
Assessing Parsimony in Models of Aspect

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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)

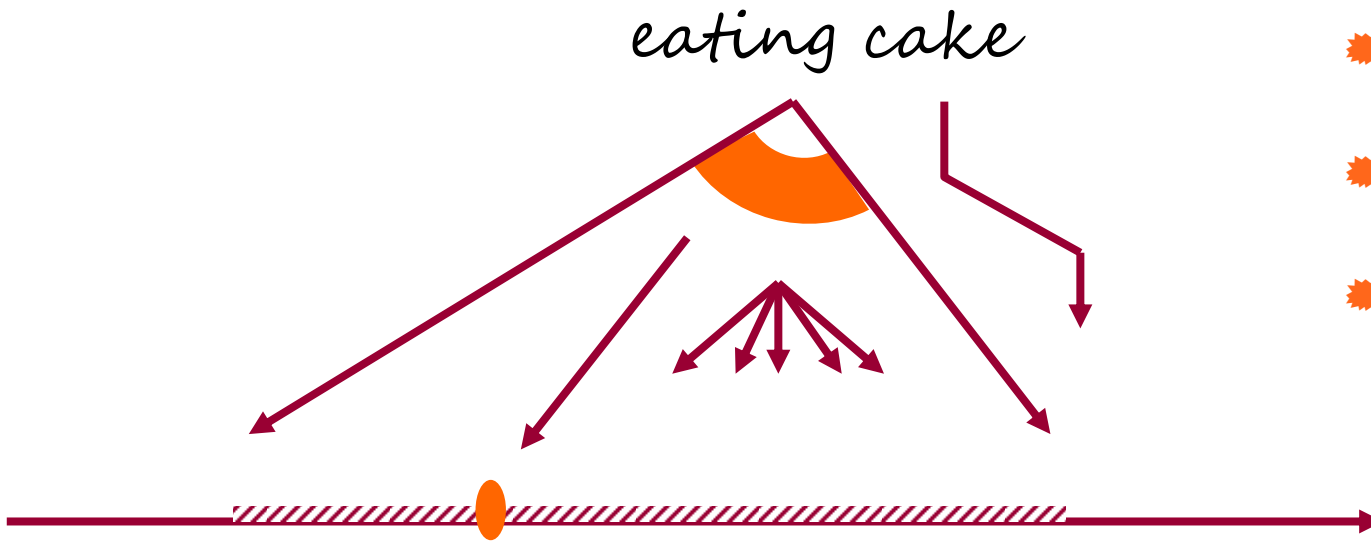
26 different (syntactically correct) combinations.
416 possible interpretations
20 only are semantically correct

...



Interpretation

Can we reverse-engineer
natural language aspectual processing?



