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

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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 (6) (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 & Ejerhed, 1982; Ertechik-Shir, 1973), thus presenting a challenge to the universality of island constraints.

Two studies suggest that in acceptability judgments and in online processing, only non-islands should show any modulating effects from individual 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.
- Sprouset 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 (WM) tasks and grammaticality judgment 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 (frequency, pragmatic fit, and working memory).

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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 (6) (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 & Ejerhed, 1982; Ertechik-Shir, 1973), thus presenting a challenge to the universality of island constraints.

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Eyetracking while reading experiment

Method

Eyetracking While Reading (Eyelink 1000 tower mount)

Reverse Digit Span (DS) (adapted into Swedish from MacWhinney et al., 2001). Participants hear a series of digits (3-6 infinite set size) and then enter them on a computer keyboard in reverse.

Automated O-span task (OS) (adapted into Swedish from Unsworth, et al., 2005). Mouse-driven recall task. Participants complete three interwoven sets: math operation and letter recall, each set size (3-7 count). Total of 75 letters and 75 math problems.

Participants

48 native Swedish speakers

Eating measures (First Fixation and Gaze Duration) at the verb (Region 1). This similarity was increased. In Region 1 Total Durations, participants showed some facilitation against the control as

Conclusions

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 suggested 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 nRCEs, showing similar timing to both OS and Prag increased. In Region 1 Total Durations, nRCE also 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 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


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