

The role of lexical information processing in sentence structure formulation

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Grammatical encoding in sentence production entails finding the right words and putting the words in the right place. Previous studies showed that the formulation of sentence structure is modulated by lexical selection. There are at least two ways in which lexical selection may influence sentence formulation. Sentence formulation may be guided by lexical accessibility whereby speakers put more accessible words earlier in the sentence (i.e., a lexical accessibility effect, e.g., Prat-Sala & Branigan, 2000). At the same time, structural priming studies suggest that lexical information can also serve as a retrieval cue that activates the memory trace of a previously encoded sentence structure, resulting in strong syntactic persistence between utterances (i.e., a lexical boost effect on structural priming, e.g., Hartsuiker et al., 2008). The two lexical effects jointly constrain the syntactic choices in sentence production. When a lexical item becomes highly accessible and a lexical-specific syntactic structure becomes available at the same time (e.g., by a lexical cue in sentence recall), speakers have to coordinate multiple lexically-driven encoding processes. The coordination might further depend on the linguistic level that speakers attend. In four experiments using sentence recall, structural priming, and sentence structure memory, we asked whether speakers indeed exploit a lexical cue both as a lexical guide and as a retrieval cue during grammatical encoding.

In two cued sentence recall experiments, 88 native Dutch speakers (40 in Experiment 1, 48 in Experiment 2) memorized either Dutch s-genitive (*De boer zijn tarwe is geel* [*Literally: The farmer his wheat is yellow*]) or of-genitive sentences (*De tarwe van de boer is geel* [*Literally: The wheat of the farmer is yellow*]) and recalled them afterwards (Figure 1a). In half of the trials, a lexical cue was presented that repeated either the possessor (*boer*) or the possessum (*tarwe*) of the to-be-recalled sentence. In Experiment 1, the presentation of a possessum cue reduced the likelihood of s-genitive production by 10.3% (Figure 2a). In Experiment 2, a possessor cue facilitated the s-genitive production (an 11.8% facilitation effect, Figure 2a). Thus, both experiments showed lexical accessibility effects on choice of genitive structures. Lexical cues did not increase the accuracy of structure retrieval (Figure 2b): in other words, there was no lexical boost on sentence memory.

Two further experiments sought to replicate the lexical accessibility effects of Experiments 1 and 2 in a structural priming and a sentence structure memory paradigm and explored whether attention to prime sentence structure influences lexical accessibility and lexical boost effects. Ninety-six native Dutch speakers (48 for each experiment) were instructed to read genitive sentences and then generate sentences out of three chunks (Figure 1b, e.g., {*banjo, boer, is rood* [banjo, farmer, is red]}). In Experiment 3, speakers generated the sentence spontaneously, whereas in Experiment 4, they were instructed to reuse the sentence structure they just experienced. The prime sentence structure and head overlap were manipulated. The accessibility manipulation was implemented by displaying either the name of the possessor (*boer*) or possessum (*banjo*) at a visually more salient location on the screen. In Experiment 3, the likelihood of s-genitive production increased by 4.5% when the possessor was made more accessible and decreased by 4.7% when the possessum was made more accessible (Figure 3a). In Experiment 4, a more accessible possessum significantly reduced s-genitive production by 3.6% (Figure 3a). Only Experiment 4 showed an effect of head overlap on structure retrieval (a 6.6% lexical boost effect, Figure 3b).

Taken together, four experiments demonstrated consistent effects of lexical accessibility on production of Dutch genitive structure. No lexical boost effect was found unless the primed phrase structure is highly available to the speakers. This indicates that lexical cues in sentence recall were predominantly exploited as a lexical guide rather than a retrieval cue.