- Slice
- Period
- Repetition
- inchoativity

Viewpoint

to snore



G

in ten minutes



F



to snore



G

for ten minutes



G



to eat up the cake



F

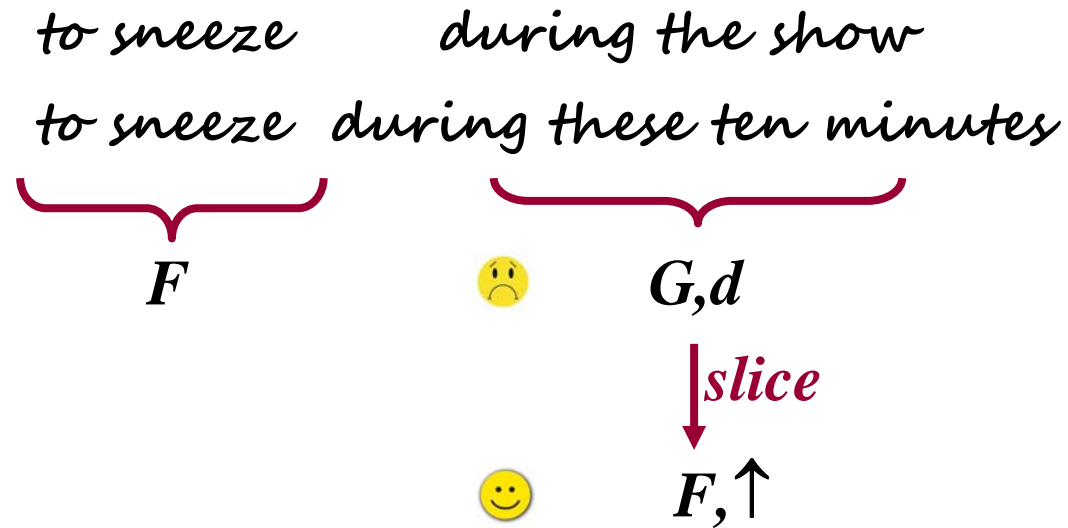
for ten minutes



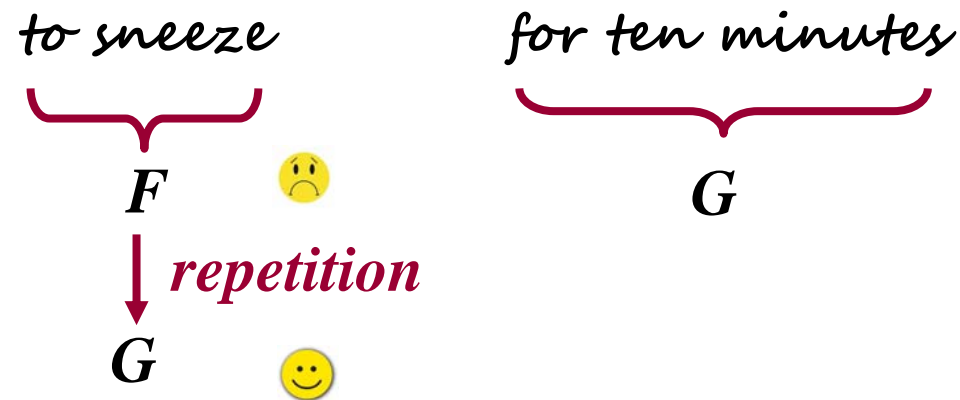
G



Slice

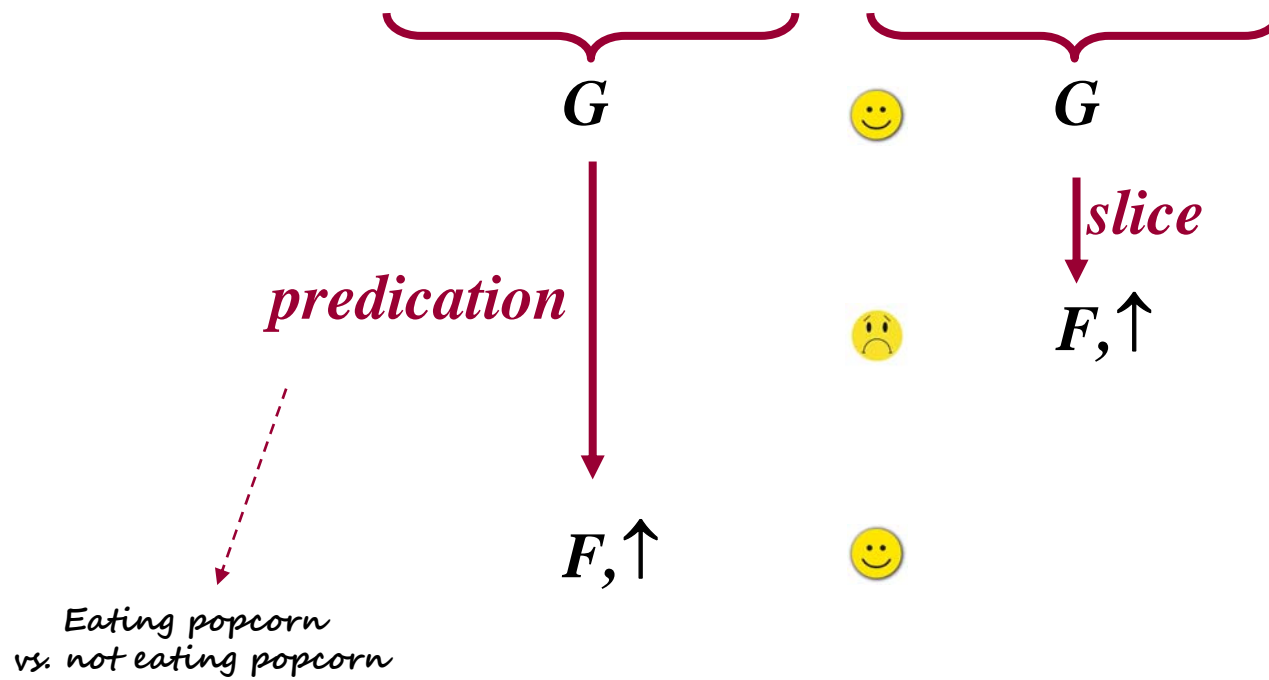


Repetition

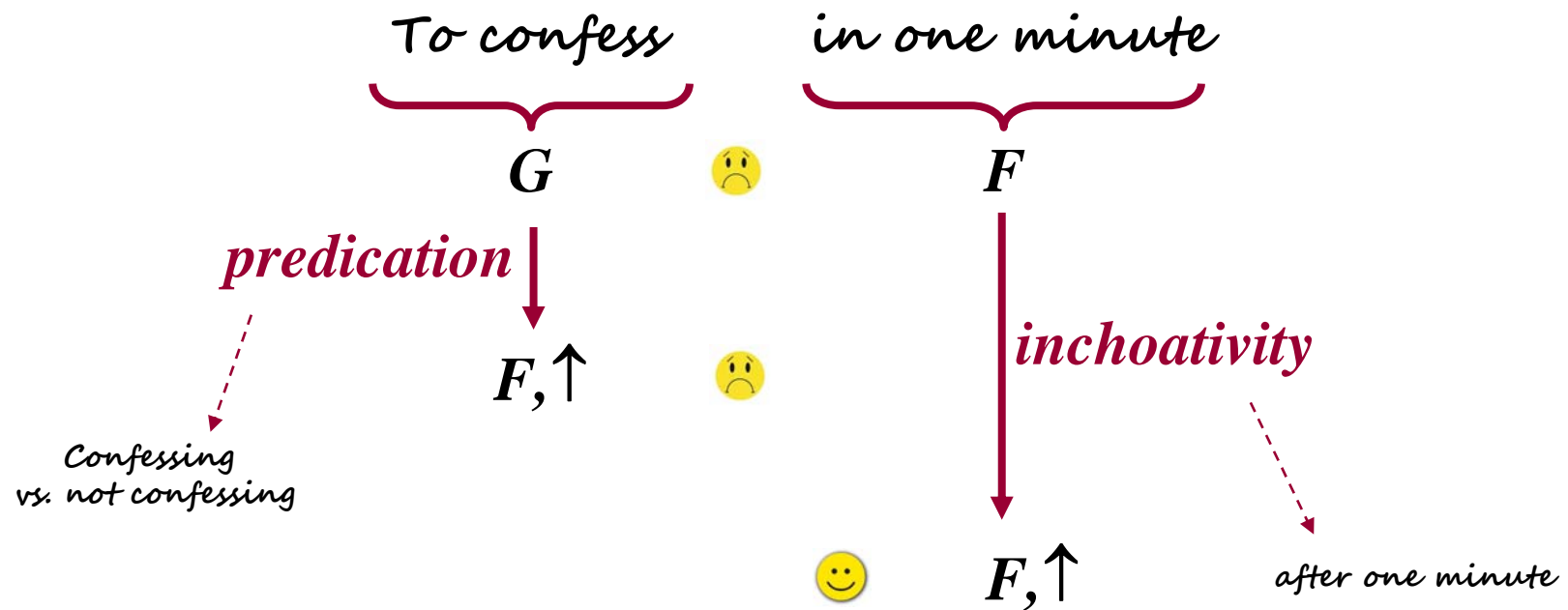


Predication

