Encoding and retrieval interference in dependency resolution
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Introduction: Structurally inaccessible noun phrases (NPs) which are not in a binding relation with
the anaphoric element have sometimes been found to be incorrectly bound by the anaphor, leading
to a slowdown in processing (Badecker and Straub, 2002; Patil et al., 2014). This so-called
inhibitory interference effect occurs when the legal antecedent and the structurally inaccessible
NP share features (e.g., gender in English reflexives himself/herself). Dillon (2011) attempted to
explain this slowdown not in terms inhibition but rather in terms of encoding interference: in con-
figurations where the syntactically licensed antecedent and the structurally inaccessible NP share
a feature, a degradation might occur of the memory trace of the legal antecedent due to mech-
anisms like feature overwriting (Oberauer and Kliegl, 2006), causing increased processing time
during retrieval of the legal antecedent. In this experiment, we aim to determine whether interfere-
ence effects in anaphoric dependency processing can be explained by encoding interference.

Swedish possessive pronouns (hans ‘his’) show gender agreement with the antecedent,
while possessive reflexives (sina ‘his/her’) do not (see Table 1). If an inaccessible NP matches
in gender with the legal antecedent, in the case of gender marked pronouns either encoding or
inhibitory interference could explain any slowdown seen at the pronoun; by contrast, in possessive
reflexives, any slowdown seen can only be attributed to encoding interference, because the re-
flexive does not have any gender marking which therefore cannot be a retrieval cue. Thus, if only
inhibitory interference explains any slowdowns at the anaphor, an interaction of anaphor type and
interference is expected: a slowdown in the gender marked pronoun due to feature match, but no
slowdown in the possessive reflexive. If only encoding interference accounts for the slowdown, a
main effect of interference is predicted, with no interaction of interference with anaphor type.

Method: 32 Swedish natives read sentences manipulated for anaphor type and interference (Table
1). Eye movements and response accuracy requiring anaphor resolution have been measured.

<table>
<thead>
<tr>
<th>condition</th>
<th>antecedent</th>
<th>region 2</th>
<th>region 3</th>
<th>region 4</th>
<th>pre-critical</th>
<th>critical</th>
<th>spill-over</th>
<th>wrap-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>pron (match/ mism.)</td>
<td>Åke</td>
<td>säger att</td>
<td>Alf/ Eva</td>
<td>jobba med</td>
<td>hans sysslingar</td>
<td>på helgen.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[M]</td>
<td>says that</td>
<td>[M]/ [F]</td>
<td>worked with</td>
<td>[M]</td>
<td>siblings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>refl (match/ mism.)</td>
<td>Åke som</td>
<td>tackade</td>
<td>sinan</td>
<td>sysslingar</td>
<td>på kvällen.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[M]</td>
<td>thanked</td>
<td>[∅]</td>
<td>siblings</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>som</td>
<td>ringer</td>
<td>[∅]</td>
<td></td>
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</tbody>
</table>

Table 1: Stimulus sentences with regions of interest.

Results: Question-response accuracy revealed an interaction of interference and anaphor type
(p<0.01) showing a lower response accuracy due to interference in pronouns (p<0.0001) but not
in reflexives (p=0.71). Re-reading time regressive, the sum of all second-pass fixation durations
in the pre-critical region after a region to its right has been fixated, shows an interaction of in-
terference and anaphor type (t=2.18) with a slowdown in pronouns (t=2.16), but not in reflexives
(t=-0.94). In the pre-critical region, last pass reading time (the sum of all fixation durations during
the last pass) shows an interaction of interference and anaphor type (t=2.11) with a slowdown in
pronouns (t=3.01) but not in reflexives (t=0.03).

Conclusion: Interference effects seem to be due to inhibitory processes following incorrect initial
retrieval of the structurally inaccessible NP and not due to encoding interference.

References
• Badecker, W. and Straub, K. (2002). The processing role of structural constraints on the interpretation of pronouns
formal model of capacity limits in working memory. Journal of Memory and Language, 55:601–626. • Patil, U., Vasishth,
under revision.