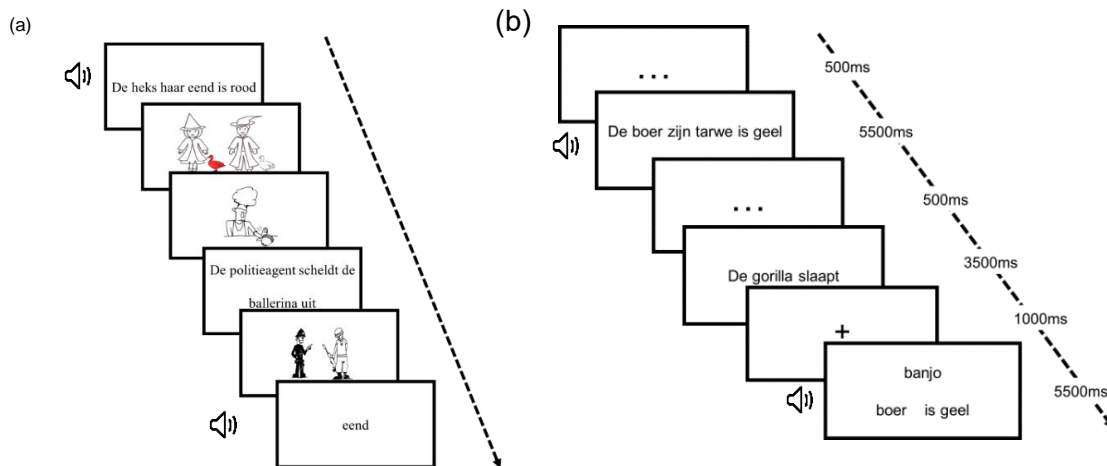


Figure 1 (a) The procedure of Experiment 1. Each trial consisted of the following events: A critical sentence memorization task, a picture verification task, a filler picture description task, a filler sentence reading task, a filler picture verification task, and finally a sentence recall task (with a lexical cue). (b) The procedure of Experiment 3 and 4. Each trial consisted of the following events: a critical prime sentence reading task, a filler sentence reading task and a sentence generation task. The tone symbol signals for sentence memorization (reading) and recall (or generation).

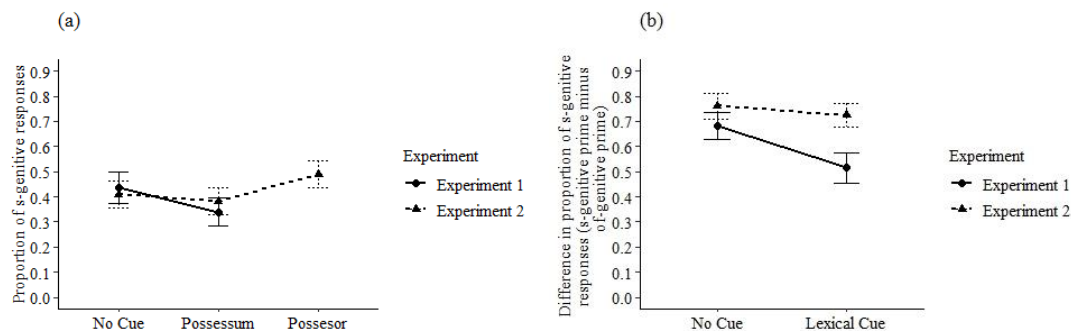


Figure 2 (a) The proportion of s-genitive responses as a function of the thematic role of the cue in Experiment 1 and 2. (b) The priming effect (s-genitive production in the s-genitive condition minus that in the of-genitive condition) as a function of cue presentation in Experiment 1 and 2. The error bar indicates the standard error aggregated over subjects.

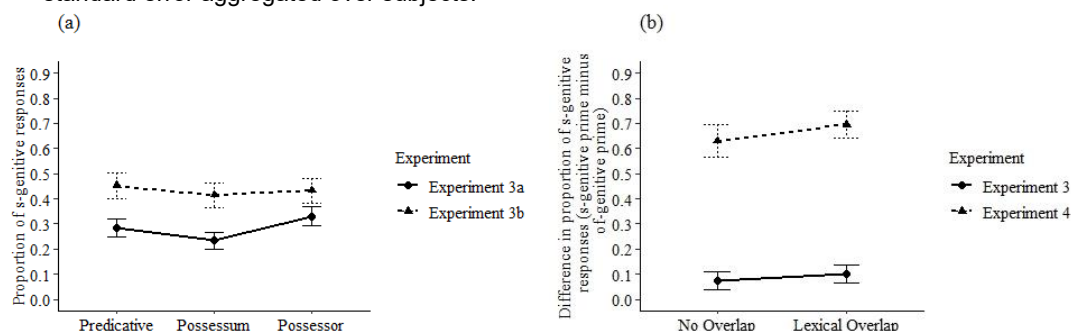


Figure 3 (a) The proportion of s-genitive responses as a function of thematic role of the salient chunk and (b) the priming effect as a function of the lexical overlap condition in Experiment 3 and 4. The error bar indicates the standard error aggregated over subjects.

References:

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