

Although syntactic priming effects are robust in language production [1], they are thought to be weaker (or non-existent) in comprehension [2]. Sentence production and comprehension could utilize different mechanisms or different syntactic representations, or this disparity could be due to methodological differences in how “priming” is assessed across experiments. In production, a structure is “primed” when the speaker produces it again. However, it is less obvious how a structure can be repeated during language comprehension. Comprehension studies typically use locally ambiguous sentences to evaluate priming: previous processing of a similar structure should facilitate reading in the temporarily ambiguous region. Unlike in language production, readers do not choose the sentence’s final interpretation; instead, the sentence structure is fixed and priming effects are measured indirectly.

We investigated syntactic priming in language comprehension more directly, using sentences containing ambiguously-attached prepositional phrases. Participants read sentences phrase-by-phrase on a computer screen, and then answered a question (2b), indicating how they had parsed the sentence. The primes (1), included semantic content that disambiguated the PP attachment site, and the targets contained PP-attachment ambiguities (2a).

Unrelated fillers disguised the purpose of the experiment. Reading times for each region and question responses were fitted to mixed-effects regression models with subject and item as random effects.

Reading times. There was a main effect of Prime-Target Congruence ($p < .01$): Prime-Incongruent responses were associated with longer RTs on the ambiguously attached phrase. The strongly biased items tended to be Early Closure (EC) biased (based on norming data); these items were read more slowly during the ambiguous region, while unbiased items were read more quickly ($p = .05$). This suggests that primes had a stronger facilitative effect on equally-biased items. Finally, Prime-Incongruent responses were read more quickly for Late-Closure (LC) than for EC primes, suggesting that EC primes had a greater facilitative effect on reading time than LC primes.

Responses. The preexisting attachment bias of each item strongly predicted how it was parsed ($p < .0001$). This bias interacted with both Prime Attachment site ($p < .05$) and Trial number ($p = .05$): EC primes were more effective when paired with EC-biased items, but the influence of EC-bias was stronger early in the experiment. As the experiment progressed, LC primes became more effective—the change in priming increased more for LC primes than for EC primes as trials progressed ($p < .0005$). This could be due to the overall EC-bias observed for targets combined with the overall LC bias in English. As the experiment progressed, participants were exposed equally to both structures, pushing their initial bias toward EC and away from LC. As this shift occurred, the EC primes became less effective and the LC primes more effective. This pattern fits well with the predictions of a surprisal account: the less favored structure has stronger structural priming effects.

We conclude that prior syntactic processing affects the interpretation and the real-time processing of sentences with similar structures, even without lexical overlap. This suggests that syntactic priming effects in comprehension and production are more comparable than previously believed.

Examples:

- (1) The kids were all scared of the spider in the web with the fangs.
- (2) a. The FBI agent noticed the mirror on the wall with a crack.
b. What had a crack? (A) the wall (B) the mirror

References

- [1] Bock, J. K. 1986. Syntactic persistence in language production. *Cognitive Psychology* 18, 355–387.
- [2] Pickering, M. and Ferreira, V. 2008. Structural Priming: A Critical Review. *Psychological Bulletin* 134(3), 427-459.