How do people produce ungrammatical utterances?

Iva Ivanova [a,b,*], Martin J. Pickering [c], Janet F. McLean [c], Albert Costa [b,d], Holly P. Branigan [c]

[a] Departament de Psicologia Bàsica, Universitat de Barcelona, Spain
[b] Departament de Tecnologies de la Informació i les Comunicacions, Universitat Pompeu Fabra, Spain
[c] Department of Psychology, University of Edinburgh, UK
[d] Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain

ABSTRACT

We investigate whether people might come to produce utterances that they regard as ungrammatical by examining the production of ungrammatical verb-construction combinations (e.g., *The dancer donates the soldier the apple*) after exposure to both grammatical and ungrammatical sentences. We contrast two accounts of how such production might take place: an abstract structural persistence account, according to which it is caused by increased activation of an abstract structural rule; and a lexically-driven persistence account, according to which it requires previous exposure to the same (ungrammatical) verb-construction combination. In four structural priming experiments, we found that sentences with ungrammatical verb-construction combinations were produced only after exposure to similar ungrammatical exemplars containing the same verb, but not after such sentences with a different verb, or grammatical sentences with the same construction. These results indicate that people can produce sentences with ungrammatical verb-construction combinations after brief exposure to related sentences, and provide support for the lexically-driven persistence account of such production.

© 2012 Elsevier Inc. All rights reserved.

Introduction

The language we produce every day is far less orderly, error-free or grammatical than we might think. Although perhaps only the Rev. W.A. Spooner would have ridden well-boiled icicles, sewn people to sheets, or inquired after the dizzy bean, adult native speakers of a language could sometimes claim in spontaneous speech that a millionaire *donated the charity a new building*, even though they would normally consider such a sentence as ungrammatical. Although there are many reasons why speakers might produce such ungrammatical utterances, one possibility is that they can reflect persistence of syntactic structure from previous linguistic exposure. In this paper, we study whether, and what kinds of (brief) exposure can trigger the production of ungrammatical utterances, and we contrast two accounts of how such production might take place.

Some evidence that speakers may persist in producing ungrammatical utterances after comprehending such utterances comes from anecdotal reports of native speakers using their language ungrammatically as a result of hearing it spoken ungrammatically by non-native speakers. In comprehension, a number of studies have demonstrated processing facilitation or increased acceptability of ungrammatical sentences after brief exposure to similar exemplars. For example, Kaschak and Glenberg (2004) observed that reading times for a construction that is ungrammatical in standard English (the *needs*-construction, as in *The meal needs cooked*) decreased with consecutive presentations. These results generalized across modalities (spoken to written language) and to different verbs (Kaschak & Glenberg, 2004) and sentential contexts (Kaschak, 2006). Furthermore, Luka and Barsalou (2005) showed that grammaticality ratings for moderately

* Corresponding author. Address: 9500 Gilman Drive, 0948, Department of Psychiatry, University of California, San Diego, La Jolla, CA 92093-0948, USA. Fax: +1 858 246 1284.
E-mail address: iva.m.ivanova@gmail.com (I. Ivanova).

ungrammatical sentences (e.g., *Armanda carried Fernando the package* or *Rachel needs to get a tattoo as colourful as Bob has*) were higher for those participants who had read them previously than for those who saw them for the first time. This effect was induced by as little as a single presentation and was also obtained for sentences which shared only structure and no content words with those presented during initial exposure. In all, these findings suggest that ungrammatical sentences are processed, and yield persistent effects in the linguistic system, even after people are only briefly exposed to them. They also imply that such persistence occurs independently of lexical content and generalizes across sentence contexts.[1]

