

## **UC Merced**

# **Proceedings of the Annual Meeting of the Cognitive Science Society**

### **Title**

Priming Word Order in Sentence Production

### **Permalink**

<https://escholarship.org/uc/item/9193w290>

### **Journal**

Proceedings of the Annual Meeting of the Cognitive Science Society, 19(0)

### **Authors**

Hartsuiker, Robert

Huiskamp, Philippine

Westenberg, Casper

### **Publication Date**

1997

Peer reviewed

# Priming Word Order in Sentence Production

Robert Hartsuiker (HARTSUIKER@NICLKUN.NL)

Philippine Huiskamp

Casper Westenberg

Nijmegen Institute for Cognition and Information  
PO Box 9104, 6500 HE Nijmegen, The Netherlands

When producing a sentence, the speaker has a number of tasks to do, in order to ensure that the utterance conveys the intended message and that it is in accordance with the grammatical constraints of his language. One of these tasks is to place words and phrases in linear order. We hypothesized that there exists a *linearization* process (cf. De Smedt, 1990; Kempen & Hoenkamp, 1987) which imposes order on a constituent structure. That structure is specified with respect to hierarchical relations between constituents but not with respect to word order. This proposal is along the lines of a theory proposed by Bock and Levelt (1994). According to that theory, the stage of formulating can be divided into a functional level and a positional level. Functional level processing consists of selection of lexical items and assignment of grammatical functions to these items. The resulting functional representation is input for the positional level. Processing at that level results in the construction of a constituent structure, in which words are placed. According to Bock and Levelt, constituent structure is highly predictable from the functional representation, but not isomorphic to it. The reason is that the order of constituents and words can vary.

We tested the hypothesis that there is linearization process, imposing word order on a constituent structure, in two experiments. In each experiment we elicited sentences and tried to "prime" word order. The first experiment was a sentence priming experiment (cf. Bock, 1986; Bock, Loebell, & Morey, 1992). Speakers of Dutch repeated prime sentences and described target pictures. The participants (N=84) were led to believe that there was no relation between consecutive items. However, experimental pictures could be described with a sentence having the same word order as that of the previous prime sentence, or with a sentence having another word order. We manipulated word order of the prime sentences. For instance, we presented the Dutch equivalent of either "in the pan is some broccoli" or "some broccoli is in the pan". Following that, a picture of a ball beneath a table could be presented. The dependent variable was the frequency with which each word order was used to describe the pictures. In support of our hypothesis, speakers were likely to reuse the word order of the prime sentence.

In a second experiment we used a written sentence completion task (cf. Branigan, Pickering, Liversedge, Stewart, & Urbach, 1995). The participants (N = 36) read sentences and supplied a number of written words to complete them. Experimental trials consisted of a prime fragment, and a target fragment, both containing a subordinate clause. In Dutch the verb(s) of a subordinate

clause are placed clause-finally, and the order of auxiliary verb and nonfinite verb is free. The prime fragment contained one verb and required another verb to complete it. In this way, either the order auxiliary-nonfinite verb ("has written") or nonfinite verb-auxiliary ("written has") could be elicited. The target fragment also required two verbs, but none was supplied. Thus, the participant could choose the order of the word order of the prime fragment or the alternative word order. Again, the participants tended to reuse the word order of the prime sentence.

We argue that the data from these two experiments support the notion of a linearization process. Both experiments showed that speakers tend to reuse the word order of a previously produced prime sentence. However, suppose that the effect should be localized at the conceptual level? That is not very likely, as there was little conceptual overlap between prime and target. A more serious criticism is that the priming effect should be attributed to increased availability of an entire syntactic tree, specified for constituency and for word order. However, we reject that explanation because it fails to capture priming effects with sentence types that are more fully determined by the functional representation.

## References

- Bock, J. K. (1986). Syntactic persistence in language production. *Cognitive Psychology*, 18, 355-387.
- Bock, J. K., & Levelt, W. J. (1994). Language production. Grammatical encoding. In: M. A. Gernsbacher, (Ed.). *Handbook of Psycholinguistics*. (pp. 945-984). San Diego: Academic Press.
- Bock, J. K., Loebell, H., & Morey, R. (1992). From conceptual roles to structural relations: bridging the syntactic cleft. *Psychological Review*, 99, 150-171.
- Branigan, H. P., Pickering, M. J., Liversedge, S. P., Stewart, A. J., & Urbach, T. P. (1995). Syntactic Priming: Investigating the Mental Representation of Language. *Journal of Psycholinguistic Research*, 24, 489-506.
- De Smedt, K. J. (1990). IPF: An incremental parallel formulator. In R. Dale, C. Mellish, & M. Zock (Eds.), *Current research in natural language generation* (pp. 167-192). London: Academic Press.
- Kempen, G., & Hoenkamp, E. (1987). An incremental procedural grammar for sentence formulation. *Cognitive Science*, 11, 201-258.