An Eye Tracking Study of Swedish Filler-Gap Dependencies: Processing Relative Clause Extractions

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

2015

Document Version:
Publisher's PDF, also known as Version of record

Link to publication

Citation for published version (APA):

Total number of authors:
4

General rights
Unless other specific re-use rights are stated the following general rights apply:
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.
• Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
• You may not further distribute the material or use it for any profit-making activity or commercial gain
• You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: https://creativecommons.org/licenses/

Take down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.
An eye-tracking study of Swedish filler-gap dependencies: Processing relative clause extractions
Damon Tutunjian*, Fredrik Heimat**, Eva Klingvall*, and Anna-Lena Wiklund*
Lund University* and Linnaeus University**
damon.tutunjian@englund.lu.se, fredrik.heimat@lnu.se, eva.klingvall@englund.lu.se, anna.lenawiklund@lundlund.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. Complex noun phrases of this type (those kinds of flowers) and the gap (2) (Ross, 1967; den Dikken & Szabolcsi, 2002), this constraint is widely assumed to be universal.

Unsurprisingly, Swedish and the other Mainland Scandinavian languages allow relative clause extractions (RCEs) (2) (Engdahl & Ejerhed, 1982; Eretskikh-Shir, 1973), thus presenting a challenge to the universality of island constraints.

(1) *Those kinds of flowers, I saw a man that sold [ .
(2) Såna blommor såg jag en man som sålde [ . (Swedish)

Existing accounts for the Swedish data

- Discourse-organizational factors (Eretskikh-Shir & Lapin, 1979)
- Island ovation by way of covert resumption (Cirque, 1986)
- Structural reanalysis during parsing (Kush et al., 2013)

Unfortunately, none of these accounts stands up under closer scrutiny (see Christensen & Nyvad, 2014; Engdahl, 1997; Heinat & Wiklund, 2015; Lindahl, 2015; Müller, 2015). Thus, what drives the apparent felicity of Swedish RCEs remains undetermined.

Approaching the question via processing

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

First step:

- Look for basic differences in processing between Swedish RCEs and other FGDs at the embedded verb (vitalized) and the following PP region (aka non-islands) (see examples 3&4) where integration is presumed to occur, while controlling for the possible influence of non-structural factors (e.g., working memory), which might affect the processing of FGDs.

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.
- Sprague 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 judgement data (cf. Hofmeister & Sag, 2010).
- Traxler and Pickering (1996) demonstrated via eye-tracking 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-structural factors on Swedish RCEs could then serve as a positive heuristic for non-island status. This would help to confirm that processing of such structures is in-line with their intuitive acceptability.

Research goals and predictions

Use eye-tracking to test whether:
- Swedish RCEs elicit processing costs similar to loci or illicit long-distance FGDs at the embedded verb (vitalized) and the following PP region (aka non-islands).
- Any basic structural differences are modulated by non-structural factors (e.g., working memory).

Possible outcomes:
- Swedish RCEs will pattern more like non-islands, in line with their intuitive acceptability. Such a finding would leave us with at least two possible interpretations:
  - Swedish RCEs do not involve island structures, and thus a structural account is still needed.
  - True variation exists in island constraints
- Swedish RCEs, although intuitively acceptable will pattern more like island structures. Such a finding would disfavor “deep variation” in the island constraints themselves (see Phillips 2013).

Method

Eyetracking while reading experiment

- Early measures:
  - RCE and TCE show similar facilitation relative to nRCE 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 pRCE control as OS and Prag increased.
  - Interpretation: RCEs are processed more similarly to TCEs and are modulated by non-structural factors. They thus exhibit non-island like behavior during the first stages of filler-gap integration.

- 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 nRCEs, patterning more similarly to TCEs as both OS and Prag increased. In Region 1 Total Durations, nRCE also showed some facilitation against the pRCE 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 nRCEs. 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

Acknowledgements

The authors thank the following for their contributions:Wolfgang Ullrich (Uppsala University) for support in language documentation and pilot testing; Carolina Foundation and Bank of Sweden Tercentenary Foundation for funding and Dr. Joost van de Weijer for statistical analysis.

Stroke: A Complex Structural Dependencies...