1. **Introduction**

Cue-based theories (e.g., Lewis & Vasishth, 2005; McElree, 2000; Van Dyke & Lewis, 2003) assume:
- Real-time linguistic dependency formation relies on cue-dependent memory retrieval.
- Sentence-external material interferes with establishment of within-sentence dependencies.
- Complete syntactic dependencies are built; interference condition on complete dependency processing.

Van Dyke & McElree (2006) reported similarity-based interference effect in English:

Self-paced reading; N = 56; Memory load × Interference interaction ($F_1(1, 55) = 4.07, p < 0.04$; $F_2(1, 35) = 5.58, p < 0.02$; $minF^{'}(1, 90) = 2.35, p = 0.13$).

2. **Research questions**

- Can interference effect be shown in eye-tracking in English?
- Can effect be observed cross-linguistically, e.g., in German (language with richer morphological marking)?
- Is similarity-based interference a function of depth of processing? (Logachev & Vasishth, 2016, Swets et al., 2008)

3. **Design & Materials**

**Design**: 2 × 2 fully-crossed factorial design; two within-subjects, within-items manipulations:
- Factor 1: Memory load (load vs. no load)
- Factor 2: Interference (no interference vs. interference)

**English example item** (adapted from Van Dyke & McElree, 2006):

<table>
<thead>
<tr>
<th>Memory load conditions:</th>
<th>a. No interference</th>
<th>b. Interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>The boat + flexible/open filler</td>
<td>that the guy who lived by the sea sailed (sailable) in the morning was very old.</td>
<td></td>
</tr>
<tr>
<td>The boat + flexible/open filler</td>
<td>that the guy who lived by the sea fixed (fixable) in the morning was very old.</td>
<td></td>
</tr>
</tbody>
</table>

No memory load conditions:

<table>
<thead>
<tr>
<th>c. No interference</th>
<th>d. Interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>The boat + flexible/open filler</td>
<td>that the guy who lived by the sea sailed (sailable) in the morning was very old.</td>
</tr>
<tr>
<td>The boat + flexible/open filler</td>
<td>that the guy who lived by the sea fixed (fixable) in the morning was very old.</td>
</tr>
</tbody>
</table>

**Depth of processing** manipulated through question complexity (complex vs. simple-question version) Within-subjects, between-items factor: versions tested 7–21 days apart with same participant group.

4. **Results**

- **Load × Interference interaction** in reading times at critical relative clause verb (sailed/fixable):
  - In load conditions:
    - sailed (no interference) < fixed (interference) -> memory items table, sink, truck and The boat are plausible objects of fixed => interference
  - In no load conditions:
    - sailed (no interference) ≈ fixed (interference)

- **Version × Interference interaction**:
  - If superficial processing is induced (in simple-question version), interference effect might be reduced or disappear altogether.

5. **Predictions**

For each language in each version separately:

**English**

**German**

- No indication of expected interaction, but Load × Interference interaction (simple version) not predicted by theory 
  ⇒ further investigation needed

**Depth of processing**

- Effects only in simple version (≠ predictions); effect might disappear with more demanding task

6. **6. Results**

**English**: Version × Load × Interference

**German**: Version × Load × Interference

**FPRT**: Ctrl [-1.1, 1] ms

**TFT**: Ctrl [-1.1, 1] ms

- Posterior means with 95% credible intervals (CrI) computed from Bayesian maximal linear mixed model using Stan. Shown are FPRT = first-pass reading time, RPD = regression-path duration, TFT = total fixation time at the critical relative clause verb (sailed/fixable).

- Posterior means with 95% credible intervals (CrI) for nested comparisons. Shown are first-pass reading times (FPRT) for English and total fixation times (TFT) for German.

7. **Summary**

**English**

- Similarity-based interference effect (simple version) as predicted by cue-based theories

**German**

- No indication of expected interaction, but Load × Interference interaction (simple version) not predicted by theory
  ⇒ further investigation needed

**Depth of processing**

- Effects only in simple version (≠ predictions); effect might disappear with more demanding task

**Open issues**

- Effect not observable in German due to richer morphological marking?
  * Larger-sample study in Russian, another language with rich morphological marking, underway
- Proactive weaker than retroactive interference manipulation (Van Dyke & McElree, 2011)?
  * Retroactive interference design currently being tested in German

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