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The production of coerced expressions: Evidence from priming

Claudine N. Raffray^a, Martin J. Pickering^a, Zhenguang G. Cai^b, Holly P. Branigan^{a,*}^a Department of Psychology, University of Edinburgh, United Kingdom^b School of Psychology, University of Plymouth, United Kingdom

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ABSTRACT

We report four structural priming experiments investigating the syntactic and semantic processes involved in producing coerced and full-form sentences (e.g., *The bricklayer began the wall* vs. *The bricklayer began building the wall*). Experiments 1 and 2 demonstrated priming for syntactic structure across sentences that involved the same coercing verb (e.g., *began*). Experiment 1 (and the combined analysis of Experiments 1 and 2) further demonstrated priming for semantic structure when syntactic structure was controlled. Experiment 3 demonstrated repetition of coerced sentences when prime and target used the same coercing verb but not different coercing verbs. Experiment 4 demonstrated repetition of coerced sentences both when the prime and target involved the same (lexically unrealized) coerced action (e.g., *building*) and when they did not, although repetition was stronger when they did. We argue that speakers use distinct mappings from semantic to syntactic structure when producing coerced and full-form sentences, and propose an account of how a model of language production might incorporate these mappings.

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Introduction

When producing an utterance, the speaker needs to make a series of decisions about how to express a message (e.g., [Levett, 1989](#)). In this paper, we are concerned with one such decision, by which a speaker chooses between a more explicit grammatical form (e.g., *The bricklayer began building the wall*) and a less explicit grammatical form that can express the same meaning (e.g., *The bricklayer began the wall*). We consider how the speaker chooses between such alternatives, and use this to investigate the way in which conceptual structures are mapped onto grammatical forms during sentence production.

A frequently cited psycholinguistic model of language production comprises three levels: conceptualization, formulation and articulation ([Bock & Levett, 1994](#); [Dell, 1986](#); [Levett, 1989](#)). During conceptualization, the message

to be expressed is determined. During a subsequent stage of formulation, concepts in the pre-verbal message trigger the retrieval of appropriate lexical entries and their associated syntactic privileges. This information determines the possible syntactic realizations of the ensuing sentence, which then undergoes phonological encoding. Finally, articulation of the relevant output forms takes place.

Most research on how speakers make choices during language production has been concerned with how the speaker decides which word to use or which syntactic construction to use (e.g., [Bock & Levett, 1994](#); [Levett, Roelofs, & Meyer, 1999](#)). For example, many studies have examined how speakers tend to repeatedly make the same syntactic choices, and how this tendency is affected by the repetition of particular words (e.g., [Bock, 1986](#); [Pickering & Branigan, 1998](#)). Such research helps determine how speakers integrate lexical and syntactic information during the processes of grammatical formulation that are assumed to take place before the speaker produces an utterance.

But language production also involves a set of choices about whether to produce an utterance that makes all aspects of meaning explicit or whether to leave out certain

* Corresponding author. Address: Department of Psychology, University of Edinburgh, 7 George Square, Edinburgh EH8 9JZ, United Kingdom. Fax: +44 131 650 3461.

E-mail address: Holly.Branigan@ed.ac.uk (H.P. Branigan).

components of content that can be inferred from some part of the context. For example, responses to questions (e.g., *What time do you close?*) can be full (*We close at nine*) or elliptical (*At nine*; e.g., Clark, 1979). Similarly, referring expressions can be more or less detailed. For example, when speakers refer to an object that they have already successfully referred to, they can choose to produce a detailed referring expression (e.g., *looks like a person who's ice-skating, except they're sticking two arms out in front*), or – more often – choose a shorter but less detailed alternative (e.g., *the ice-skater*; Clark & Wilkes-Gibbs, 1986; Krauss & Weinheimer, 1964). Presumably in such cases the speaker must assess the relative benefits of brevity and intelligibility (and evidence suggests that they often err on the side of caution; Engelhardt, Bailey, & Ferreira, 2006).

On other occasions, the speaker makes a quite specific choice between a more and a less explicit grammatical form. For example, verbs such as *begin* or *finish* can take a complement specifying an event. That event can be expressed by a verb phrase containing a verb and a noun relating to an entity, as in (1a). But it is also sometimes possible to omit the verb, as in (1b).

- 1a. The bricklayer began building the wall.
- 1b. The bricklayer began the wall.

