

Cross-linguistic priming in bilinguals: Multidisciplinary perspectives on language processing, acquisition, and change

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This special issue deals with cross-linguistic priming in bilinguals, and consists of six contributions, which were all presented during the workshop on cross-linguistic priming in bilinguals at Radboud University Nijmegen (NL) in September 2013 (<http://crosslingprimingconf2013.wordpress.com>).

Priming is the influence of recent experience with language on current processing of language. For example, when language users have just heard a sentence with a specific syntactic structure, they have a tendency to re-use that syntactic structure in subsequent utterances (i.e., structural priming; see e.g., Pickering & Ferreira, 2008, for a review; see the JML special issue on New Approaches to Structural Priming [Dell & Ferreira, 2016], for recent insights). Priming plays an important role in the psycholinguistic and sociolinguistic literature. Not only is it used in experiments to gain insight into the representational nature of language comprehension and production (Bock, 1986, 1996; Garrod, 2006; Pickering & Branigan, 1999); it is also proposed as a factor that facilitates fluency of language production (Ferreira & Bock, 2006; MacDonald, 2013; Schober, 2006), that contributes to implicit language learning and predictive language processing (Chang, Dell & Bock, 2006; Dell & Chang, 2014), and that guides linguistic choices in spontaneous language use between conversation partners in social interaction (e.g., Bresnan, Cueni, Nikitina & Baayen, 2007; Pickering & Garrod, 2004; Schenkein, 1980; Weiner & Labov, 1983). Thus, priming is a multifaceted phenomenon firmly grounded in cognition and social interaction.

Priming also plays a central role in bilingual language use. Cross-linguistic priming, i.e., the influence of recent exposure to one language on language processing in another language, has been investigated in many laboratory studies on language processing in bilinguals (e.g., Basnight-Brown & Altarriba, 2007; Bernolet,

Hartsuiker & Pickering, 2012; Jiang, 1999; Hartsuiker, Pickering & Veltkamp, 2004; Loebell & Bock, 2003; Zhao & Li, 2013). The underlying idea here is that if priming takes place across languages, this is evidence of cross-language activation. By investigating the processing levels at which cross-linguistic priming can take place, more information is gained on the different processing levels at which cross-language activation can take place, and thus on the interactivity of the bilingual processing system in general, a central theme in the psycholinguistic study of bilingualism. Thus, for example, findings of cross-language structural priming have indicated that cross-language activation can take place at the syntactic level of processing, which has informed the development of models on cross-language interactions in bilingual language use beyond the single-word level (see e.g., Hartsuiker & Pickering, 2008, for more information).

In addition to serving as a laboratory measure of cross-language activation, cross-linguistic priming is also a real-life process that can be related to many results of language contact, such as cross-linguistic transfer in second language acquisition (Flett, Branigan & Pickering, 2013; Jackson & Ruf, 2016; Nitschke, Kidd & Serratrice, 2010; Nitschke, Serratrice & Kidd, 2014), code-switching (Kootstra, van Hell & Dijkstra, 2010; 2012; Fricke & Kootstra, 2016), and contact-induced language change (Loebell & Bock, 2003; Torres Cacoullos & Travis, 2011, 2015). This not only provides ecological validity to experimental studies, but also indicates that cross-linguistic priming is a key mechanism of bilingual language use with important functions, just as is the case with priming in monolingual language use (Ferreira & Bock, 2006). The study of cross-linguistic priming in both experiments and corpora can thus create a link between issues that are traditionally studied in quite different sub-disciplines of bilingualism research, and often on the basis of different methodological paradigms and beliefs of what

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counts as evidence (cf. Gullberg, Indefrey & Muysken, 2009; Li Wei, 2008; Moyer, 2008).

The goal of this special issue is to create this link. It brings together research on the role of cross-linguistic priming with respect to the cognitive mechanisms of language processing and research on the role of cross-linguistic priming in language variation and change. It provides a multidisciplinary overview of the state of the art of cross-linguistic priming research, in terms of both theoretical issues and methodological approaches, and it presents novel findings on the role of cross-linguistic priming with respect to various aspects of bilingual language processing, acquisition, and change. This way, we intend to provide a broad and up-to-date impression of the central role and great potential of cross-linguistic priming in bilingualism research.

