a telos is the base for decompositional approaches to eventualities.
• Targets the narrow VP, without modification, and to some extent lexical verbs.
• Another way to go: properties of quantity.
• The way eventualities sum, divide, overlap...
• Targets (modified) VPs, but not lexical verbs.
Eventualities are like objects (Bach)

(19) a. Much mud was in evidence.
    b. (*)Much dog was in evidence.
    c. John slept a lot last night.
    d. (*)John found a unicorn a lot last night.

(20) a. Many dogs were in the yard.
    b. (*)Many muds were on the floor.
    c. John fell asleep three times last night.
    d. (*)John slept three times last night.
Bach’s classification

eventualities

states

dynamic (a) static (b)

non-states

processes (c)

events

protracted (d) momentaneous

happenings (e) culminations (f)
Bach’s classes, examples

• Static states: *be drunk, be in New York, own x, love x, resemble x*
• Dynamic states: *sit, stand, lie + LOC*
• Processes: *walk, push a cart, be mean*
• Protracted events: *build x, walk to Boston*
• Happenings: *recognize, notice, flash (once)*
• Culminations: *die, reach the top*
Eventualities and intervals

- Points or intervals, i.e. a Cantorian or Aristotelian algebra for time?
- Defining temporal intervals by eventualities (Landman 1992).
- Krifka: telicity through bounded intervals (which can be closed by adverbials).

(21) [[[Christina [ran]] for 5 hours]every day]
Divisiveness (objects and events)

• Preserving the predicate under division (the sequence in red added by Borer):

$$\forall P. [\text{DIV}(P) \iff [[\forall x. P(x) \Rightarrow \exists y. P(y) \land y<x] \land [\forall x, y. P(x) \land P(y) \land y<x \Rightarrow P(x-y)]]]$$

(22) Anne ran to the shop in/*for 5 minutes. Divisive without Borer’s inovation – all final parts of the eventuality satisfy the predicate; non-cumulative: a sum gives two ‘runnings’.
The starting point

• If the presence of the starting point is specified by the predicate, Borer’s argument does not hold: final parts have different starting points.

(22) a. Anne ran to the shop in/*for 5 minutes.
   b. It took Anne an hour to run to the shop. ambiguous: to run the distance, or to start running; there is a starting point, contextually determined (C-variable, covert) (Arsenijević).
Divisiveness (objects and events)

• Preserving the predicate under division:

\[ \forall P. \ [ \text{DIV}(P) \iff \left[ \left[ \forall x. P(x) \Rightarrow \exists y. P(y) \land y<x \right] \land \left[ \forall x, y. P(x) \land P(y) \land y<x \Rightarrow P(x-y) \right] \right] ] \]

(23)a. water, sand, air; be red, sail, heat x
b. chair, cup, sun; assemble x, arrive (Sg)
c. chairs, cups, stars; assemble x’s, arrive (Pl)
d. 5 chairs, cups, stars; sail for x time, assemble 5 x’s...
Cumulativity (objects and events)

• Preserving the predicate under sum.
  \( \forall P. CUM(P) \iff [\forall x, y. P(x) \land P(y) \Rightarrow P(x \oplus y)] \)

(24) a. water, sand, air  
   b. chair, cup, sun  
   c. chairs, cups, stars  

(25) a. being red, sitting, sailing, heating x  
   b. assembling an x, arriving (Sg), finding an x  
   c. assembling x’s, arriving (Pl), finding x’s
Homogeneity and quantization

• Quantized (atomic) eventualities (telic, Krifka)
  \( \forall P.QUA(P) \iff [\forall x, y. P(x) \land P(y) \Rightarrow \neg(x<y)] \)

• Homogeneous eventualities (atelic, Borer)
  \( \forall P.HOM(P) \iff CUM(P) \land DIV(P) \)

• Plural events? Conjunction (Bach)? Iterative?

(23) Berit read the newspaper (and Nino made his bed) / (again and again).
Chicken or egg

- Borer: mass is more primitive than individual – individual derives from mass.
- Homogeneous is more primitive than cumulative and divisive (pro-mereology).
- The structure (the features added) restricts it.
- All lexical nouns denote masses.
- Fits a decompositional view of eventualities (states < activities < telic eventualities).
Event-argument homomorphism

• Aka incremental theme, measuring out, leaking...
• Eventualities and objects interact at the level of quantity.

(24) a. Anne drank water / a glass of water / glasses of water / 3 glasses of water / more than 3 glasses of water...

• Syntax (Tenny, Ramchand, Borer) or semantics (Bach, Verkuyl, Krifka).
Verkuyl: SQA and ADD_TO

• No eventualities – just predicates (no event argument).

• +/-ADD_TO – dynamicity of the verbal meaning (only stative verbs are -ADD_TO).

• +/-SQA – specified quantity of A, boundedness of the quantity of an argument (quantization).

• The VP needs to be quantity-tight, one negative value suffices for a leakage.
Which arguments?

• Verkuyl: Any argument can introduce a leaking point, not only the affected one (the incremental theme).

