ENCODING AND RETRIEVAL INTERFERENCE IN DEPENDENCY RESOLUTION

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I. Background

- Structurally inaccessible NPs have been found to slow down processing at the anaphor site when they match the anaphor in certain features (e.g., gender in English reflexives himself/herself; Badecker & Straub 2002, Patil et al. 2014, Sturt 2003).
- Two alternative explanations:
  i Retrieval Mutual features of linguistic constituents lead to cue-overload at the retrieval site (e.g., Gordon et al. 2006, Van Dyke & McElree 2011).
  ii Encoding Feature sharing of items in working memory leads to degradation of memory traces (e.g., Naïme 1990, Oberauer & Kliegl 2006).

  → Feature overlap of antecedent and structurally inaccessible NP causes partial feature deletion of the antecedent during encoding. This reduces the quality of the antecedent’s memory trace leading to a slowdown at the moment of retrieval (Dillon 2011).

II. Research Question

Q: What is the source of slowdown observed at the anaphor site?

→ Retrieval processes: Cue-overload due to feature match of antecedent and structurally inaccessible NP

→ Encoding processes: Degraded memory trace of the antecedent due to partial feature deletion

III. 2 × 2 Design

Factor I Anaphor type (gender marked, gender unmarked)

Factor II Gender match (gender of antecedent and structurally inaccessible NP matched or mismatched)

Swedish distinguishes between locally free possessive pronouns hans ‘his’/hennes ‘her’ in (1) which agree in gender with their antecedent and gender unmarked locally bound possessive reflexives sina ‘his’/‘her’ in (2).

Regions of interest
Pre-critical region: jobbade med in (1)/ ringer in (2)
Critical region: hans in (1)/ sina in (2)
Spillover region: spillvärde

IV. Predictions

i Retrieval
If a gender-matching inaccessible NP causes cue-overload at the retrieval site, we should observe a slowdown only in case of gender-marked anaphors, but no effect in case of gender-unmarked anaphors.

ii Encoding
If a gender-matching inaccessible NP causes representational degradation of the antecedent’s memory trace, we should observe a slowdown regardless of gender marking at the anaphor.

V. Materials

- Materials: 55 participants, Swedish natives
- Eye tracking in reading task
- 48 items (Latin square); 70 fillers
- Comprehension question: dependency resolution (in 3/4 of the items)
- 32 participants, Swedish natives
- Eyelink 1000, Desktop mounted

VI. Procedure

- Eye tracking in reading task
- 48 items (Latin square); 70 fillers
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VII. Results

- Question response accuracy
- Re-reading time regressive (pre-critical region)
- Total-fixation time (pre-critical region)
- First-pass regression probability (spillover region)

- Interaction of Gender match and Anaphor type (β̂ = 0.65, SE = 0.2; z = 3.16, p < 0.002).
- Lower response accuracy due to gender match in gender marked pronouns (β̂ = 1.36, SE = 0.29, z = −4.66, p < 0.0001).
- No difference for gender match in gender unmarked reflexives (β̂ = −0.1, SE = 0.27, z = −0.38, p = 0.71).

- Marginal significant interaction of Gender match and Anaphor type (β̂ = 0.03, SE = 0.216).
- Longer fixation time due to gender match in gender marked pronouns (β̂ = 0.1, SE = 0.18, t = 2.41).
- No difference for gender match in gender unmarked reflexives (β̂ = −0.0005, SE = 0.04, t = −0.01).

- Interaction of Gender match and Anaphor type (β̂ = 0.31, SE = 0.13; z = −2.39, p < 0.05).
- Lower regression probability due to gender match in gender marked pronouns (β̂ = 0.51, SE = 0.19, z = −2.84, p < 0.005).
- No difference for gender match in gender unmarked reflexives (β̂ = 0.07, SE = 0.17, z = 0.41, p = 0.66).

VIII. Discussion

- No interference was observed for gender unmarked reflexives, but gender marked pronouns showed processing facilitation in FPRP in the spillover region and slowdown in late measures in the pre-critical region.
- At the anaphor itself, no effect reached significance.
- Our results are compatible with accounts assuming that interference effects at the anaphor site are rather caused by retrieval than encoding processes (e.g., Jäger et al. 2013, Van Dyke & McElree 2006).
- The pattern found cannot be explained by encoding interference but only by retrieval interference:
  → Facilitation in FPRP might be caused by a higher proportion of mis-retrievals of inaccessible gender matched NPs. This is in line with lower question response accuracy for gender match in gender marked pronouns.
  → Inhibition in late measures is in line with previous results (e.g., Sturt 2003, Van Dyke & McElree 2011).

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References