The issue of lexical guidance in sentence production: Evidence from structural priming experiments

Sandra Pappert (Bielefeld), Michael Baumann (Bielefeld), & Thomas Pechmann (Leipzig)

sandra.pappert@uni-bielefeld.de, michael.baumann@uni-bielefeld.de
Outline

• Sentence production
  – Lexicalist vs. "conceptualist" accounts
  – Evidence from structural priming

• Experiment
  – Design, materials
  – Results
  – Discussion

• Outlook
• Summary
Sentence production

Conceptualisation

Formulation

Articulation

(Ferreira & Slevc, 2007)
Lexicalist accounts

• Combinatorial nodes

• Representation of
  – syntactic contexts?
    (Pickering & Branigan, 1999)
  – argument structures?
    (Levelt, Roelofs, & Meyer, 1999)
  – ...

Residual activation
  – frequency
  – recency (priming)

"Conceptualist" accounts

- Direct mapping from message to syntactic form
  - strict incrementality (cf. Melinger, Pechmann, & Pappert, 2009)
  - conceptual accessability
    - inherent accessability: animacy, concreteness, prototypicality
    - derived accessability: givenness, priming
      (cf. Bock, Irwin, & Davidson, 2004; Prat-Sala & Branigan, 2000)
  - controversial; plausible for verb-final structures?
    (Hwang & Kaiser, 2014; Momma, Slevc, & Phillips, in press)
Evidence from structural priming

• *Is sentence production guided by argument structure?*

• Structural priming
  – Speakers tend to re-use previously uttered structures (Bock, 1986).
  – prime-target relation
    ▫ structural similarity (vs. identity)
    ▫ dissociation of crucial vs. less crucial similarities
      (Bernolet, Hartsuiker, & Pickering, 2009; Bock & Loebell, 1990; Chang, Bock, & Goldberg, 2003; Pappert & Pechmann, 2014)
Evidence from structural priming

• *Is sentence production guided by argument structure?*

• Structural priming across argument structures?
  (Pappert & Pechmann, 2013)
  – German
  – benefactive alternation structures with monotransitive verbs
  – dative alternation structures with ditransitive verbs
  – sentence generation task
Evidence from structural priming

Die Sekretärin backte einen Kuchen für ihren Chef.
'The secretary baked a cake for her boss.'

Die Sekretärin backte einen Kuchen für ihren Chef.

Der Rechtsanwalt schickt den Vertrag an seinen Klienten.
'The lawyer sends the contract to his client.'

(Pappert & Pechmann, 2013; Pappert & Pechmann, 2014; Chang, Baumann, Pappert, & Fitz, 2015)
Evidence from structural priming

- *Is sentence production guided by argument structure?*
  - structural priming
    between benefactive alternation structures with monotransitive verbs
    and dative alternation structures with ditransitive verbs
  - no evidence for necessary involvement of argument structure
  - compatible with "conceptualist" account

(Pappert & Pechmann, 2013)
Experiment

- *Is the argument mapping procedure sensitive to the role properties?*

- Structural priming between different event semantics / thematic roles?
  - benefactive alternation structures with monotransitive verbs and ‘true’ beneficiaries (Kittilä, 2005)
  - dative alternation structures with ditransitive verbs and recipients
  - sentence generation task in German
Experiment - materials

- Recipients vs. ‘true’ beneficiaries

primes
  - (DA.datacc) Der Schiffsjunge vermittelt dem Fischer den alten Kahn. 'The cabin boy offers the fisher the old boat.'
  - (DA.accPP) Der Schiffsjunge vermittelt den alten Kahn an den Fischer. 'The cabin boy offers the old boat to the fisher.'
  - (BA.datacc) Der Schiffsjunge schrubbt dem Fischer den alten Kahn. 'The cabin boy scrubs the fisher the old boat.'
  - (BA.accPP) Der Schiffsjunge schrubbt den alten Kahn für den Fischer. 'The cabin boy scrubs the old boat for the fisher.'

target
(DA) Fan Rose Sänger überreichen
    fan  rose  singer  hand
Experiment - results

- percentage of DA.accPP (vs. DA.datacc) responses per prime condition

<table>
<thead>
<tr>
<th>prime</th>
<th>DA.accPP</th>
<th>DA.datacc</th>
<th>BA.accPP</th>
<th>BA.datacc</th>
</tr>
</thead>
<tbody>
<tr>
<td>% DA.accPP</td>
<td>56.65</td>
<td>36.94</td>
<td>52.98</td>
<td>36.02</td>
</tr>
</tbody>
</table>

![Graph showing percentage of responses for different prime conditions](image)
Experiment - results

- percentage of DA.accPP (vs. DA.datacc) responses per prime condition

<table>
<thead>
<tr>
<th>prime</th>
<th>DA.accPP</th>
<th>DA.datacc</th>
<th>BA.accPP</th>
<th>BA.datacc</th>
</tr>
</thead>
<tbody>
<tr>
<td>% DA.accPP</td>
<td>56.65</td>
<td>36.94</td>
<td>52.98</td>
<td>36.02</td>
</tr>
</tbody>
</table>

- GLMM (N = 659)