(26) a. Roberta/students pushed a cart/carts to a shop/shops.
  b. For an hour, nobody arrived.
  c. Roberta fixed the bike with screwdrivers.
Krifka: thematic roles

• Specifying relations between arguments and eventualities (Krifka does not use this term).
• Formal properties of thematic roles, e.g.:

  ✓ Mapping to subevents: \( \text{MAPS}(\theta) \iff \forall x, y, e \ [(\theta(x, e) \land y < x \Rightarrow \exists e'[e' < e \land \theta(y, e')]] \)

(26)  Radek drank a pint of beer.
... thematic roles ...

✓ Uniqueness of events: only one eventuality assigns the role to one particular object: $UE(\theta) \iff \forall x, y, e [\theta(x, e) \land y \leq x \Rightarrow \exists e'[e' \leq e \land \theta(y, e)]]$

(for each part of the participant, there is only one matching subevent)

• Holds for eventualities of consumption, creation: *drink a pint of beer, assemble a kite.*

• Does not hold for others (*paint/see x*)
(Dis-)Advantages of the approach

• Advantage:
  1. Fine distinctions,
  2. Detailed coverage of the empirical facts.

• Disadvantages:
  1. Stipulations (the brute force of algebra).
  2. Importing world knowledge (e.g. uniqueness of events for consumption/creation verbs).
Jackendoff: distribution

• EAH is a relation between the dimensional structure of the argument, the time interval and the event, closely related to distribution.

• An instance of binding.

(27) a. Giorgos loaded the truck with the hay.
   (a whole event matches a whole truck)
   b. Giorgos loaded the hay into the truck.
   (a whole event matches the whole amount of hay)
Jackendoff: issues

• Decomposing objects into an axis and crosscuts (mereology more natural/explicit).
• Why decompose objects into axes, and not simply use their scalar properties (Hay et al)?
• A contribution: binding as the process behind the isomorphism.
• Strange without a syntactic and/or semantic decomposition of the lexical meaning of the verb: how can lexical meanings enter binding?
Borer: syntactic range-assignment

- Quantity-features restricting the default ranges of syntactic heads:

```plaintext
[DP Q-feature]  VP
   |               |
   | Q-range       |
   | ... [DP Q-feature] ...
```

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References not on the website

Appendix: EAH backwards

• Arsenijević: Event-Argument Homomorphism (EAH) is concord.
• No such thing as mapping between objects and events – that is knowledge of the world.
• With Borer: mass is primitive, quantity is specified by additional predicates.
• These predicates restrict everything in their scopal domain (Borer).
• Val is introduced as a value-specifier for property\textsubscript{i} (Val<range\textsubscript{i}).

• If Val is a possible value of a more deeply embedded property\textsubscript{j} (Val<range\textsubscript{j}), then it will also specify the value of property\textsubscript{j}.
Quantifying over eventualities

(29) a. ‘5 of [Nataša built a house].’

b. 

![Tree diagram with labels: 5, cardinal:range\textsubscript{card}, build, VP, \exists, \forall, \in, \Leftrightarrow, \wedge, \cap, |R \cap E| = 5.]

c. \exists E, R [[\forall e \exists x [e \in E \Leftrightarrow [\text{house}(x) \wedge \text{build}(e) \wedge \text{theme}(e, x) \wedge \text{agent}(e, \text{Nataša})]]] \wedge |R \cap E| = 5]
Concord and lexicalization

(30) a. ‘5 [Nataša built a house]’

b. 

c. 5 Nataša built 5 houses. (concord)

d. No lexical material for event quantifiers.
Like negative concord

(31) a. NOT [Nataša built a house]

b. 

```
NOT
  existential:range_{pol}
    build
    ...[NP existential:range_{pol} house]...
```

c. NOT Nataša built a NOT house. (concord)
d. Nataša didn’t build no house. (AAVE)
Counterparts

- Quantity properties of eventualities and the matching quantity properties of objects:

<table>
<thead>
<tr>
<th>eventualities</th>
<th>objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>homogeneity</td>
<td>atelic</td>
</tr>
<tr>
<td>division</td>
<td>telic</td>
</tr>
<tr>
<td>cardinal</td>
<td>numeral</td>
</tr>
<tr>
<td>generalized q’s</td>
<td>quantifier</td>
</tr>
</tbody>
</table>
Empirical support

• Concord, and not quantification:
  (32) The referee showed 4 yellow cards.
  (1 card, 4 showing events)

• *more than x* quantifiers (non-quantized):
  (33) Veronika wrote more than six pages in only
       four hours/*for only four hours.
  ...
  ...[DegP [MORE][6[<sub>VP</sub> Veronika read a page]]]
  quantified, telic
Empirical support

(34) a. *Kim wrote letters up. (single event interpretation)
   b. *Kim ate sandwiches up. (single event interpretation)

• Explained if plural comes from the eventuality.
• Strange in the leaking approach, fine in the mapping and distribution stories.
• Borer gives the data, but does not explain it in terms of her model.