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Tutunjian, Damon; Heinat, Fredrik; Klingvall, Eva; Wiklund, Anna-Lena

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An eye-tracking study of Swedish filler-gap dependencies: Processing relative clause extractions

Damon Tutunjian*, Fredrik Heinat**, Eva Klingvall*, and Anna-Lena Wiklund*
Lund University* and Linnaeus University**
damon.tutunjian@english.lu.se, fredrik.heinat@insu.se, eva.klingvall@englund.lu.se, anna-lena.wiklund@lunduniv.lu.se

Introduction
Complex noun phrases involving relative clauses (1) are standardly treated as instances of “strong islands” structural configurations into which a filler-gap dependency (FGD) cannot be formed between the filler (those kinds of flowers) and the gap (3) (Ross, 1967, den Dikken & Szabolcsi, 2002). This constraint is widely assumed to be universal.

Unexpectedly, Swedish and the other Mainland Scandinavian languages allow relative clause extractions (RCEs) (2) (Engdahl & Erteschik-Shir, 1973), thus presenting a challenge to the universality of island constraints.

• Discourse-organizational factors (Erteschik-Shir & Lapin, 1979)
• Island-obviation by way of covert resumption (Cinque, 1990)
• Structural reanalysis during parsing (Kush et al., 2013)
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Approaching the question via processing

First step:
• No on-line processing data exists for Swedish.
• Not clear whether processing patterns track intuitive well-formedness.

Second step:
• Two studies suggest that in acceptability judgments and in online processing, only non-islands should show any modulating effects from plausibility and working memory on any primary manipulation.
• Spronck et al. (2012) found no evidence that acceptability-based island-effects show any modulation from individual differences in general processing resource capacity, as measured via two Working Memory Span (WMS) tasks and grammaticality judgment data (cf. Hofmeister & Sag, 2010).
• Traxler and Pickering (1996) demonstrated via eyetracking that manipulations to the plausibility of a filler as a continuation of a verb only affected integration for non-island structures, with no differences being found for island structures.

If correct, the presence of an interaction between structural and non-island constraints themselves (see Phillips 2013).

Eyetracking while reading experiment

Method

Eyetracking While Reading (EyeLink 1000 tower mount)

Revised Digit Span (DS) (adapted into Swedish from MacWhinney et al., 2001). Participants hear a series of digits (3- to an infinite set size) and then enter them on a computer keyboard in reverse.

Automated O-span task (OS) (adapted from Swedish from Unsworth et al., 2005). Mouse-driven recall task.

Participants:
48 native Swedish speakers

Existing accounts for the Swedish data

Materials

Eighty-long distance FGD sentence items (constructed using the Korp corpus), each appearing in four structural variants (Structure) (3-6) and six salty distractor items rotated over four lists.

Possible outcomes:

1. Those kinds of flowers, I saw a man that sold [1].
2. Såna där gamla skottkärror såg jag en man som förresten såg och tvättade på bensinmacken (Swedish)

Conclusions

Early measures:
• RCE and TCE show similar facilitation relative to RCE in early measures (First Fixation and Gaze Duration) at the verb (Region 1). This similarity was also present in one early measure (Gaze Duration) at the PP (Region 2). In Region 1, RCE also showed additional facilitation against the prCCE control as OS and Prag increased.

Late measures:
• For both late measures of processing in Region 1, and for Total Durations in Region 2, RCEs were processed with more ease than RCEs, differing more similarly to TCEs in both OS and Prag increased. In Region 1 Total Durations, rRCE and RCE showed some facilitation against the prCCE control as Prag increased, but this could just be reflective of a late repair mechanism.

• Interpretation: Swedish RCEs are processed more similarly to non-island TCEs during late stages of integration.

Summary:
• RCEs appear to be easier to process than RCEs. Facilitation is dependent in part on non-structural factors (working memory span and pragmatic fit).
• Our study thus provides novel evidence that Swedish RCEs are not processed like syntactic islands, in line with offline intuitions.

References

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