Elaboration of concepts facilitates their retrieval in sentence processing
Melissa Troyer, Philip Hofmeister, and Marta Kutas

Sentence comprehension involves connecting current linguistic input with existing knowledge about the world. Here, we propose that this process is facilitated when more, compared to less, information is known about referents (such as nouns) in the sentence. Current models of sentence processing claim that relevant cues at retrieval sites enable access to appropriate targets in memory [1,2]. Further, models of similarity-based interference predict that to the extent that a target has more unique features cued at retrieval, retrieval will be made easier (due to less interference) [3]. These models are consistent with recent findings that a noun which has been described with a greater number of modifiers (e.g., a Texas cattle rancher, compared to simply a rancher) leads to faster reading times in regions thought to index retrieval of the noun [4] within the same sentence. However, no study has investigated the retrieval of concepts that have been more or less elaborated by other types of material in larger discourses. The current study extends previous work by elaborating elements (here, descriptions of people) in short texts. We hypothesized that effects of greater elaboration (leading to more semantic cues) would persist across sentences to facilitate retrieval in a subsequent target sentence.

In our experiment, 48 participants read 24 short texts like (1). Sentences 1-2 were presented in their entirety one at a time, and sentence 3 was presented word-by-word using self-paced reading (slashes indicate regions used for analysis). All short texts were followed by a comprehension question.

(1) Two senators were arguing with a Democrat and a Republican after a big debate. The Democrat had voted for one of the senators, and the Republican had voted for the other, a man from Ohio who was running for president. The senator/ who the { Democrat / Republican } / had voted for / was picking a fight / about health care reform.

Critically, sentence 2 depicted two individuals from sentence 1 (with the same definite noun phrase descriptor, here senator) with either many (“many-cue” condition) or only one (“one-cue” condition) additional piece(s) of information. In sentence 3, the subject of the embedded relative clause picked out which of the two senators was the object of supported (blue=“one-cue”, red=“many-cue”). As predicted, we found that the many-cue condition led to reduced reading times in both the retrieval region of the relative clause (had voted for), supporting our hypothesis that more elaborate representations lead to facilitated access. In addition, at a region earlier in the sentence (who the { Republican / Democrat }), slower reading times were observed in the many-cue condition relative to the one-cue condition. Both of these effects were modulated by the reading abilities of participants, as indexed by overall reading speeds as well as a measure of print exposure (the Author and Magazine Recognition Tests [5]). Taken together, these findings suggest that what and how much one knows about a concept can impact retrieval in sentence processing, even when that information has been encountered over the course of a discourse above the level of a single sentence. Models of sentence comprehension would do well to take into account both (a) the varied richness of information in language, above and beyond the information provided in the local sentential context, and (b) individual differences in knowledge and linguistic expertise.