

Editorial

Variability and its limits in bilingual language production

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Experimental and other empirical research on language is faced with the fact that language performance exhibits a high degree of variability at all linguistic levels. Variability is found across languages, across speech communities within one language, across individuals within one speech community and even within the same individual. Bilingual language use adds a further source of variability to this already complicated picture. On the other hand, there are aspects of language and language use that are constrained, stable, or robust and that are less (or not at all) subject to variability, for example, possible options that are not chosen in any language or kinds of error that are never produced. Several familiar ways of dealing with the variability of language use and its limits have turned out to be unsatisfactory. One approach has been to simply abstract away from variability with constructs such as the ‘ideal speaker–hearer’ (who – to our knowledge – nobody has met so far). Another strategy is to average across individuals, which sometimes results in arbitrary mean scores or mean activation patterns that are hard to replicate for individuals, even for those who took part in a given study. A third solution when confronted with variability in language use is to take it at face value, positing that every language, every speech community, and even every individual is different, an approach that essentially gives up on discovering any kind of generalizations. While none of these strategies appears to us to be particularly fruitful, the problem of how to deal with variability in language performance and its limits remains.

Our *keynote article* (Goldrick, Putnam & Schwarz, 2016a) offers a promising approach to this problem and applies it to a core phenomenon of bilingual language use: code mixing. Goldrick et al. (2016a) promote a constraint-based approach to grammar (Gradient Symbolic Computation, Smolensky, Goldrick & Mathis, 2014) that provides a formally explicit way of bringing together grammatical constraints (or rules) and graded representations. Their specific test case is doubling constructions, blends, and other kinds of across-language code mixing phenomena in which an element of an intended utterance appears in both of a bilingual’s languages within a single utterance. Goldrick et al. (2016a) account for code mixing in terms of grammatical constraints and graded co-activation of representations from both languages of a bilingual speaker. They conclude that their approach not only provides an account of code

mixing, but more generally offers a framework to integrate the ‘discrete and gradient properties of bilingual linguistic knowledge and processing’.

Twelve commentaries representing different perspectives on code mixing and bilingual language use accompany the keynote article. Most of the commentators praise Goldrick et al. (2016a) as an attempt to develop a formally explicit account of bilingual code mixing. Several commentators have also pointed out limitations of the proposed account and of the data presented in its support. Bhatt (2016) wonders how a bilingual’s so-called portmanteau sentences that have a hybrid structure relative to normal sentences in the two languages are to be dealt with in their account. Muysken (2016) also points to more complex cases of code mixing that require an extension of the apparatus provided by the keynote article. López (2016) calls for more detailed grammatical analyses of the phenomena involved in code mixing. Deuchar and Biberauer (2016) question the significance of the phenomenon that Goldrick et al. (2016a) present, arguing that doubling is extremely rare and is likely simply to be a performance error. Poplack and Torres Cacoullos (2016) also note the scarcity of doublings and question the utility of this particular construction as a showcase for a particular model of code mixing. Similarly, Gullberg and Parafita Couto (2016) confront the keynote authors with data from other more frequent types of code mixing, which they argue are challenging for the GSC account. Hartsuiker (2016) observes that the GSC account is highly flexible, perhaps too flexible to be falsifiable, and that, to be relevant, the currently large number of degrees of freedom in how to account for code mixing and other phenomena needs to be reduced. Green and Wei (2016) note that the proposed account is limited by capturing input output mappings but that it does not explain the mental machinery, the mechanisms of bilingual language control that underlie code mixing and other aspects of bilingual language use. A similar point is made by Sorace (2016), namely that the GSC is a purely linguistic model that does not have much to say about the mechanisms of bilingual language processing. Bobb and Hoshino (2016) call for an extension of Goldrick et al.’s (2016a) account to include a developmental perspective. Other commentators apply the framework laid out in the keynote article to other phenomena of bilingual language performance. Van Hell, Cohen and Grey (2016) demonstrate that the model is

flexible enough to account for variable lexically-specific effects on code mixing, and Veríssimo (2016) applies the model to gradient differences between native and non-native language processing. In their response, Goldrick et al. (2016b) readily admit the current limitations of their proposal and welcome the extensions to other phenomena. What remains as their main contribution is a rather promising attempt at linking different traditions of bilingualism research, formal grammatical investigations and psycholinguistic studies.

We hope our readers will enjoy the keynote article together with the commentaries and the authors' response as well as the interesting regular research articles and research notes presented in the current issue.

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