To eat popcorn during the show



Inchoativity

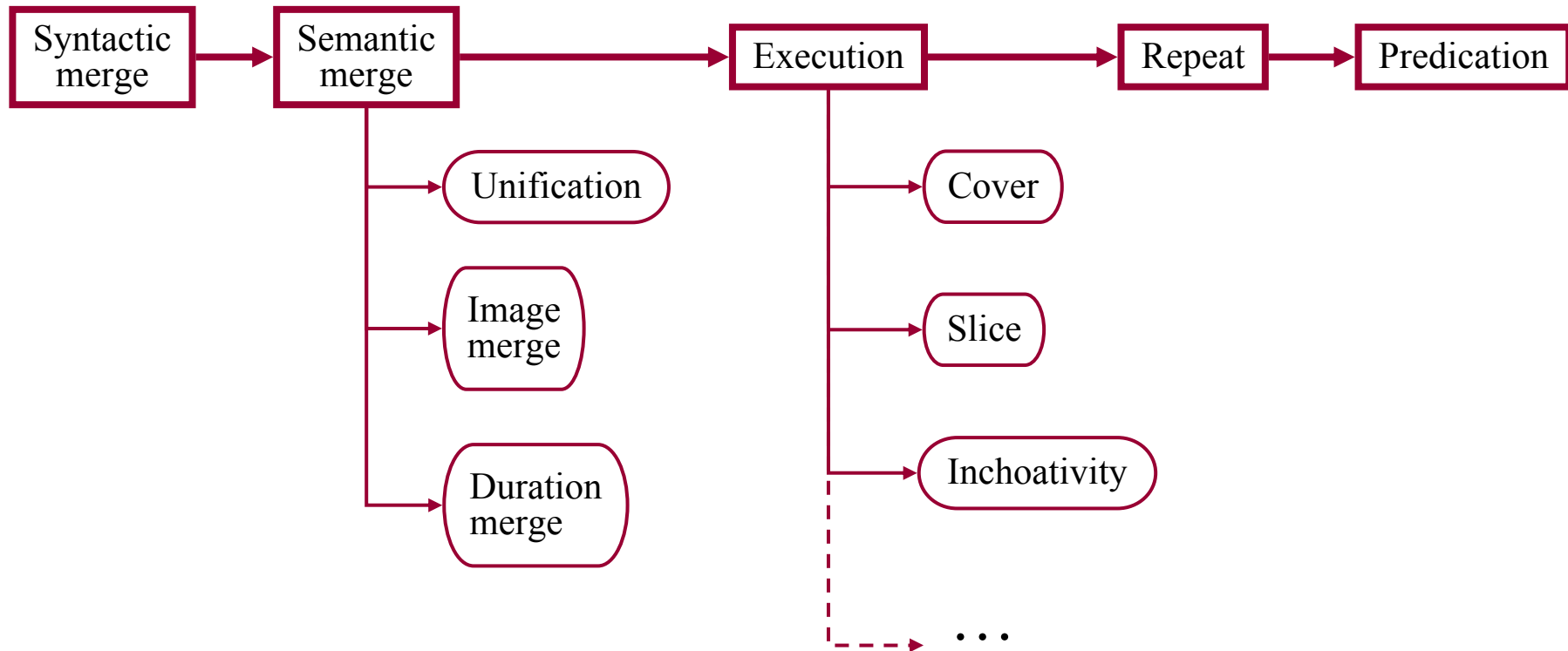


Aspectual Information Structure

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

	<i>viewp.</i>	<i>det.</i>	<i>duration</i>	<i>operation</i>
<i>en</i> (in)	f	–	–	simult
<i>pendant</i> (for, during)	g	–	–	simult
eat (lunch)	–	–	3.5	
minute	–	u	1.8	
the	–	d	–	
show	–	–	3.8	
2010	–	d	7.5	
“during the show”	g	–	3.8	

A minimalist model



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 × size of the aspectual vocabulary (‘in’, ‘during (for)’, ‘minute’, ‘since’ ...).

Our model is bounded
in principle.

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]).
```

synt:	syntactic category
vwp:	viewpoint
det:	determination
im:	image
dur:	duration
occ:	multiplicity of occurrences