The issue starts with two review papers (Hartsuiker & Bernolet, 2017; Gries & Kootstra, 2017). Hartsuiker and Bernolet (2017) focus on the experimental literature on structural priming across languages, which has informed an influential model on shared syntactic representations in bilinguals (e.g., Hartsuiker, Pickering & Veltkamp, 2004; Hartsuiker & Pickering, 2008). After a review of literature, Hartsuiker and Bernolet present a re-analysis of data from Schoonbaert, Hartsuiker, and Pickering (2007) to address the question how these shared syntactic representations develop as a function of proficiency. In doing so, they link their model on shared syntactic representations with the idea of priming as a form of implicit learning, in this case syntactic learning. Hartsuiker and Bernolet's model can serve as an important and testable model for future studies on cross-linguistic priming and second language acquisition (see e.g., Jackson & Ruf, 2016).

The second review paper is by Gries and Kootstra (2017), who focus on corpus-based investigations of structural priming in real life. Structural priming in spontaneous language use was long thought to be difficult if not impossible to investigate in an internally valid way, but recent statistical techniques have made it possible to control for the many confounding variables that may influence linguistic choices in real life. Gries and Kootstra provide a selective review of the way corpus-based approaches to structural priming have developed and the kind of questions investigated on the basis of corpora. They end with a discussion of studies on priming in bilingual corpora, showing the potential insights that can be gained from the relatively recent advance in the development of bilingual corpora big enough for the quantitative study of linguistic choices in bilinguals.

The other four papers in this issue present empirical findings on various aspects of priming in bilinguals. Fernández, de Souza, and Carando (2017) bring together two experimental studies on the processing and primed production of contact-induced innovative

language structures in Portuguese–English and Spanish–English bilinguals. They show how bilinguals can become tolerant to innovative structures in their first language on the basis of experience with such structures in their second language (via priming). Based on these results, they develop a preliminary hypothesis that cross-linguistic priming may well serve as a mechanism of contact-induced language change.

Jacob, Katsika, Family, and Allen (2017) present two experiments examining the representational nature of cross-linguistic structural priming. As specified in Hartsuiker et al.'s model (e.g., 2004; see also Hartsuiker and Bernolet, 2017), cross-linguistic structural priming is explained in terms of shared syntactic representations in the bilingual mind. The question is, however, what kind of syntactic 'sharedness' between languages is necessary for priming to take place? Based on a systematic experimental investigation in German–English bilinguals, Jacob et al. argue that not only constituent order but also syntactic level of embedding needs to be shared between sentences for priming to occur – a finding that is explained with reference to hierarchical tree structures. An interesting aspect brought up by Jacob et al. is that syntactic level of embedding does not seem to constrain structural priming in monolingual discourse. Thus, perhaps, structural priming across languages is more constrained than structural priming within languages.

This difference between priming within and across languages is one of the issues explored in the paper by Travis, Torres Cacoullos, and Kidd (2017). They analyzed a corpus of natural speech from Spanish–English bilinguals in New Mexico, focusing on a dependent variable that is different from the syntactic alternations central in 'traditional' priming studies, namely pronominal subject expression, which is optional in Spanish but not in English. They found that priming of the overt expression of the pronominal subject in Spanish occurred both within and across languages, but was weaker and shorter-lived across languages than within languages. They further show that priming effects depend on verb-specific usage patterns and subject continuity of the conversation. Especially this last factor is difficult to investigate in an experimental setting, thus showing the added value of corpus-based investigations of priming. Travis et al. make a convincing case for combining usage-based perspectives on language variation with psycholinguistic modeling.

The final paper is by Carrol and Conklin (2017), who focus on cross-linguistic priming in the processing of idioms in Chinese–English bilinguals. Based on two eye-tracking experiments in which bilinguals read English sentences that contained Chinese idioms (translated in English), they find that idioms modulate reading times, and that figurative meanings of the idioms are processed slower than literal meanings. Thus, this study shows

how formulaic units in one language, which can perhaps be related to usage-based constructions as addressed in Travis et al.'s (2017) paper, can prime language processing strategies in the other language. These findings provide important insights into the workings of the bilingual mental lexicon with respect to multi-word units. The study can also be seen as an example of how priming (in this case, cross-linguistic priming) can lead to linguistic expectations that result in predictive language processing (cf. Dell & Chang, 2014).

All in all, this special issue covers reviews and novel findings on many aspects of cross-linguistic priming, based on both experimental and corpus-based methodologies, on various linguistic structures, and with bilingual speakers of various languages. Cross-linguistic priming can be seen as a beautiful experimental measure of cross-linguistic interaction that, at the same time, shapes linguistic choices in real-life discourse. It provides a unique mirror into the dynamics of bilingual language use, revealing the connection between cognitive mechanisms, learning processes, and communicative forces in spontaneous communication in bilinguals. The study of cross-linguistic priming may thus help in establishing stronger links between research on bilingual language production and comprehension, research on second language acquisition, and research on (contact-induced) language variation and change. We hope this special issue contributes to further establishing these links.

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