

# The role of non-structural factors in the processing of long-distance filler-gap dependencies in Swedish – two eye tracking studies

Damon Tutunjian, Fredrik Heinat\*, Eva Klingvall, Anna-Lena Wiklund  
Lund University, Linnaeus University\*

In Swedish and the other the Mainland Scandinavian languages, relative clause extraction (RCE) appears to be exempted from the constraints that induce so-called *island effects* in RCEs cross-linguistically (Allwood, 1976; Engdahl & Ejerhed, 1982; Erteschik-Shir, 1973). No theoretical account has proven successful in explaining this exceptionality, which poses a problem for both syntactic explanations (e.g., Sprouse, Wagers and Phillips 2012) and processing accounts (e.g., Hofmeister and Sag 2010) of island effects. In this talk we report the results from two studies, both using the eye tracking while reading paradigm to investigate the processing of relative clause extractions in Swedish (RCE) and the potential influence of non-structural factors on the processing of these.

In Tutunjian, Heinat, Klingvall and Wiklund (2015), we investigated whether RCEs (1b) elicit processing costs similar to licit extractions from *that*-clauses (TCE) (1a), or instead pattern closer to extractions from non-restrictive relative clauses (nRCE) (1c), reported to yield island effects in informal judgments (Engdahl, 1997; Telemann, Hellberg & Andersson, 1999). We also included an intransitive control condition (not shown here). In addition to the structural manipulation, we investigated whether certain non-structural factors (pragmatic fit, working memory span, and the transitional probability of a filler as a completion of a verb) modulated any pattern of effects from our primary manipulation.

- (1) a. *That-clause extraction (TCE)*  
Såna där gamla skottkärror såg jag att en man alltid tvättade på bensinmacken  
such old wheelbarrows saw I that a man always washed at gas-station-the  
när han var ledig.  
when he was free
- b. *Relative clause extraction (RCE)*  
Såna där gamla skottkärror såg jag en man som alltid tvättade på bensinmacken  
such old wheelbarrows saw I a man that always washed at gas-station-the  
när han var ledig.  
when he was free
- c. *Non-restrictive relative clause extraction (nRCE)*  
Såna där gamla skottkärror såg jag en man som förresten tvättade på  
such old wheelbarrows saw I a man that by-the-way washed at  
bensinmacken när han var ledig.  
gas-station-the when he was free

We found evidence that RCEs are easier to process than nRCEs in Swedish, patterning either with TCEs or between TCEs and nRCEs. In the latter case, facilitation from high values of working memory span and pragmatic fit was visible, making RCEs draw closer to TCE. The results from this study suggest that Swedish RCEs are more appropriately categorized as regular long-distance FGDs (licit extractions), in line with offline intuitions.

In the second study, we looked for signs of integration of the extracted filler by manipulating the plausibility of the NP filler – e.g. *skottkärror* ‘wheelbarrows’ vs. *idéer* ‘ideas’ in (1) above – in relation to the embedded predicate (*tvättade* ‘washed’). Traxler and Pickering (1996) found a plausibility effect (elevated reading times) in English for implausible fillers in the non-island condition, but no such effect in the island condition. Plausibility effects are taken to reflect integration of the filler at the verb and the lack of such effects, conversely, a lack of such integration. In Experiment 1, we used the same

structural manipulation as in the first study. Our expectation, based on Traxler and Pickering’s results, was that RCE would show the same plausibility effect as TCE, but NRCE should show no such effect. Surprisingly, we found plausibility effects for all three structures at the verb (*tvättade*) and the following PP, suggesting that integration of the filler takes place in all three conditions at the verb, also in the purported island structure (nRCE).

In Experiment 2, we wanted to see if plausibility effects are present also in violations of the subject condition in Swedish, which would open up the possibility that there is variation with regard to how island violations are processed. For this purpose, we compared extraction from relative clauses modifying subject NPs and extraction from relative clauses modifying object NPs. We used control structures, where the object of the non-finite verb – *bära* ‘carry’ in (2) – was fronted. The verb in the relative clause (*renoverade* ‘renovated’) was optionally transitive, hypothesized to allow for filler-integration ‘(-)’ in RCs modifying an object NP but not in RCs modifying a subject NP. The verb (*bära* ‘carry’) in the control-clause was obligatorily transitive, the gap indicated by ‘-’. We expected plausibility effects in the object condition, but not in the subject condition, and a garden path effect on the verb in the control-clause in the object condition (Traxler & Pickering, 1996). Again, however, we found plausibility effects in both structures. We discuss potential explanations for these patterns of results and their implications for our understanding of island constraints.

- (2) a. *Extraction from RC modifying subject*  
 Såna möbler bad en kollega som renoverade (-) mig att bära - .  
 Such furniture asked a colleague who renovated (-) me to carry -
- b. *Extraction from RC modifying object*  
 Såna möbler bad jag en kollega som renoverade (-) att bära - .  
 Such furniture asked I a colleague who renovated (-) to carry -

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