Syntactic-Adaptation vs Task-Adaptation: The Case of Object Relative Clauses
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**Syntactic Adaptation**
Comprehenders have been argued to rapidly adjust to the statistics of the syntactic environment:
- Fine et al. (2013) found that susceptibility to garden paths decreased relative to the number of similar garden path sentences a subject had already seen.
- Fine et al. characterize this syntactic adaptation as:
  - Rapid and Incremental
  - Statistically Sensitive
- Adapting to syntactic structure within the local environment.

**Object Relative Clauses (ORCs)**
- ORCs are read slower than Subject RCs (Gordon, Hendrickson, 2001).
- The chef [ that the waiter distracted ___] poured the flour onto the counter.
- Staub et al. (2016) argued that ORC difficulty is best understood via surprisal:
  - Found primary difficulty at Relative NP
  - Makes ORCs an attractive test for statistically-based adaptation.
- Wells et al. (2009) found exposure-based facilitation similar to Fine et al. for ORCs in SPR:
  - Not fully incremental: consist of pre- and post-test values.
  - Long-term: four sessions.
  - Show the statistically-sensitive ORC vs SRC interaction only at the Main Verb (much later than Staub et al.)
  - Potentially subject to SPR task-based strategies.

**Task-Effects in Self-Paced Reading**
Fine et al. and Wells et al. rely on Self-paced reading (SPR):
- SPR is unpracticed, with substantial variation in task strategies and additional risk of task-specific mis-parsing.
- Artificially slow compared to natural reading.
- Addtional reliance on regions as guides to prosodic/syntactic grouping (Adams et al. 1998).
- Lack of regression and paralexial information contributes to deviance from natural reading.
- But, natural reading is a highly practiced skill for educated, adult subjects.
  - Relatively little strategic variation between subjects.
  - Syntactic Adaptation should be tested in Eyetracking.

**Prior Findings from Staub et al. (2016)**
- Substantial ORC penalty at Relative NP, significant in both First Pass and Go Past.
- Smaller ORC penalty at Relative Verb, but still present.

**Conclusion:**
In line with Expectation-based theories, the locus of difficulty in ORCs is on the NP.

**Analysis Overview**
**Prediction:**
Statistical Syntactic Adaptation should manifest as an interaction of ORDER x RC TYPE (facilitation for later ORC trials, but reduced or no facilitation for SRCs), because:
- Relative NP region of an ORC disambiguates to an ORC structure → NP has high syntactic Surprisal
- Many ORCs in the environment should lead to reduced Surprisal of resolving to an ORC and faster reading times.
- Smaller penalty for SRCs.

**Critical Interaction:**
ORDER effect is significant in Go Past at the NP.
**Main Effects:**
- ORDER is significant at the Rel NP in First Pass (β = 18.66, SE = 9.14) and Go Past (β = 11.53, SE = 11.53).
- Neither ORDER or RC TYPE are significant at the Verb Region in First Pass or Go Past.

**Summary of Results**
- Later trials do show faster reading times.
- No evidence that trial order effect differed for ORCs vs SRCs.
- Adaptation effects are concentrated in regression-based measures (Go Past, p(regression))
  - Consistent with local revision, rather than coarse-constructing an initial analysis.
  - Potentially surprising for expectations-based theories.
  - Relative NP is more sensitive to ORDER effects than the Verb.

**Potential Reasons for Divergence from Previous Work**
The present results differ from both Fine et al. (2013) and Wells et al. (2009):
- Adaptation in previous studies may have been specific to SPR.
- Adaptation may not apply equally to all constructions.
- Perhaps ORCs have slower adaptation than Garden Paths.
- Surprisal difference between ORCs and SRCs may be too small to observe the crucial interaction.
- ORDER adaptation may be restricted to particularly difficult or ambiguous sentences.

**Conclusion**
- No evidence for statistically-based adaptation for ORCs vs SRCs in naturalistic reading.
- Currently, task adaptation and experimental fatigue are sufficient to explain apparent priming for ORCs.
  - Although, priming by structure-activation is still a possible explanation.

**Future Work**
- Eyetracking experiment with multiple measures of experimental fatigue, to isolate any adaptation.
- Comparison of adaptation-potential of ORC/SRCs with other syntactic constructions.
- Direct comparison of ORC adaptation in comprehension to production adaptation.

**References**

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