TRANSITIVITY
IN THE LIGHT OF EVENT RELATED POTENTIALS

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A joint work with neuroscientists

**Introduction**

**Experiment**
- on transitive construction in French
- using Event Related Potential’s (ERPs) measures

(Magne, Besson & Robert, 2014)

**ERPs:** recording of
- changes in the brain’s electrical activity
- timelocked to an event
- e.g. introduction of an unexpected word
• **N400 and semantic processing**  
  (Kutas & Hillyard, 1980)

• **P600 and syntactic processing**  
  (Osterhout & Holcomb, 1992)
Purpose of experiment on transitive clauses in French:

- Semantics processed **independently** or in **interaction** with syntax?
Manipulating **2 factors** (each with 2 values) in **SVO clauses** (French)

- **Syntactic congruence**
  - $S^+$ vs $S^-$
    - (transitive V)
    - (intransitive V)

- **Semantic (‘conceptual’) congruence**
  - $C^+$ vs $C^-$
    - (congruent Obj.)
    - (incongr. Obj.)
4 types of SVO clauses:

(1) L'ennemi a préparé un complot
    The enemy prepared a scheme (T)

(2) *L'ennemi a conspiré un complot
    The enemy conspired a scheme (I)

(3) L'ennemi a labouré un complot
    The enemy ploughed a scheme (T)

(4) *L'ennemi a déjeuné un complot
    The enemy lunched a scheme (I)

Hypothesis: meaning influences syntactic processing
Maximizing semantic congruence

Experiment 1

Target \( (S-C+) \) condition:

**Strong semantic association between \( VO \) and \( SV \)**

prototypical \( S \rightarrow \text{Verb} \rightarrow \text{‘internal’ Object} \)

\[
\begin{align*}
&\text{L’ennemi a conspiré un complot.} \\
&\text{The enemy conspired a scheme. (I)} \\
&\text{La concierge a bavardé un ragot.} \\
&\text{The janitor chattered a rumour. (I)} \\
&\text{Le gamin a pleurniché un sanglot.} \\
&\text{The kid whined a tear. (I)}
\end{align*}
\]
(1) Double incongruity (S-C- vs. S+C+) :

the expected **N400** (semantics) and **P600** (syntax) on Object

<table>
<thead>
<tr>
<th>Congruous</th>
<th>– – – – Incongruous</th>
</tr>
</thead>
<tbody>
<tr>
<td>L’ennemi a préparé un complot</td>
<td>L’ennemi a déjeuné un complot</td>
</tr>
<tr>
<td>The enemy prepared <strong>a scheme</strong></td>
<td>The enemy lunched <strong>a scheme</strong></td>
</tr>
</tbody>
</table>
(2) Simple syntactic incongruity \((S-C^+ \text{ vs. } S+C^+)\)

L’ennemi a préparé un complot
The enemy prepared a scheme

L’ennemi a conspiré un complot
The enemy conspired a scheme

no significant differences!
syntactic violation undetected
semantics overrides syntax
How to account for these results?

Frame semantics and Construction Grammar
(Fillmore 1982, Goldberg 1995 and 2004)

✓ **Verbs**
- a rich semantic structure (‘semantic frame’)
- foregrounded components: ‘participant’ roles (obligatory)

✓ **Syntactic constructions :**
- have an intrinsic meaning (profiling ‘argument’ roles)
✓ Semantics of the transitive construction:

to profile an Object as the affected or effected Patient of the process

✓ Transitive coercion (transitive construction on Intransitive V):

Adding an Object argument role profiled as an affected or effected Patient

A suitable argument, backgrounded in the verb’s semantic frame?
A linguistic account

(1) S-C+ sentences: « successful » transitive coercion

L'ennemi a conspiré un complot

The enemy **conspired a scheme** ← internal Obj. *(sem. frame)*

*a scheme is a result (or effected object) of conspiring*

**Backgrounded component retrieved by the construction**

(2) S-C- sentences: « failed » transitive coercion

L'ennemi a déjeuné un complot

The enemy **lunched a scheme**

*a scheme** **can not** be retrieved from semantic frame of lunch

→ P600
Experiment 1

*Semantic congruence maximized (S-V-O)*

prototypical **Subject** + Verb + « internal **Object** »

