Interference and Filler-Gap Dependencies in Native and Non-Native Comprehension

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The resolution of filler-gap dependencies, as in (1), where the displaced filler ('the beer') must be interpreted as the complement of 'drank' for successful comprehension, has been widely examined in native (L1) and non-native (L2) sentence processing. Both L1 and L2 speakers 'actively' fill gaps at the first available position during processing and use syntactic constraints to guide when a dependency can be formed [5,8,9]. This study extends on this research by examining whether L1 and L2 readers are susceptible to interference during dependency resolution. Cue-based parsing predicts that dependency resolution utilises a cue-based retrieval mechanism that is susceptible to interference (for review, see [7,10]). [4] reported interference in filler-gap dependencies in L1 readers, but whether L2 readers also exhibit such interference is not yet known. Finding increased difficulty in dependency resolution for L2ers would be compatible with the Shallow Structure Hypothesis of L2 processing [1,2]. The claim that L2ers are more susceptible to interference [3] as a result of how they weight structural and semantic retrieval cues, would also predict L1/L2 differences in the resolution of filler-gap dependencies.

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) read sentences like (1/2) as their eye-movements were monitored. Sentences manipulated the plausibility of both the retrieval target ('the beer'/'the cake') and a linearly closer distractor ('the wine'/'the food'). In a separate experimental session after the main experiment, participants also completed an offline comprehension task as in (3/4), which manipulated the plausibility of a distractor ('the cake'/'the milk') in sentences either with a filler-gap dependency (3) or without (4). For eye-tracking, we expected longer reading times at 'drank' in implausible (2) than plausible (1) sentences. Interference was expected, such that implausible sentences should have shorter reading times when the distractor is plausible, as in (2a), than implausible, as in (2b) [4]. If L2ers are more susceptible to interference, they should show a larger difference between plausible and implausible distractor conditions. For the offline task, we expected interference in filler-gap dependency conditions only, with lower accuracy in (3a) than (3b), but no differences between (4a/b).

In a pre-registered analysis (https://osf.io/5up4f), we analysed first-pass, regression-path and total viewing times at the critical verb ('drank') and spillover region ('during the party'). Reading times were significantly longer for implausible than plausible sentences in regression-path and total viewing times (*ps* $<$ .001). We observed a significant plausibility by distractor interaction in regression path times (p = .003), where reading times for implausible sentences were significantly shorter (p < .001, estimated difference 45ms [19ms, 72ms]) when the distractor was plausible (see Figure 1). Although this effect was most clearly visible at the spillover region, the relevant interaction was not significant (p = .054). We did not find evidence of significantly more interference in L2ers in any measure. In the comprehension data (see Figure 2), we observed significant main effects of group (p = .002), with higher accuracy in the L2ers, and distractor (p < .001), with lower accuracy when the distractor was plausible. Additional (non pre-registered) analyses also indicated that individual differences in L2 proficiency, lexical processing ability (see [6]) or L1 background (wh-movement vs wh-in-situ L1) did not significantly influence the interpretation of our L2 results.

The eye-tracking results replicate and extend [4], indicating retrieval interference during L1 and L2 processing of filler-gap dependencies. In the offline task, we did not find the expected interference pattern in dependency conditions only, and interpret these results as suggesting interference in dependency and no dependency conditions during the post-trial comprehension question phase. Although we did not find evidence of increased interference in L2 as compared to L1 processing (cf. [3]), our results suggest both L1 and L2 readers utilise a cue-based memory retrieval mechanism that combines structural and semantic cues during sentence processing.

<u>Eye-Tracking Experiment Items</u> (n = 24)

(1a) *Plausible Target, Plausible Distractor*
Mary saw the beer that the man with the wine very happily drank during the party.
(1b) *Plausible Target, Implausible Distractor*
Mary saw the beer that the man with the food very happily drank during the party.
(2a) *Implausible Target, Plausible Distractor*
Mary saw the cake that the man with the wine very happily drank during the party.
(2b) *Implausible Target, Implausible Distractor*
Mary saw the cake that the man with the food very happily drank during the party.

<u>Comprehension Task Experiment Items</u> (n = 24)

(3a) *Filler-Gap Dependency, Plausible Distractor*
Kevin saw the sandwich that the boy by the cake quickly ate during lunch.
(3b) *Filler-Gap Dependency, Implausible Distractor*
Kevin saw the sandwich that the boy by the milk quickly ate during lunch.
(4a) *No Dependency, Plausible Distractor*
Kevin saw the boy by the cake who quickly ate the sandwich during lunch.
(4b) *No Dependency, Implausible Distractor*
Kevin saw the boy by the milk who quickly ate the sandwich during lunch.

What did the boy eat during lunch? (The sandwich / The cake)

Figure 1. *Reading times.*

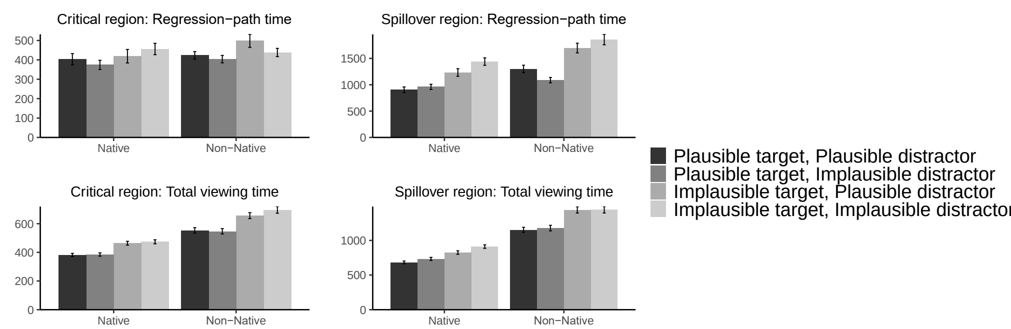
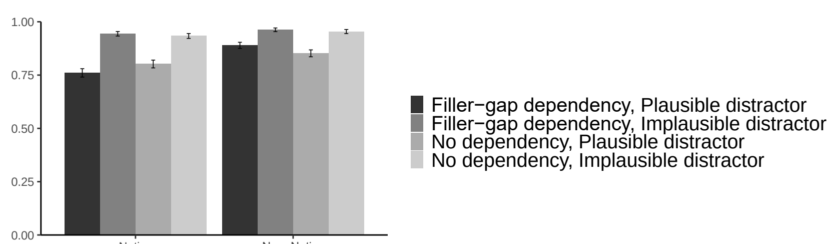


Figure 2. *Comprehension accuracy*.



References

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