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# Priming sentence planning



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### ABSTRACT

Sentence production requires mapping preverbal messages onto linguistic structures. Because sentences are normally built incrementally, the information encoded in a sentence-initial increment is critical for explaining how the mapping process starts and for predicting its timecourse. Two experiments tested whether and when speakers prioritize encoding of different types of information at the outset of formulation by comparing production of descriptions of transitive events (e.g., *A dog is chasing the mailman*) that differed on two dimensions: the ease of naming individual characters and the ease of apprehending the event gist (i.e., encoding the relational structure of the event). To additionally manipulate ease of encoding, speakers described the target events after receiving lexical primes (facilitating naming; Experiment 1) or structural primes (facilitating generation of a linguistic structure; Experiment 2). Both properties of the pictured events and both types of primes influenced the form of target descriptions and the timecourse of formulation: character-specific variables increased the probability of speakers encoding *one* character with priority at the outset of formulation, while the ease of encoding event gist and of generating a syntactic structure increased the likelihood of early encoding of information about *both* characters. The results show that formulation is flexible and highlight some of the conditions under which speakers might employ different planning strategies.

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## 1. Introduction

To produce language, speakers must decide what they want to say and how they want to say it – that is, they must formulate a preverbal message and a corresponding utterance. At the sentence level, the formulation process involves several steps. For example, when asked to describe a picture of a dog chasing a mailman, speakers must select referential terms from a range of potentially suitable nouns (e.g., *man* or *mailman* to refer to the patient in this event) and must select one out of a range of suitable syntactic structures (e.g., active, passive, or intransitive constructions). Numerous production studies have shown that the availability of lexical and structural information can influence selection processes as well as production speed (e.g., Bock, 1986a, 1986b; Smith & Wheeldon, 2001). Questions about the relative contributions of words and structures to grammatical encoding have inspired a number of hypotheses about interactions between these processes (Bock, 1982; Bock & Griffin, 2000; Hartsuiker, Bernolet, Schoonbaert, Speybroeck, & Vanderelst, 2008; Pickering & Branigan, 1998) and have led to the development of detailed production models (e.g., Chang, Dell, & Bock, 2006; Kempen & Hoenkamp, 1987).

Differences between models reflect different assumptions about the division of labor between lexical and structural processes in the shaping of sentence form (Bock, 1987a). On the one hand, lexicalist accounts propose that structure building has a lexical source (e.g., Bates & MacWhinney, 1982): retrieving a word provides access to structural information stored with this word at the lemma level and thus triggers the assembly of a syntactic structure. On the other hand, abstract structural accounts posit that structures can also be built by lexically-independent structural procedures (Bock, 1986a): when preparing their utterances, speakers may first generate an abstract structural framework and then retrieve the necessary words in the order required by these structures. Experimental work testing these accounts is found in the production (Bock, 1986a, 1986b, and others) as well as acquisition (Fisher, 2002; Tomasello, 2000) literature.

Here we take the position that debates about the relative timing of lexical and structural encoding are also important for explaining how speakers formulate and map preverbal messages onto language. Namely, production processes can be divided into two large classes, one concerned with encoding of individual elements of a message (*non-relational* processes) and the other concerned with encoding the relationships between them (*relational* processes). The distinction applies both to sentence-level and message-level encoding. At the sentence level, non-relational and relational information is carried by words and structures respectively; at the message level, these processes refer to identification of characters participating in an event (a dog, a mailman) and to encoding of the who-did-what-to-whom, relational structure of the event (one character chasing the other character). Since some combination of non-relational and relational processing at the message level and at the sentence level is necessary to produce any utterance longer than one word, the coordination of these processes is important for explaining information flow in the production system from conceptualization to linearization.

A crucial part of this puzzle is the fact that message-level and sentence-level processes are normally interleaved during production. All psycholinguistic models agree that messages and sentences are built incrementally, i.e., that speakers plan what they want to say in small chunks rather than in sentence-sized units (Levelt, 1989; see Wheeldon, 2013, for a review). The high degree of temporal overlap in message-level and sentence-level encoding requires a theory about dependencies between conceptual and linguistic processes. Notably, the two leading accounts of incrementality in sentence production take different views on the way that speakers generate message-level and sentence-level increments. One proposal (*linear* incrementality; Gleitman, January, Nappa, & Trueswell, 2007) assumes that speakers can prepare a sequence of small conceptual and linguistic increments without guidance from a higher-level framework. The other proposal (*hierarchical* incrementality; Bock, Irwin, & Davidson, 2004; Bock, Irwin, Davidson, & Levelt, 2003) assumes that formulation can instead begin with encoding of the gist of an event and with generation of a conceptual framework to guide subsequent linguistic encoding. The difference between these proposals lies in different assumptions about the way that non-relational and relational information are combined during early formulation, much the same way that production models differ in the extent to which they give either words or structures priority during grammatical encoding.

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