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
- surface-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; \text{minF}'(1, 90) = 2.35, p = 0.13).\

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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):

- **Memory load conditions:**
  - a. No interference
  - b. Interference

- **The boat** + **fixable**/− **sailable**/− **open filler**

- **The boat** + **fixable**/− **sailable**/− **open filler**

No memory load conditions:

- a. No interference
- b. Interference

- **The boat** + **fixable**/− **sailable**/− **open filler**
- **The boat** + **fixable**/− **sailable**/− **open filler**

English study (critical verb region)

- **FPRT:** Cra [-14, 1] ms
- **RPD:** Cra [-14, 1] ms
- **TFT:** Cra [-14, 1] ms

German study (critical verb region)

- **FPRT:** Cra [-14, 1] ms
- **RPD:** Cra [-14, 1] ms
- **TFT:** Cra [-14, 1] ms

**Nested comparisons (critical verb) in FPRT**

- **English (simple)**
- **German (simple)**

**Nested comparisons (critical verb) in TFT**

- **English (simple)**
- **German (simple)**

Posterior means with 95% credible intervals (CrI) computed from Bayesian maximal linear mixed model

4. Experiments

Two eye-tracking while reading studies:

- **Study**
- **Expt version**
- **Subjects**
- **Items**

5. Predictions

For each language in each version separately:

- **Load × Interference interaction** in reading times at critical relative clause verb (sailed/fixed):

  - 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)
      - no memory items ⇒ no interference

- **Version × Load × Interference interaction:**

  - If superficial processing is induced (in simple-question version), interference effect might be reduced or disappear altogether.

6. Results

- **English:** Version × Load × Interference
- **German:** Version × Load × Interference

- **FPRT:** Cra [-14, 1] ms
- **TFT:** Cra [-14, 1] ms

Posterior means with 95% credible intervals (CrI) 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/fixed).

**Nested comparisons (critical verb) in FPRT**

- **English (simple)**
- **German (simple)**

**Nested comparisons (critical verb) in TFT**

- **English (simple)**
- **German (simple)**

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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