<table>
<thead>
<tr>
<th></th>
<th>Estim.</th>
<th>Std. Err.</th>
<th>t value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>1.5393</td>
<td>0.0665</td>
<td>23.151</td>
<td>&lt; .001 ***</td>
</tr>
<tr>
<td>phrase structure</td>
<td>-0.1575</td>
<td>0.0299</td>
<td>-5.261</td>
<td>&lt; .001 ***</td>
</tr>
<tr>
<td>thematic role</td>
<td>-0.0196</td>
<td>0.0297</td>
<td>-0.658</td>
<td>0.511</td>
</tr>
<tr>
<td>ps : tr</td>
<td>-0.0044</td>
<td>0.0593</td>
<td>-0.074</td>
<td>0.941</td>
</tr>
</tbody>
</table>

- main effect of phrase structure
- no interaction of phrase structure : thematic role
Experiment - discussion

- main effect of phrase structure
- no interaction of phrase structure : thematic role
- + not different from primes with recipient-beneficiary in Pappert & Pechmann (2013)

Is the argument mapping procedure sensitive to the role properties?

- Differences between event semantics and thematic roles, as defined here, do not seem to be crucial for the mapping mechanism.
- Points towards abstract phrase structural representations / syntactic procedures. Independent from lexical argument structure.
Experiment - discussion

Conceptualisation

Formulation

Articulation

Figure 1. Schematic of consensus model of grammatical encoding. Filled arrowheads mark direction of primary information flow, open arrowheads mark possible feedback information flow.

Ferreira & Slevc, 2007
Outlook

- Open question: Proto-Roles?
  - recipient = recipient-beneficiary = beneficiary = Proto-Recipient?
    (Primus, 1999)

- Future experiment:
  - benefactive alternation vs. temporal PP-adjunct
Outlook

• beneficiaries vs. temporal adjuncts

primes

- (Tp.accPP)  *Der Manager reserviert das Tonstudio für eine Stunde.*
  'The manager reserves the recording studio for one hour.'

- (BA.accPP)  *Der Manager reserviert das Tonstudio für den Künstler.*
  'The manager reserves the recording studio for the artist.'

- (BA.datacc)  *Der Manager reserviert dem Künstler das Tonstudio.*
  'The manager reserves the artist the recording studio.'

- (Mt.acc)  *Der Manager reserviert das Tonstudio.*
  'The manager reserves the recording studio.'

(target)

(BA)  *Assistent Brief Chef öffnen*
  assistant letter boss open
Experiments - Summary

Sentence production

- No evidence for necessary involvement of lexical argument structure
- No evidence for the sensitivity of the mapping procedure for fine grained differences between thematic roles

- Compatibility with "conceptualist" account
  - procedures for mapping Proto-Roles to phrase structure

- Future experiment(s): Test further role and argumenthood contrasts
end of presentation

time for questions and remarks
References

Syntactic configuration


• A functional head Appl introduces non-core arguments into the syntactic representation of the argument structure of a verb

  non-core arguments

• Recipients = low Appl

• Beneficiaries = high Appl  -> conceptual-semantic distinction

• Low Appl head merges in a syntactic tree representation below the VP
  – transfer-of-possession relation between to individuals

• High Appl head merges above the VP
  – relates an individual and the event described by the verb
Lexical argument structure revisited

- Verb-specific argument linking vs. abstract representations of argument structure
  - lexical boost (e.g. Pickering & Branigan, 1998; Chang et al., 2015)

primes
- (Tp.accPP) Der Makler reserviert das Haus für den Interessenten.
  'The estate agent reserves the house for the potential buyer.'
- (BA.accPP) Der Makler reserviert dem Interessenten das Haus.
  'The estate agent reserves the potential buyer the house.'
- (BA.datacc) Der Makler öffnet das Haus für den Interessenten.
  'The estate agent opens the house for the potential buyer.'
- (Mt.acc) Der Makler öffnet dem Interessenten das Haus.
  'The estate agent opens the potential buyer the house.'

target
- (BA) Assistent Brief Chef öffnen
  assistent letter boss open
Evidence against effects during the linearisation of phrase structure

- **DA.datacc** Der Rentner schickt dem Minister den Beschwerdebrief.
  'The retiree sends the minister the complaint-letter.'

- **DA.accdat** Der Rentner schickt den Beschwerdebrief einem Minister.
  'The retiree sends the complaint-letter a minister.'

- **DA.accPP** Der Rentner schickt einen Beschwerdebrief an den Minister.
  'The retiree sends a complaint-letter to the minister.'

- **DA.PPacc** Der Rentner schickt an den Minister einen Beschwerdebrief.
  'The retiree sinds to the minister a complaint-letter.'

**primed accdat**

Der Vorgesetzte erklärt die Arbeit dem Angestellten.
'The boss explains the task the employee.'

Pappert & Pechmann (2014)
Lexicalist accounts

Lexical entry

1. Lemma
   - syntactic information
   - triggers syntactic encoding

2. Word form
   - morpho-phonological information

(Kempen & Hoenkamp, 1987; Levelt, 1989; Roelofs, 1997; Levelt, Roelofs, & Meyer, 1999)