



Event structure influences language production: Evidence from structural priming in motion event description

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ABSTRACT

This priming study investigates the role of conceptual structure during language production, probing whether English speakers are sensitive to the structure of the event encoded by a prime sentence. In two experiments, participants read prime sentences aloud before describing motion events. Primes differed in (1) syntactic frame, (2) degree of lexical and conceptual overlap with target events, and (3) distribution of event components within frames. Results demonstrate that conceptual overlap between primes and targets led to priming of (a) the information that speakers chose to include in their descriptions of target events, (b) the way that information was mapped to linguistic elements, and (c) the syntactic structures that were built to communicate that information. When there was no conceptual overlap between primes and targets, priming was not successful. We conclude that conceptual structure is a level of representation activated during priming, and that it has implications for both Message Planning and Linguistic Formulation.

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Introduction

During the process of language production, the message that a speaker wants to convey passes through several distinct levels of linguistic representation before it is realized as an utterance (e.g., Bock & Levelt, 1994; Levelt, 1989; Levelt, Roelofs, & Meyer, 1999). At each level, speakers make rapid, often implicit decisions about how elements from a conceptual representation of their message—the idea they want to convey—map onto linguistic representation. At the level of Message Planning, sometimes called “Conceptualization” because it interfaces with conceptual representations (Levelt, 1989), the content of the utterance is determined. Here speakers select both the information they will communicate and the perspective from which they want to present that information, and arrange these semantic elements in some linear order. At the level of

Linguistic Formulation, the form of the utterance is determined as speakers select lexical items, assemble them into syntactic constituents, and engage in phonological and articulatory encoding.

The process of language production is subject to various linguistic constraints and language-specific biases that may influence both the content of an utterance and the form that the utterance takes. The way that a speaker resolves choices during both Message Planning and Linguistic Formulation is affected, in part, by the speaker’s competing goals of informativeness and processing efficiency (e.g., Grice, 1975; Qian & Jaeger, 2011). Speakers may, for example, under-specify certain details of a conceptual representation in a related utterance to reduce formulation costs (Smith, 2000), for instance, omitting information about one or more components of a complex event. Linguistic Formulation may also be guided by a desire to emphasize different parts of a message, with the effect that different formulation choices may result in utterances that convey roughly the same information but that differ in their pragmatic implications (e.g., Smith, 2000; Talmy, 2000).

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In addition to these higher-level influences, the form of an utterance may be shaped by the emerging linguistic representation itself. The choice of a particular verb, for example, imposes both syntactic (e.g., Levelt, 1992; Levin, 1993; Melinger & Dobel, 2005; Pinker, 1989) and semantic (e.g., Medina, 2007; Merlo & Stevenson, 2001; Pinker, 1989; Resnik, 1996; Scott & Fisher, 2009) constraints on the rest of the utterance, determining both the number of argument positions available in the grammatical structure and the semantic features of the elements that may be chosen to occupy those positions. Moreover, language-specific grammatical encoding biases may lead to systematized differences in the way that conceptual representations are mined for linguistic purposes (e.g., Bock, 1995; Levelt, 1989; Slobin, 1996, 2003). Slobin (1996) refers to this process as “thinking for speaking,” arguing that a speaker’s experience with the way his/her native language tends to encode various conceptual elements may affect the way that early decisions about Message Planning are made.

Very little research has targeted the Message Planning stage of language production, either in terms of how information is selected for inclusion in a message, how the structure of a conceptual representation shapes the utterances that may be formulated to convey it, or what the downstream implications of Message Planning are for later levels of linguistic processing (though see, e.g., Bock, Irwin, Davidson, & Levelt, 2003; Gleitman, January, Nappa, & Trueswell, 2007). The current study was designed to probe the way that this level of representation comes into play during language production. In particular, we are interested in the way that speakers take the conceptual structure of an event into account as they formulate an utterance to describe it.

Event conceptualization and description

When encoding information about the complex and continuous activity occurring in the environment, the human mind creates structured representations of events that capture abstract spatial, temporal, and causal information about the world. The conceptual representation of a given event includes information about the entities that participate in the event, certain characteristics of those entities, and the relations among them. The relations between event participants are defined in terms of conceptual/semantic features (e.g., motion, contact, causation, transfer) that facilitate generalization, allowing events to be grouped into classes on the basis of their *event structure*—that is, a schematic of the types of participants in an event (e.g., agent, causer, recipient) and the types of relations that hold among them (e.g., Jackendoff, 1990; Pinker, 1989; Rappaport Hovav & Levin, 1998; Talmy, 1985a, 2000). Examples of event classes include *motion events*, in which an event participant undergoes a change in location by moving in some particular way (e.g., events of walking, driving, or entering), *causative events*, in which an event participant performs some activity that causally affects another (e.g., events of externally caused breaking, opening, or soaking), and *transfer events*, in which an event participant experiences a change in location or possession

between two other participants (e.g., events of sending, giving, or donating).

There is robust evidence that abstract event representations have implications for language, since the meanings assigned to linguistic expressions that encode events (mostly, but not exclusively, verbs) are tied very closely to the underlying conceptual representations of events (Jackendoff, 1990; Levin & Rappaport Hovav, 1995; Pinker, 1989; Talmy, 2000). Here we ask whether and how the class of event that a speaker is describing during language production influences Message Planning and Linguistic Formulation. We focus on motion events, a relatively well-studied class of events in the linguistic and psycholinguistic literature (e.g., Allen et al., 2007; Naigles, Eisenberg, Kako, Highter, & McGraw, 1998; Papafragou, Hulbert, & Trueswell, 2008; Papafragou, Massey, & Gleitman, 2002; Slobin, 1996, 2003; Talmy, 1985b, 2000).

Following Talmy (1985b, 2000), we define a motion event as one in which a Figure experiences a change in location with respect to some Ground object. The details of a motion event may be elaborated by optionally specifying the Manner in which the Figure moves (e.g., bounce, drive) or the trajectory, or Path, that the Figure takes in relation to the Ground object (e.g., circle, enter, down). When describing a motion event, speakers may make choices about which of these event components they want to mention and how they want to package information about those components in the sentence they produce. Imagine, for example, an event in which an alien drives a car into the mouth of a cave, as depicted in Fig. 1.

Some examples of possible descriptions of this motion event in English are given in (1): note that information provided about both the manner (drive) and the path (enter, into) of motion may be encoded in a variety of different structural positions, if these components are mentioned at all.

- (1) a. The alien drove.
- b. The alien drove into the cave.
- c. The alien entered the cave.
- d. The alien entered the cave, driving.
- e. The driving alien entered the cave.

English speakers usually prefer to use sentences like (1a) and (1b) when describing motion events, with information about manner of motion encoded early in the sentence (usually in the verb) and path information mentioned later (usually in a post-verbal prepositional phrase) or not at all. However, this is a language-specific bias, not a requirement of English, and different languages demonstrate different biases for motion event encoding (Talmy, 1985b).

The description of motion events illustrates the range of decisions faced by speakers during language production. At the level of Message Planning, speakers need to select which conceptual components (e.g., manner, path, among others) of a motion event to include in their description. Speakers also need to make a choice at the interface of Message Planning and Linguistic Formulation about how to order motion information (e.g., manner or path first?) and what kinds of grammatical elements to encode that

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