

Cross-linguistic priming of syntactic hierarchical configuration information

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Abstract

An important psycholinguistic discussion centers on the question of whether bilinguals use the same representations and mechanisms for the languages they speak (the interactive view) or whether the representations and mechanisms for each language are kept strictly separated (the modular view). Empirical investigations of this question have focused on the lexical level of language processing, either by looking at activation of word-level information or at activation of syntactic information that is closely tied to lexical entries. In three experiments, we looked at the priming of syntactic information that is unrelated to lexical entries, namely relative clause attachments. For example, in a sentence like “Someone shot the servant of the actress who was on the balcony” the relative clause can be attached to two possible noun phrases, “the servant” or “the actress.” This type of attachment is syntactic because it cannot be represented by lexical subcategorization frames (relative clauses are modifiers) or by lexically related combinatorial nodes (both interpretations have the same NP+RC structure). We found that relative clause attachments can be primed from Dutch to English in Dutch–English bilinguals. This is the first demonstration of cross-linguistic priming of syntactic information that is not directly linked to lexical entries and favors the interactive view of bilingual syntactic processing.

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Introduction

An intriguing question in psycholinguistics is whether bilinguals make use of the same representations and mechanisms for processing the different languages that they know or whether they make use of separate representations and mechanisms for each of their languages. In the last decade, this question has received a lot of attention from psycholinguists interested in the lexical level of language processing. This research has largely

been driven by two opposing theoretical views on bilingual word processing. According to the first—the language-selective or modular view—both languages of a proficient bilingual are processed independent of each other (e.g., Kroll & Stewart, 1994). According to the other view—the non-selective-language or interactive view—the lexical representations of both languages strongly interact with each other during word processing (e.g., van Heuven, Dijkstra, & Grainger, 1998). The question of modular versus interactive processing of lexical representations in bilinguals has led to a large number of influential empirical and theoretical studies (e.g., Alvarez, Holcomb, & Grainger, 2003; Bloem & La Heij, 2003; Costa, Caramazza, & Sebastian-Galles, 2000;

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Costa, Miozzo, & Caramazza, 1999; Francis, Augustini, & Saenz, 2003; Gollan, Forster, & Frost, 1997; Grainger & Frenck-Mestre, 1998; Jiang & Forster, 2001; Jiang, 2000; Scheutz & Eberhard, 2004; Sebastian-Galles, Echeverria, & Bosch, 2005, among many others).

In contrast to the abundance of studies on language (non-)selectivity in lexical processing, researchers interested in the syntactic level of language processing have been less active in investigating bilinguals' organization of linguistic knowledge. The same theoretical question can be asked about syntactic processing. On the one hand, bilinguals may take advantage of the existence of similar syntactic structures in the languages they know (e.g., Chomsky, 1981; Greenberg, 1966; Hawkins, 1988) by representing these syntactic structures only once or by representing them in a highly integrated way. On the other hand, it could be argued that there are so many syntactic differences between any two languages and that activating representations related to one language while processing another language is so resource demanding that it might be more parsimonious for bilinguals to keep the syntactic representations of their languages strictly separated. Following Hartsuiker, Pickering, and Veltkamp (2004), we shall refer to these two possibilities as, respectively, the shared-syntax account (which corresponds to the non-selective-language view in the bilingual lexical processing literature) and the separate-syntax account (which corresponds to the language-selective view in the bilingual lexical processing literature).

One plausible reason for why the question of language specificity in bilingual language processing has received less attention in syntactic processing than in lexical processing is that it has proven difficult to design methods that allow researchers to directly investigate the activation of syntactic structures and, consequently, even harder to find methods to study how the activation of a syntactic structure in one language might help or interfere with the activation of a syntactic structure in another language. Note that the situation for bilingual lexical processing is somewhat different because there were many early demonstrations that lexical characteristics can be primed (e.g., Meyer & Schvaneveldt, 1971) and it was relatively easy to adapt these priming paradigms to bilingual contexts. The situation for syntactic processing changed when it was shown—much later than in lexical processing—that syntactic structures can also be primed (Bock, 1986, 1989; Bock & Loebell, 1990). The syntactic priming effect is the observation that people are more likely to use a syntactic structure when the same syntactic structure was used in a preceding sentence compared to when a different syntactic structure was used in a preceding sentence. Bock (1986) observed this effect in a picture-description task, in which participants were asked to describe pictures after repeating prime sentences, which were conceptually unrelated and only shared the structural information with the target sentences.

For instance, she found that participants were more likely to describe the picture in a passive voice (e.g., “The building manager was mugged by a gang of teenagers”) when they had just repeated a prime containing a passive syntactic structure (e.g., “The referee was punched by one of the fans”) than when they had just repeated a prime containing an active syntactic structure (e.g., “One of the fans punched the referee”).

The syntactic priming phenomenon has not only been demonstrated with active versus passive sentences but has been found in a variety of grammatical structures. In fact, the most frequently used syntactic structure in syntactic priming studies involves two alternative dative constructions (e.g., Bock, 1986, 1989; Bock & Loebell, 1990; Branigan, Pickering, & Cleland, 1999, 2000; Corley & Scheepers, 2002; Pickering & Branigan, 1998; Pickering, Branigan, & McLean, 2002; Potter & Lombardi, 1998; Schoonbaert, Hartsuiker, & Pickering, submitted). For instance, when the prime consists of a double-object construction, like the sentence “A rock star sold an undercover agent some cocaine,” participants are more likely to describe a picture using a sentence with a similar structure as the prime, like “The girl handed the man the paintbrush” than in trials where the prime had the structure of a prepositional-object construction, like the sentence “A rock star sold some cocaine to an undercover agent.”

Syntactic priming is a promising tool to study the question of whether syntax is shared or separate in bilinguals. If bilinguals represent the syntax of both languages separately, as is argued by the modular view, the activation of a syntactic structure in one language should have no influence on the activation of a similar syntactic structure in the other language. On the other hand, if bilinguals have a highly integrated representation of the syntax of both languages, it should be possible to find that the activation of a structure in one language primes the activation of a corresponding structure in the other language. There are only two published studies that have used syntactic priming in online processing in a bilingual context, namely Loebell and Bock (2003) and Hartsuiker et al. (2004).

Loebell and Bock (2003) had fluent German–English bilinguals repeat a sentence in either their first (German) or their second (English) language and describe a picture of an unrelated event in the other language. The prime constructions they used were dative (double-object and prepositional-object sentences) and transitive structures (passive and active sentences). After being primed with a prepositional-object construction, participants described the picture more frequently with a prepositional-object construction. The same results were found with the double-object construction and with active sentences. The passive primes showed no syntactic priming. However, according to Loebell and Bock (2003) this may have been due to the fact that the structures differed

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