

# Online processing of temporal discourses: verbal tenses and *ensuite*

Cristina GRISOT & Joanna BLOCHOWIAK  
Université de Genève

18.06.2015, Diablerets, LogPrag Workshop

# Processing temporal discourses

*Les enfants ont décoré le sapin. Maman a préparé des bons gâteaux.*

The children decorate.PC the Christmas tree. Mum cook.PC delicious biscuits.

- 3 possible interpretations

*Les enfants ont décoré le sapin, **ensuite** maman a préparé des bons gâteaux.*

The children decorate.PC the Christmas tree, **then** mum cook.PC delicious biscuits.

- one possible interpretation

Research question:

How do speakers process these 2 temporal discourses?

# Background on verbal tenses (VT)

- *Tense is the grammaticalized marking of location in time.* (Comrie, 1985)
- Temporal operator (Prior 1967): *internal* perspective on time
- Referential category (e.g. Reichenbach 1947; Port-Royal Grammar):
  - S, R and E
  - relations of *precedence*, *simultaneity* and *posteriority*
- Temporal anaphor in formal discourse semantics (e.g. DRT Kamp&Reyle 1993)
  - a verbal tense introduces a temporal discourse referent (state or event) and temporal relations that the discourse referents have with the surrounding context (via Reichenbachian coordinates)
  - *A man entered the White Hart. He was wearing a black jacket. Bill served him a beer.*
- Verbal tenses encode interpretations rules (Kamp&Rohrer 1983)
  - PS/PC introduces new R which succeeds the existent R
  - IMP introduces an E which includes the existent R

# Background on verbal tenses (VT)

- Relevance Theory: underdeterminacy thesis
  - Linguistic expression uttered underdetermine the speaker's communicated content, both at the level of explication and at the level of implicatures
- The procedural/conceptual distinction: *constraining vs. contribution*
- Tenses are procedural expressions (Nicolle 1996; Moeschler et al. 1998; Moeschler 2002; Saussure 2003, 2011)
- Tense: instruction to locate an eventuality E with respect to R and S but actual temporal reference is contextually determined
- Constraints of the PC and of the PS in French
  - *Les enfants ont décoré le sapin. Maman a préparé des bons gâteaux.*
    - compatibility with *et* and *parce que*
  - *Les enfants décoraient le sapin. Maman prépara des bons gâteaux.*
    - one possible interpretation
    - incompatible with *parce que*

# Background on verbal tenses

- The category of Tense: instruction to relate eventualities with respect to one another: the [ $\pm$ narrativity] binary feature (Grisot and Moeschler 2014; Grisot 2015)
  - locate an eventuality E with respect to another eventuality E
  - contextual value for each verbal tense (PC, PS, IMP, etc.)

*Il y a une heure Max boudait dans son coin, et ça n'est pas près de changer.*

An hour ago Max sulk.IMP in a corner, and this will not change very soon.

*Elle a fini par fuguer à Kaboul, où elle a été recueillie par une femme généreuse.  
Quelques mois plus tard, elle épousait un jeune cousin de sa bienfaitrice dont elle était tombée amoureuse.*

She finally run.PC to Kaboul, where receive.PC.Passive by a kind woman. A few months later, she marry.IMP a younger cousin of her benefactor of whom she fell in love.PQP.

# Background on connectives

- Procedural information (Blakemore 1987 on *but*)
  - Blakemore's idea was that *but* excludes a variety of possible relations inferable from P and Q alone
  - Procedural expressions are therefore semantic constraints which help at achieving better relevance
- Two possibilities:
  - one expression encodes either conceptual or procedural information
  - one expression can encode both conceptual and procedural information (Moeschler 2002, 2015; Wilson 2011, 2015)
    - *parce que, donc* and *et* have conceptual and procedural meanings that trigger different levels of meaning (Moeschler 2015)
    - 'While temporal deictics such as *then* are plausibly analysed as procedural, at least some temporal connectives are properly conceptual' (Wilson 2015)

# Ensuite

- Is *ensuite* a temporal encoding ‘temporal sequence’ or a serial connective encoding ‘ordered series’ (Moeschler 2000) and ‘non-adjacency’ (Kozłowska 1996; Saussure 2011)

*Marc a fait le repassage. Ensuite, il s’est reposé sur le canapé.*

Marc iron.PC. Then, he rest.PC on the couch.

*Paul s’est rendu à Paris en décembre 1997. Ensuite il y a habité pendant plus d’une année.*

Paul go.PC to Paris in december 1997. Then he live.PC there for more than a year.

*Le vase est tombé. \*Ensuite il s’est brisé.*

The vase fall.PC. \*Then it break.PC

- *Ensuite* gets temporal interpretation ‘only as a specification of a broader notion “new element in a series”’ (Saussure 2011)

# Temporal discourse with Tense and *ensuite*

Procedural

- *Les enfants ont décoré le sapin. Maman a préparé des bons gâteaux.*

Procedural

- *Les enfants ont décoré le sapin, **ensuite** ~~maman~~ a préparé des bons gâteaux.*

Procedural: temporal? serial?

