

Similarity-Based Interference in Native and Non-Native Comprehension

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Similarity-based interference has played an important role in informing our understanding of the memory access mechanisms during sentence processing [6,8]. One example of similarity-based interference is observed in subject and object relative clauses (SRCs and ORCs), where the difficulty associated with processing ORCs is attenuated if the two noun phrases in the relative clause are dissimilar (e.g. a proper name and a noun), compared to when they are similar (e.g. two nouns) [3,4]. Such effects are believed to index difficulty in encoding information in memory that is similar along a particular dimension [9]. Although similarity-based interference has been widely studied in native (L1) comprehension, less is known about interference during non-native (L2) processing. L2 processing is generally more difficult than L1 processing, though the precise nature of this difference is debated [1,2,5]. If L2 learners are more susceptible to interference during processing than L1 speakers [2], L2 learners may show larger similarity-based interference effects during processing than L1 speakers.

We examined similarity-based interference in relative clauses in 80 L1 English speakers and 80 L2 English speakers from different L1 backgrounds (upper-intermediate to advanced English L2ers with mean English proficiency 46/60). Participants read sentences as in (1/2) while their eye-movements were monitored and completed an offline comprehension task as in (3/4). The offline task was conducted in a separate experimental session after the main experiment. Experimental items in both tasks manipulated clause type, ORC vs. SRC, and noun similarity, similar (two common nouns, e.g. 'the boy' and 'the girl') vs. dissimilar (one common noun and one proper name, e.g. 'the boy' and 'Rebecca'). At the relative clause, we expected longer reading times in ORCs when the two nouns were similar, as in (1a), than dissimilar, as in (1b) [3,4]. We also investigated processing at the matrix verb, as retrieval of a subject for this verb may be more difficult following ORCs, because the noun inside the relative clause ('the girl' / 'Rebecca') is itself also a subject [7]. For comprehension accuracy, we expected lower accuracy for ORCs with two similar nouns, as in (3a) than dissimilar nouns (3b), but no differences in SRCs (4a/b). If L2ers are more susceptible to interference than L1ers [2], they should show larger similarity-based effects during processing and in offline comprehension.

We pre-registered analyses of first-pass, regression path and total viewing times (<https://osf.io/awxju>). At the relative clause ("that the girl saw" / "that saw the girl"), we found significant interactions between clause type and noun similarity ($p < .033$) in regression path times and total viewing times, with reading times being particularly long in ORCs when the two nouns were similar, as in (1a), than dissimilar, as in (1b) (Figure 1). At the matrix verb ('walked'), we did not find longer reading times following ORCs than SRCs in any measure. If anything, SRCs caused difficulty, especially in the dissimilar condition for L2ers, as evidenced by a significant group by clause type by noun similarity interaction in regression path times ($p = .004$). For comprehension accuracy, we observed a significant main effect of group ($p < .001$), with lower accuracy in the L1ers, and a significant clause type by noun similarity interaction ($p = .005$), with lower comprehension accuracy rates for similar than dissimilar ORCs, while the SRC conditions did not differ (Figure 2).

Our results at the relative clause replicate [3,4], indicating ORCs are easier to process when the two nouns are dissimilar, and extend these results to L2 learners. We did not find evidence of ORCs causing processing difficulty at the matrix verb, but noun similarity did influence comprehension accuracy for sentences containing ORCs. While we did find some L1/L2 differences, the pattern of results was not consistent with L2ers being more susceptible to interference than L1ers (cf [2]), and we did not find significant interactions with group at either the relative clause region, or in comprehension accuracy rates. Finding similarity-based interference in both groups suggests L1 and L2 comprehension utilise similar mechanisms when encoding and retrieving information from memory during sentence processing.

Eye-Tracking Experiment Items (n = 24)

(1a) *Object Relative Clause, Similar*

The boy that the girl saw yesterday afternoon, walked through the park.

(1b) *Object Relative Clause, Dissimilar*

The boy that Rebecca saw yesterday afternoon, walked through the park.

(2a) *Subject Relative Clause, Similar*

The boy that saw the girl yesterday afternoon, walked through the park.

(2b) *Subject Relative Clause, Dissimilar*

The boy that saw Rebecca yesterday afternoon, walked through the park.

Comprehension Task Experiment Items (n = 24)

(3a) *Object Relative Clause, Similar*

The passenger that the pilot saw before the flight, seemed to be nervous.

(3b) *Object Relative Clause, Dissimilar*

The passenger that Joseph saw before the flight, seemed to be nervous.

(4a) *Subject Relative Clause, Similar*

The passenger that saw the pilot before the flight, seemed to be nervous.

(4b) *Subject Relative Clause, Dissimilar*

The passenger that saw Joseph before the flight, seemed to be nervous.

Who seemed to be nervous?

(The passenger – The pilot / Joseph)

Figure 1. *Reading times.*

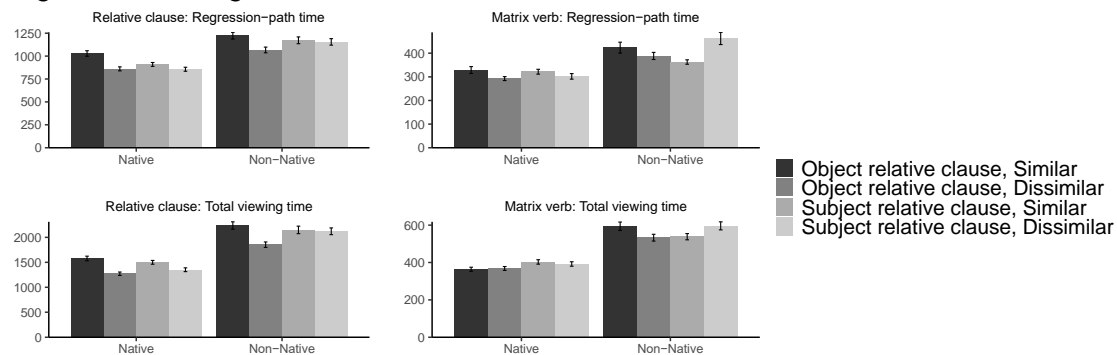
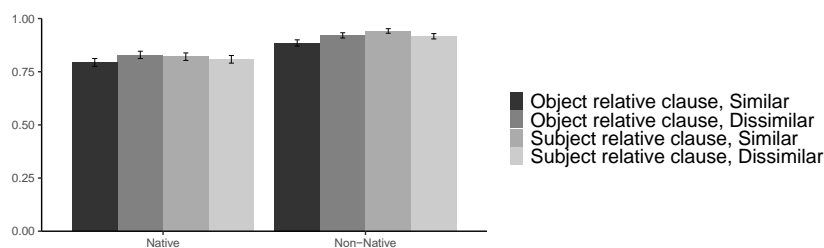


Figure 2. *Comprehension accuracy.*



References

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