Assessing Parsimony in Models of Aspect

Damien MUNCH & Jean-Louis DESSALLES

Telecom ParisTech
France

JL@dessalles.fr
Eating cake during a scientific talk
Elle a mangé du gâteau pendant le spectacle  
(she has been eating cake during the show)

Elle a ronflé en une minute  
(she snored in one minute)

Elle a mangé en 2010  
(she has eaten in 2010)

26 different (syntactically correct) combinations. 
416 possible interpretations 
20 only are semantically correct
Can we reverse-engineer natural language aspectual processing?

- Slice
- Period
- Repetition
- Inchoativity

eating cake

Interpretation
to snore in ten minutes

G  F

G

G

G

to eat up the cake for ten minutes

F  G

F

G
Slice

to sneeze during the show
to sneeze during these ten minutes

F

G,d

slice

Repetition

to sneeze for ten minutes

F

repetition

G

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Predication

To eat popcorn during the show

\[ G \]

**predication**

\[ F, \uparrow \]

Eating popcorn vs. not eating popcorn

\[ G \]

slice

\[ F, \uparrow \]
Inchoativity

To confess

\[ G \]

predication

\[ F, \uparrow \]

Confessing vs. not confessing

in one minute

\[ F \]

inchoativity

\[ F, \uparrow \]

after one minute
### Aspectual Information Structure

- **Viewpoint** (F or G)
- **Determination** (d or u)
- **Multiplicity** (s or m)
- **Operation**
- **Image**
- **Duration**

<table>
<thead>
<tr>
<th></th>
<th>viewp.</th>
<th>det.</th>
<th>duration</th>
<th>operation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>en (in)</strong></td>
<td>f</td>
<td>–</td>
<td>–</td>
<td>simult</td>
</tr>
<tr>
<td><strong>pendant (for, during)</strong></td>
<td>g</td>
<td>–</td>
<td>–</td>
<td>simult</td>
</tr>
<tr>
<td><strong>eat (lunch)</strong></td>
<td>–</td>
<td>–</td>
<td>3.5</td>
<td>–</td>
</tr>
<tr>
<td><strong>minute</strong></td>
<td>–</td>
<td>u</td>
<td>1.8</td>
<td>–</td>
</tr>
<tr>
<td><strong>the</strong></td>
<td>–</td>
<td>d</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>show</strong></td>
<td>–</td>
<td>–</td>
<td>3.8</td>
<td>–</td>
</tr>
<tr>
<td><strong>2010</strong></td>
<td>–</td>
<td>d</td>
<td>7.5</td>
<td>–</td>
</tr>
<tr>
<td><strong>“during the show”</strong></td>
<td>g</td>
<td>–</td>
<td>3.8</td>
<td>–</td>
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</tbody>
</table>
A minimalist model

Syntactic merge → Semantic merge → Execution → Repeat → Predication

- Unification
- Image merge
- Duration merge
- Cover
- Slice
- Inchoativity...

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An MDL approach to parsimony

The “null model”

For each sentence,
- either: ‘cover’, ‘slice’, ‘after’ and incorrect (#)
- repeated or not
- which phrase is predicated

Each sentence generates 16 possible interpretations,
among which the model must determine those that are correct.
The “null model” requires 16 bits for each sentence,
as each interpretation may be correct or not.

This number would grow uncontrollably
if we increase the size of the aspectual vocabulary.

Other models may be bounded
in fact, but not in principle.

The Aspectual Model

6 bits per aspectual word
- four binary flags: viewpoint, determination, multiplicity,
- three bits if we allow for eight operations).

Fixed amount of information to describe procedures (Figure ),
plus 6 bits \( \times \) size of the aspectual vocabulary (‘in’, ‘during (for)’, ‘minute’, ‘since’…).
Implementation

lexicon(heure, [synt:n, det:u, im:heureDuree, dur:3.6 |_]).

lexicon(2010, [synt:dp, det:d, im:'2010', dur:7.5 |_]).

lexicon(spectacle, [synt:n, im:spectacle, dur:3.8 |_]).

lexicon(ronfle, [synt:vp, vwp:g, im:ronfler|_]).

lexicon(mange, [synt:vp, vwp:f, im:manger_repas, dur:3.5 |_FS]).
lexicon(mange, [synt:vp, vwp:g, im:grignoter, dur:1.4 |_FS]).
lexicon(mange, [synt:v, vwp:f, im:ingérer, dur:1.4 |_FS]).
lexicon(mange, [synt:v, vwp:g, im:manger_de, occ:mult, dur:2 |_FS]).