In fact, sentence (1b) is ambiguous; *began the wall* can mean began building the wall, began painting the wall, or even began photographing the wall or began climbing the wall. This is because the meaning of the complement of verbs such as *begin*, *finish*, and *enjoy* depends on both the meaning of the verb and the meaning of the noun phrase. In addition, interpretation of the verb phrase can be affected by the sentence subject (Lapata, Keller, & Scheepers, 2003): *The bricklayer began the wall* is likely to mean the bricklayer began building the wall, but *The decorator began the wall* is likely to mean the decorator began painting the wall, since (typically) bricklayers build walls and decorators paint them.

More formally, work in lexical semantics (e.g., Briscoe, Copestake, & Boguraev, 1990; Copestake, 2001; Copestake & Briscoe, 1995; Pustejovsky, 1991, 1995) seeks to account for the systematic flexibility of meaning illustrated above. In grammatical terms, the class of *begin* verbs is of a particular *semantic type* that requires a complement denoting an event. If the complement refers to an event, the meaning of the verb and the meaning of the complement can be combined directly, via normal composition. This is the case in (1a), where *building the wall* refers to an event. It is also the case in (1c), because *the construction* (although a noun phrase) also refers to an event:

- 1c. The bricklayer began the construction.

But if the sentence contains a complement that normally denotes an entity (and is therefore of a different semantic type), as in (1b), standard composition is not possible. Instead, it is necessary to make use of *enriched composition* (Jackendoff, 1997), by applying a rule that allows certain normally entity-denoting complements to denote

events. Enriched composition generates the additional semantic material needed to interpret expressions containing a semantic type-mismatch, specifically where an event-selecting verb is combined with an entity-denoting object. The rule that allows this change from an entity to an event is known as *type-shifting* (because entities and events are different semantic types; Pustejovsky, 1991, 1995) or *coercion* (because a complement that refers to an entity is coerced into referring to an event; McElree, Traxler, Pickering, Seely, & Jackendoff, 2001). So the sentences in (1) differ in two respects. Syntactically, (1b) and (1c) involve a noun-phrase argument, whereas (1a) involves a verb-phrase argument. Semantically, (1b) involves enriched composition between a verb seeking an event-denoting complement (i.e., of semantic type Predicate/Event, where the element before the “/” denotes the result of composition between the verb and the element following the “/”) and a complement denoting an entity (i.e., of type Entity), whereas (1a) and (1c) involve standard composition between a verb seeking an event-denoting complement and a complement denoting an event (i.e., of type Event/Entity).

Why can (1b) mean *began building the wall*, *began painting the wall*, or other things? According to Pustejovsky's (1991, 1995) framework for lexical knowledge representation, lexical information is augmented with generative operations that guide the composition of sentence meaning in context. One of these levels, *qualia* structure, specifies the conceptual features associated with a noun in much the same way that argument structure does for a verb. Thus, *qualia* representations contain information about a noun's purpose (its *telic* role) and how it came into existence (its *agentive* role). Typically, coercion involves combining the meaning of the *coercing verb* (here, *began*) with aspects of the noun's *qualia* representation. However, it is also possible for *began the wall* to mean something not associated with the noun's *qualia* representation, at least given an appropriate context. For example, *the goat began the wall* might mean it began eating the wall, even though eating is not part of the *qualia* representation for *wall*. In general, the precise range of meanings available is not fully understood (see Lascarides & Copestake, 1998).

How might such linguistic proposals relate to cognitive mechanisms of language processing? There is strong evidence that language comprehension involves mappings between syntactic and semantic representations that are consistent with enriched composition. Most notably, eye-tracking and self-paced reading studies show that readers have more difficulty with sentences involving enriched composition than sentences that do not (Frisson & McElree, 2008; McElree, Traxler, Pickering, Seely, & Jackendoff, 2001; McElree, Frisson, & Pickering, 2006; Pickering, McElree, & Traxler, 2005; Traxler, Pickering, & McElree, 2002; Traxler, McElree, Williams, & Pickering, 2005). For example, readers have more difficulty with *book* or words immediately following *book* in a sentence starting *The author began the book* than in *The author wrote the book*, *The author began writing the book*, *The author saw the book*, or *The author began the lecture* (see also McElree, Pykkänen, Pickering, & Traxler, 2006; Scheepers, Keller, & Lapata, 2008). Experiments using magnetoencephalography suggest

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