L'ennemi a conspiré un complot
The enemy conspired a scheme

Experiment 2

*Reduction of the (S-V) semantic association*

**Proper name** + Verb + « internal **Object** »

Thomas a conspiré un complot
**Thomas** conspired a scheme
Simple syntactic incongruity (S-C+ vs. S+C+) with Neutral subject

Thomas a préparé un complot
Thomas prepared a scheme

Thomas a conspiré un complot
Thomas conspired a scheme

≠ Exp.1

Syntactic violation detected!

P600
Transitives clauses (SVO) with intransitive verb

(Exp.1) If S-V-O semantically strongly related: no P600 on Object
Semantic congruence overrides syntactic violation (V-O)

→ Semantic context influences syntactic processing

(Exp.2) With a congruent O but a neutral Subject: P600 on Object
Semantically related Object not sufficient

→ Syntactic processing relies on the entire semantic context
Gradual effect of semantic context, with threshold
(cf. multifactorial and gradual aspects of transitivity)

- The S-V relationship influences processing of V-O relationship!
→ (prototypical) S induces scenarios and expectations
Neutral Subject: reduced semantic anticipation on O
Results validate models:

- Constructionist (≠ modularist) approach to coercion (Michaelis 2004)

- Sentence comprehension:
  - all linguistic cues integrated into a meaningful global representation
  - constantly updated (new coming information)
  - generating expectations
    
    (cf. e.g. Robert 1999, Michaelis 2003 « scene construal »)

- In line with interactive models of language processing
References


Thank you for your patience !
- **Subjects**: 25 native French-speaking students (Mean = 25 years)

- **Task**: Participants were asked to decide whether the sentence was semantically and syntactically acceptable. (112 experimental sentences + 112 fillers)

- **Timing**: (Visually presented)
## The 26 intransitive verbs of the corpus for S-C+ condition

<table>
<thead>
<tr>
<th>Speech</th>
<th>Motion</th>
<th>Gesture</th>
<th>Reduced Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>bavarder</td>
<td>to chatter</td>
<td>to make a face</td>
<td>to idle</td>
</tr>
<tr>
<td>disserter</td>
<td>to talk at length</td>
<td>to exult</td>
<td>to laze</td>
</tr>
<tr>
<td>divaguer</td>
<td>to wander (psy.)</td>
<td>to simper</td>
<td>to doze</td>
</tr>
<tr>
<td>papoter</td>
<td>to have a natter</td>
<td>to whine</td>
<td></td>
</tr>
<tr>
<td>plaisanter</td>
<td>to joke, to kid</td>
<td>to sneer</td>
<td></td>
</tr>
<tr>
<td>radoter</td>
<td>to ramble (on)</td>
<td>to frown</td>
<td></td>
</tr>
<tr>
<td>ronchonner</td>
<td>to grumble</td>
<td>to shudder</td>
<td></td>
</tr>
<tr>
<td>tempêter</td>
<td>to storm, rage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fabuler</td>
<td>to confabulate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>délirer</td>
<td>to rave</td>
<td></td>
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</tr>
</tbody>
</table>

| Arrangement             |                                  |                          |                             |
| conjurer                |                                  |                          |                             |
| intriguer               |                                  |                          |                             |
| magouiller              |                                  |                          |                             |
| transiger               |                                  |                          |                             |

| Motion                  |                                  |                          |                             |
| naviguer                |                                  |                          |                             |
| tournoyer               |                                  |                          |                             |
| voltiger                |                                  |                          |                             |

| Gesture                 |                                  |                          |                             |
| grimacer                |                                  |                          |                             |
| jubiler                 |                                  |                          |                             |
| minauder                |                                  |                          |                             |
| pleurnicher             |                                  |                          |                             |
| ricaner                 |                                  |                          |                             |
| ricaner                 |                                  |                          |                             |
| sourciller              |                                  |                          |                             |
| tressaillir             |                                  |                          |                             |