Procedural

- *Maman a préparé des bons gâteaux.*



# Offline experiment

- Offline experiment with linguistic judgement task (Grisot and Moeschler 2014; Grisot 2015)
- Judge a VT (English Simple Past) used in large context (from corpus) according to its instruction to temporally relate or not two eventualities
- Binary choice: narrative usage (i.e. temporally related) or non-narrative usage (i.e. not temporally related or simultaneous)
- 2 judges, evaluation of results with Kappa coefficient, 458 items
- Results: judges agreed on 325 items (71%) and disagreed on 133 items (29%). The value of Kappa coefficient was 0.42.
- Disagreements (114 items) were resolved in a second round: judges were asked to insert a connective to explicitate the relation existent or not among the eventualities
  - Connectives *and*, *and then*, *because* were proposed
  - Inter-annotator agreement rate in this second phase of the experiment corresponds to a Kappa of 0.91, signalling very strong and reliable agreement

# Predictions and hypotheses for online experiment

- Procedural information constraints the interpretation process (i.e. reduces the number of possible interpretations)
  - reduces the processing time when the context is compatible with the connective's procedural content (e.g. Zufferey 2014 for *puisque* followed by segments containing 'given' information)
- Two main conditions: PQ et *Pensuite*Q
- Exploratory hypotheses
  - Hypothesis 1:  $PQ > PensuiteQ$  if *ensuite* is temporal (H1)
  - Hypothesis 2:  $PQ = PensuiteQ$  if *ensuite* is serial (H1)
- Control condition: Q
  - Hypothesis 3:  $PQ/PensuiteQ \neq Q$  (H1)

# Experiment

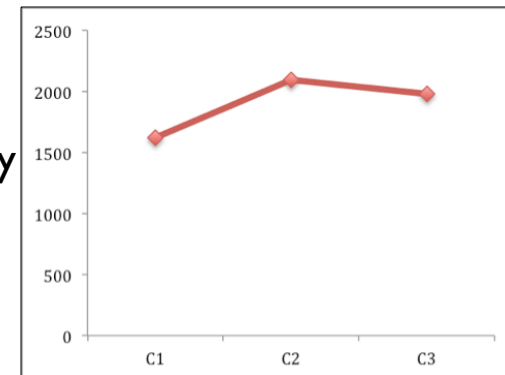
- Online processing with self-paced reading task
- Three experimental conditions:
  1. Q: Lena a mangé des biscuits au chocolat.
  2. PQ: Pierre a bu un soda. / Lena a mangé des biscuits au chocolat. /
  3. PensuiteQ: Pierre a bu un soda, ensuite / Lena a mangé des biscuits au chocolat. /
- Participants:  $16 \times 3 = 48$ , Undergraduate students from Faculty of Letters, Univ. of Geneva and Univ. of Neuchâtel
- Material: 10 experimental items and 10 fillers per condition
- Procedure:
  - Each group saw only one condition, 16 participants per condition
  - Experimental items were presented with E-prime; the items and the fillers were presented in a random order
  - The experiment consisted of a training phase on 4 experimental items and 4 fillers, followed by the genuine experiment phase.
  - The task was to judge if the situation described was plausible (i.e. the experimental items) or not (i.e. the fillers)

# Results

Condition 1=Q ; Condition 2=PQ ; Condition 3=PensuiteQ

Condition	RT Phrase Q Min.	RT Phrase Q Max.	RT Phrase Q: Mean
1	727	5222	1621.87
2	754	5387	2098.85
3	813	5271	1978

- There is an effect of condition on RT
  - Statistically significant ( $p < 0.05$ ) for condition 1
- The difference between conditions Q (1) and PQ (2) is statistically significant ( $p < 0.05$ ) → reject H0
- The difference between conditions Q (1) and PensuiteQ (3) is statistically significant ( $p < 0.05$ ) → reject H0
- The difference between conditions PQ (2) and PensuiteQ (3) is not statistically significant ( $p > 0.05$ ) → do not reject H0



# Discussion of results

- The difference between conditions PQ (2) and *Pensuite*Q (3) is not statistically significant ( $p > 0.05$ )
  - procedural information encoded by *ensuite* does not 'help' the hearer in the interpretation process more than the VT does
  - The instruction given by *ensuite* is not 'temporal sequence' but 'ordered series'
  - Is *Ensuite* is a serial and not a genuine temporal connective?
  - Tense encodes 'E related to another E'.
    - Otherwise,  $PQ > PensuiteQ$
- The difference between conditions Q (1) and *Pensuite*Q (3), as well as Q (1) and PQ (2) is statistically significant ( $p < 0.05$ )
  - Processing a sentence out of context is shorter than in a context, be it PQ or *Pensuite*Q
  - No relation to calculate (instructed by VT or *ensuite*) → faster

# Further work: research questions

- Replicate the experiment with a different design and with other connectives
- Improve the design:
  - distribution of segments of sentences over several screens and have several measures
  - avoid having the critical segment at the end of the experimental item
  - counter-balancing of conditions and have intra-subject measures
  - the feasible/not feasible decision
- Is there a connective that reduces the RT: PQ vs. PconnectiveQ
  - Candidates:
    - *puis* (temporal according to Saussure 2010), *après*, *et*
- What is the exact relation between VT and temporal connectives?
- Does the English *then* have the same behaviour as *ensuite* or as *puis*?