A bidirectional explanation of the pronoun interpretation problem

Workshop on Semantic Approaches to Binding Theory
ESSLLI 2004, 16-20 August, Nancy

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Outline

Experimental studies
  Children’s comprehension
  Children’s production

Accounting for Pronoun Interpretation Problem
  Accounting for experimental data

Unidirectional and bidirectional optimization
  Referential expressions
  Unidirectional optimization
  Bidirectional optimization

Predictions and Summary
Children’s comprehension of reflexives and pronouns

- **Principle A**: A reflexive must be bound locally
  
  (1) Bert saw himself

  - 85% correct interpretation from the age of 3;0

- **Principle B**: A pronoun must be free locally

  (2) Bert saw him.

  - only 50% correct interpretation even as late as 6;6
  - looks like chance

Children’s production of reflexives and pronouns

- Bloom et al. (1994)

(3) I hit myself.
(4) Give it to me.

- 2,834 me tokens and 75 myself tokens in direct object position
- 93.5 percent correct production of myself at 2;3 -3;1 years old
- 99.8 percent correct production of me at 2;3-3;
Anecdotal evidence

Grimshaw and Rosen (1990): 188-9

“It is remarkable (...) that production errors have not been reported, with the exception of the use of emphatic or contrastive pronouns (...)”.

- Chien and Wexler (1990), Manzini and Wexler (1987), similar comments
Several strategies

1. Reject comprehension data
   - Bloom et al. (1994) do this
2. Revise Principle B so that it doesn’t cover problematic cases
   - Argue that previous experiments didn’t really test Principle B
   - Children’s errors are pragmatic
3. Specific third person delay
4. Distinguish between production and comprehension grammar
5. Accept the existence of a pronoun comprehension delay
Referential expressions

- Function of referential expressions is delimited in part by what other referential devices are present in a given language
  - Difficult to describe the properties of referential expressions in terms of morphological classes
  - Instead Burzio (1998) suggests using implicational hierarchies
- Descriptions based on implicational hierarchies translate easily into soft constraints
Soft constraint alternative to binding

- Soft constraints are violable
- Soft constraints in optimality theory are potentially conflicting
- Burzio proposes two constraints to account for the distribution of reflexives and pronouns cross-linguistically

(5) **Principle A**: a reflexive must be bound locally

(6) **Referential Economy**: Avoid R-expressions >> Avoid pronouns >> Avoid reflexives

(7) **Referential Economy**: Avoid pronouns >> Avoid reflexives
Speaker’s perspective: coreferential meaning

Tableau for producing a coreferential meaning

<table>
<thead>
<tr>
<th>Input: coreferential meaning</th>
<th>PRINCIPLE A</th>
<th>REF ECONOMY</th>
</tr>
</thead>
<tbody>
<tr>
<td>🍷 reflexive form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>🌼 pronominal form</td>
<td></td>
<td>*!</td>
</tr>
</tbody>
</table>

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**Unidirectional optimization**

**Speaker’s perspective: disjoint meaning**

▶ **Tableau for producing disjoint meaning**

<table>
<thead>
<tr>
<th>Input: disjoint meaning</th>
<th>Principle A</th>
<th>Ref Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>reflexive form</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>pronominal form</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
Hearer’s perspective: reflexive form

Tableau for interpreting reflexive form

<table>
<thead>
<tr>
<th>Input: reflexive form</th>
<th>PRINCIPLE A</th>
<th>REF ECONOMY</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶️ coreferential meaning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>disjoint meaning</td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>
Hearer’s perspective: pronominal form

Tableau for interpreting pronominal form

<table>
<thead>
<tr>
<th>Input: pronominal form</th>
<th>Principle A</th>
<th>Ref Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>corefential meaning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>disjoint meaning</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Bi-OT evaluates form-meaning pairs

Bidirectional Optimality (Jäger’s version)

A form-meaning pair \(<f,m>\) is super-optimal iff:

a. there is no super-optimal pair \(<f',m>\) such that \(<f',m>\) is more harmonic than \(<f,m>\).

b. there is no super-optimal pair \(<f,m'>\) such that \(<f,m'>\) is more harmonic than \(<f,m>\).
Bidirectional tableau for the production and interpretation of reflexives and pronouns in simplex transitive clauses

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Principle A</th>
<th>Ref Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>✹</td>
<td>&lt;reflexive, coreferential&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✹</td>
<td>&lt;reflexive, disjoint&gt;</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>✹</td>
<td>&lt;pronoun, coreferential&gt;</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>✹</td>
<td>&lt;pronoun, disjoint&gt;</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

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Proposal

- Children begin with unidirectional optimization
- To acquire the right interpretation of the pronoun they must reason about production alternatives when they are interpreting
- This type of bi-directional reasoning is acquired late
Rule I

This explanation is compatible with ideas in Grodzinsky and Reinhart (1993)

Rule I: Intrasentential Coreference

NP A cannot corefer with NP B if replacing A with C, where C is a variable A-bound by B, yields and indistinguishable interpretation.

(8) Bert saw him.
Advantages to our proposal

▶ Rule I is specific for coreference relationships
  ▶ we articulate this instead in terms of a more general process of bidirectional optimization

▶ No need for an additional pragmatic rule (i.e. Rule I)
  ▶ we derive the same effects from Principle A alone combined with bidirectional optimization

▶ Our analysis also more clearly distinguishes the task of the hearer and the task of the speaker
Predictions of this account

- Correct production of third person form *him* and *her* will precede correct interpretation of this form.
- There may not be a pronoun interpretation delay for first person forms *me* because there is no similar ambiguity in reference as with the third person forms.
Predictions II

- there may be a Third Person Delay but this delay will not explain the entire gap of 4 years between production and comprehension
  - Diary studies have generally found that children employ the first person pronoun I/me earlier than other personal pronouns, with the second-person form following closely
  - Researchers report simultaneous usage of both forms or a delay from 10 weeks to 3 months (Chiat 1978, Huxley, 1970; Girouard, Ricard and Gouin Decarie (1997))
Summary

- Delay of Principle B is an effect of children’s inability to put themselves in the perspective of the speaker when interpreting, i.e.
  - they are unable to reason about interpretation alternatives in production
  - they are unable to reason about production alternatives in comprehension

  i.e. they lack the ability to bi-directionally optimize