In this paper, we are concerned with sentences in which the ungrammaticality arises from the particular combination of the verb and the construction (as in *The dancer donates the soldier the apple*). A process by which people can come to produce such sentences after exposure (that is, can generalize from comprehension to production) is structural priming. Structural priming (in production) refers to the observation that speakers tend to repeat a syntactic structure they have experienced, in the presence of alternatives. For example, Bock (1986) showed that participants tended to describe target pictures using the same structure (e.g., a prepositional object dative) that they had used in repeating a previously encountered prime sentence (such as *The rock star sold some cocaine to an undercover agent*). Structural priming is very widespread, occurring with different constructions (Branigan, Pickering, McLean, & Stewart, 2006; Cleland & Pickering, 2003; Ferreira, 2003; Griffin & Weinstein-Tull, 2003; Hartsuiker & Westenberg, 2000), in different languages (e.g., Bock, 1986; Cai, Pickering, Yan, & Branigan, 2011; Hartsuiker & Kolk, 1998; Scheepers, 2003), in corpora as well as in experiments (Gries, 2005; Szmrecsanyi, 2005), and from anomalous as well as well-formed prime sentences (Ivanova, Pickering, Branigan, McLean, & Costa, 2012). It does not depend on lexical repetition (suggesting that the effect has an abstract nature) but is enhanced by such repetition (the so called *lexical boost* effect: Cleland & Pickering, 2003; Hartsuiker, Bernolet, Schoonbaert, Speybroeck, & Vanderelst, 2008; Pickering & Branigan, 1998). In addition, structural priming occurs in language comprehension, for example in relation to the resolution of ambiguity (e.g., Branigan, Pickering, & McLean, 2005).

Importantly, priming occurs between comprehension and production. For example, Levelt and Kelter (1982) found that participants' answers tended to use the same structure as the questions, and Potter and Lombardi (1998) demonstrated that the structure of recalled sentences was influenced both by comprehended and produced primes (see also Bock, Dell, Chang, & Onishi, 2007; Branigan, Pickering, & Cleland, 2000; Cleland & Pickering, 2003; Hartsuiker, Pickering, & Veltkamp, 2004; Hartsuiker et al., 2008).

Two mechanisms have been proposed to explain structural priming, and are consistent with the production of ungrammatical verb-construction combinations as a result of structural persistence from previously comprehended sentences. According to Chang, Dell, and Bock (2006), when speakers process a given message with a given structure, the mappings between the message and the structure are strengthened and the linguistic system becomes more prone to expressing similar messages with the same structure. Alternatively, according to Pickering and Branigan (1998), structural priming is due to the increased activation of nodes representing constructions that are linked to respective lemma nodes, so that encountering a verb as part of a particular construction leads to activation of both the verb node and the construction node. In this model, the production of sentences with ungrammatical verb-construction combinations can be caused by the (temporary) establishment of new construction nodes (for constructions that have not been experienced before), or the establishment of new links between existing nodes (when a speaker knows a verb and a construction, but does not currently use that verb with that construction).

In all, various empirical and theoretical sources suggest that, in principle, adults can come to produce sentences with ungrammatical verb-construction combinations on the basis of brief prior exposure. But such a tendency might be detrimental for communication if speakers were influenced by any ungrammatical utterance they encounter, as in the speech of one or two people with an imperfect grasp of the language. So our first goal in the present study was to determine whether people can come to produce ungrammatical sentences within a single experimental session, which we assume is roughly analogous to a conversation.

Importantly, we focus on the production of ungrammatical verb-construction combinations – that is, on argument structure which is ungrammatical with respect to the verb in the sentence (e.g., *The dancer donates the soldier the apple*). Argument structure (specifications of the number and type of syntactic constituents obligatorily or optionally occurring with a verb in a sentence) is interesting because it relates to the interface between lexical properties and syntactic structure. The role of lexically-specific syntactic information versus. abstract syntactic structure in language production is currently debated (see Konopka & Bock, 2009). By studying whether people come to produce sentences involving ungrammatical verb-construction combinations (that is, argument structure that is ungrammatical in relation to the verb), we may shed light on the ways in which lexical restrictions and abstract syntactic structure might be implicated in language production. That is, we will see whether or not the influence of previously experienced abstract syntactic structure is sufficiently strong to override lexical constraints.

We envisage two accounts of how structural persistence from prior exposure can lead to the production of sentences with ungrammatical verb-construction combinations. On one account, which we term here the *abstract structural persistence* account, speakers come to produce

---

[1] Additionally, Snyder (2000) observed that people found some ungrammatical sentences (e.g., *Who does Mary think that likes John?*) more acceptable after they had repeatedly judged their acceptability, a phenomenon known as *syntactic satiation*. However, acceptability did not increase for some other sentence types. In addition, Snyder's study has been criticized for its unreplicability and for introducing biases in the experimental paradigm (Sprouse, 2009).