

Similarity-based interference can cause difficulty in processing subject-verb dependencies: when an intervening subject matches the retrieval cues of the matrix verb, the parser may erroneously retrieve the intervener [1, 2]. Previous studies have identified the relevant dimensions of similarity for subjects [1, 2, 3], but none have explicitly attempted to disentangle the contribution of tensed clauses from their subjects. These clauses could lead to interference if the parser retrieves the embedded clause as the attachment site for the matrix verb [1]. In two experiments, we replicate previous findings of subject interference but fail to find evidence for interference from embedded clauses.

**Design.** To probe the sources of interference we manipulated the complexity of potential interveners by elaborating them with additional modifiers. This makes the intervener a stronger competitor during retrieval by raising its baseline activation; when it matches the retrieval cues of the verb, it is relatively more accessible in memory [3, 4]. In COMPLEX SUBJECT conditions, the modifier attached to the subject, while in COMPLEX CLAUSE conditions it attached at the clause level (Table 1). In the BASELINE condition we elaborated the embedded object, because it should be minimally targeted by the matrix verb's retrieval cues [3, 5].

**Experiment 1.** We first conducted a word-by-word self-paced reading study (N = 61) using prepositional phrase (PP) modifiers with matched content. At the site of retrieval, the matrix auxiliary verb (*was*), we found that the COMPLEX SUBJECT condition was read more slowly than the BASELINE condition (22 ms  $\pm$  11 ms;  $p = .057$ ). Moreover, at the spillover preposition (*in*), the COMPLEX CLAUSE condition was read *faster* than BASELINE (-21 ms  $\pm$  10 ms;  $p < .05$ ; Figure 1). We conclude that intervening subjects of tensed clauses can generate interference, but intervening clauses do not. However, faster reading times may stem from an antilocality effect [6]: additional clause-final modifiers increase the expectation of exiting the embedded clause, which facilitates reading and could mask any interference-based difficulty. Experiment 2 addresses this issue with a different modification strategy.

**Experiment 2.** A follow-up phrase-by-phrase self-paced reading study (N = 58) kept the number of clause-final modifiers constant across conditions by using pre-head modifiers instead of PPs (Table 2). Preverbal and prenominal modifiers were matched for frequency. At the spillover PP (*in the streets*), COMPLEX CLAUSE conditions were read faster than BASELINE (-33 ms  $\pm$  18 ms;  $p = .065$ ) or COMPLEX SUBJECT (-32 ms  $\pm$  19 ms;  $p = .091$ ). The BASELINE and COMPLEX SUBJECT conditions were not significantly different in this region, nor were there any significant differences between conditions at the retrieval site (*was celebrating*). We conclude that clausal interference, if it occurs, does not slow processing to the same extent as elaborated noun phrases (NPs).

Our results provide evidence that similarity-based interference may be triggered by subjects but not by clauses. The difference between BASELINE and COMPLEX CLAUSE in Experiment 2 suggests that complex objects may give rise to interference, contra Experiment 1 and previous studies [3, 5]. This could be due to the difference between pre- and post-nominal modification: elaboration prior to encountering the head could lead to deeper encoding. A less interesting possibility is that the BASELINE was spuriously inflated by phrase-by-phrase reading. Further investigation is needed to determine whether clausal interference was not observed because English has limited verbal morphology to cue clausal attachment sites (a language-specific property) or because the verb's retrieval cues target argument structural properties rather than phrase structural properties.

Initially, the <b>bookie</b> who expected that ... <b>was</b> celebrating in the streets.	
Baseline	the fighter would defeat the challenger <u>from the city</u> on Saturday
Complex Subject	the fighter <u>from the city</u> would defeat the challenger on Saturday
Complex Clause	the fighter would defeat the challenger on Saturday <u>in the city</u>

Table 1. Sample Item from Experiment 1.

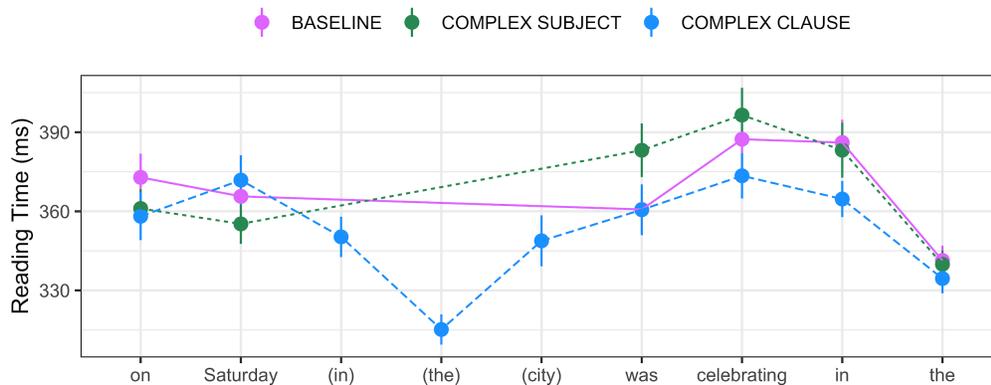


Figure 1. Experiment 1 word-by-word reading times at retrieval site and surrounding regions.

Initially,   the <b>bookie</b>   who expected that   ...   <b>was</b> celebrating   in the streets   joyfully.	
Baseline	the fighter   would defeat   the <u>very determined</u> challenger   on Saturday
Complex Subject	the <u>very determined</u> fighter   would defeat   the challenger   on Saturday
Complex Clause	the fighter   would <u>very likely</u> defeat   the challenger   on Saturday

Table 2. Sample Item from Experiment 2 with regions.

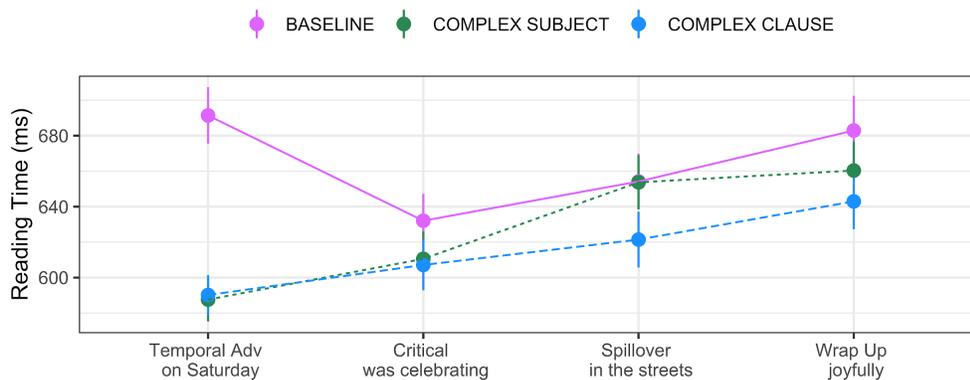


Figure 2. Experiment 2 region-by-region reading times at retrieval site and surrounding regions.

**References.** [1] Van Dyke, J. A., & Lewis, R. L. (2003). *Journal of Memory and Language* [2] Van Dyke, J. A. (2007). *Journal of Experimental Psychology: Learning, Memory, and Cognition* [3] Arnett, N., & Wagers, M. (2017). *Journal of Memory and Language* [4] Hofmeister, P., & Vasishth, S. (2014). *Frontiers in psychology* [5] Van Dyke, J. A., & McElree, B. (2011). *Journal of Memory and Language* [6] Vasishth, S., & Lewis, R. L. (2006). *Language*