A Constraint on the Online Empty Pronoun Resolution in Japanese

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Synopsis

1. Empty Arguments (EAs) in Japanese
   - EAs can be coreferential with an NP that appears later in the sentence
     
     
     
     "Taro made Taro take poison, got shocked."

2. Issues on EAs in head-final radical pro-drop language
   - There is no clue to decide whether an EA position is a silent pronoun (pro) or a gap left by movement (gap), as in relative clauses (Miyamoto & Nakamura 2003).
   - If EA is a gap, what kind of information of the EA does such an active search rely on? (cf. Kwon 2008, Aoshima et al. 2004)

3. Self-paced reading experiment shows:
   - The parser uses verbs’ argument-structure-case-frame information to locate EAs.
   - When an EA is recognized, the parser inserts a “silently case-marked” empty category into that EA position.
   - Then the parser launches an active search for the antecedents of the case-marked EA.

Key Configuration

1. Violation of the Proper Binding Condition (Saito 1989)


   "Mari, because Taro made Taro take poison, got shocked."

2. Scrambling


   " Mari, because Taro made Taro take poison, got shocked."

3. Ill-formed configuration


   "Mari, because Taro made Taro take poison, got shocked."

4. (II)-formed configuration

   [1] [Emended Taro-nom poison-acc take-made-because]


Proper Binding Condition:

Traces must be bound by their antecedents at surface structure. (Saito 1989)

Question:

Does the parser infer online that a sequence that is partially identical with a PBC-violation configuration won’t arise?

Selected References:


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Experiment

- Goal of Experiment: Test whether a potential PBC violation is predicted;
- Participants: 41 Japanese students;
- Materials: 24 items, 72 fillers;
- 2 x 2 design

Factor 1: Embedded verb type (Embedded Dat verb vs. Embedded Acc verb)
Factor 2: Case of the first matrix NP (Matrix Dat NP vs. Matrix ACC NP)

Matrix Dat NP: "V-because, John-dat..." Matrix ACC NP: "V-because, John-acc..."

<table>
<thead>
<tr>
<th>Embedded Dat verb</th>
<th>Embedded ACC verb</th>
</tr>
</thead>
<tbody>
<tr>
<td>'poison-acc take.made'</td>
<td>'poison-acc took'</td>
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</tbody>
</table>

Sample set (critical region = Region 4)

(A) Embedded Dat verb / Matrix Dat NP

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td></td>
<td>[Taro-nom poison-acc take-made-because]</td>
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<tr>
<td></td>
<td>John-dat</td>
<td>polis-nom</td>
<td>quickly</td>
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<td>&quot;Because Taro made take poison, the police officer quickly talked to John.&quot;</td>
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(B) Embedded Dat verb / Matrix ACC NP

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<td>&quot;Because Taro made take poison, the police officer quickly examined John.&quot;</td>
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(C) Embedded ACC verb / Matrix Dat NP

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(D) Embedded ACC verb / Matrix ACC NP

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Results and Discussion

- A large slowdown was observed in (A), where an EA exists and it matches the first matrix NP in case.
- No slowdown was found when the EA doesn’t match the first NP in case (B) or when no EA exists (C, D).

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>t-value</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>Verb Form (Dat vs. Acc V)</td>
<td>21.0</td>
<td>1.29</td>
</tr>
<tr>
<td>NP Case (Dat vs. Acc NP)</td>
<td>24.5</td>
<td>1.51</td>
</tr>
<tr>
<td>Interaction (VForm × NPCase)</td>
<td>34.1</td>
<td>2.10</td>
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</tbody>
</table>

Table: Fixed effects summary for averaged reading times at Region 6 (the second spill-over region)

We used a minimal random effect structure (the maximal model did not converge).

The results suggest:

1. The parser uses verbs’ case-frame information to locate EAs.
2. When it locates an EA, the parser launches an active search for an antecedent, trying to resolve its reference as soon as possible.
3. The search is conducted under the expectation that the case value of the EA (e.g. nominative, accusative, etc.) doesn’t match that of its antecedent.

Why 3?

- Hypothesis: The parser assumes an EA inside the fronted clause to be a gap. The parser takes the first NP it encounters if as if it is the gap’s antecedent.
- Open Questions
  - Why slow down in Region 6, as opposed to Region 4?
  - The fronted clause containing an EA is an adjunct, which is often considered an island. Given this, why does the parser not assume the EA to be a pronoun, rather than a gap (Stowe 1986, Phillips 2006)?