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Trying to make sense of language synthesis

Gary Morgan

City, University of London

The inclusion of sign/spoken language bilinguals in theoretical arguments concerning language acquisition and language architecture is an interesting endeavour. This small population of bilinguals can provoke several fascinating questions and scenarios for the study of bilingualism and linguistics more generally. Because sign and speech are produced in different modalities we can ask questions about how transfer, interference and linguistic representations work between the visual and oral channels. The authors in this paper exploit a case of sign-speech mixing known in the literature as ‘code-blending’ in order to formulate and test out a model of language representation. This type of code-mixing is unique to the simultaneous use of sign and speech. As signing and speaking use different articulators, it is possible to combine two languages at the same time. By contrast, spoken language bilinguals might be able to speak one language with the accent of another but they cannot say ‘cat’ and ‘gato’ at the same time. Code-blending has been described in both child and adult bilingual signers (CODAS: hearing children of deaf adults) by van den Bogaerde (2000) and Emmorey Borinstein, Thompson and Gollan (2008) previously. More recently this topic has received more attention by the inclusion of sign-speech bilinguals who are deaf children with cochlear implants (Giezen, Baker, & Escudero, 2014). However, most of this work focuses on how the two systems work together at the level of language processing. Previous research from the current authors has followed this line of work by following young children learning a varied set of spoken and signed languages simultaneously. The authors now propose to embed this research data into a model of linguistic competence. This commentary relates to how this keynote paper captures code-mixing individuals and their control of language and gesture.

The main thrust of Lillo-Martin, Müller de Quadros and Chen Pichler (2016) (henceforth LQC) is that data from sign-speech bilinguals and in particular code-blending can be explained in a formal linguistic theory – one which they term ‘the Language Synthesis model’. Furthermore, using a corpus of bilingual-bimodal

data, LQC make an argument that this theory can account for spoken languages bilingual cross-linguistic influence and transfer as well. This approach to using sign language data to refine and strengthen general linguistic theory is the right way to move forward. In this commentary, I would like to raise three issues concerning the blended data, the bilingual population and lastly the role of co-speech gesture.

- (1) The data presented by LQC come from a wider set of studies and so it is entirely possible that more evidence has been published in previous papers, but in the current paper there are not a lot of data presented to evaluate the argument. The children who produce English in sign orders are very young and they might be just producing immature English with non-canonical word orders or morphological omissions because of processing demands etc. As quite little data is presented, it would be useful to know how representative these constructions are within a wider context. LQC's argument would be stronger if the authors made some predictions stemming from their theoretical model and then showed how these would play out in a larger set of data with some statistical frequencies to support the model.
- (2) Deaf signers are bilingual to more or less a degree and it seems that Sign Supported Speech (SSS) input is a very common occurrence in deaf parent and hearing child dyads (van den Bogaerde, 2000). Further, much adult signed communication is accompanied by spoken language mouthings during contact with hearing people. The scenario as presented is that bimodal bilingual children are doing something quite elegant with two separate grammars as a response to two separate inputs. However, what is discounting the possibility that SSS is in fact the only language the children are learning? Instead of children having two grammars which then has led to a blended system, is it possible they have instead only one grammar. What these children use to communicate is spoken English but articulated on the hands? Again more evidence from patterns in the input that can discount this would be welcome.
- (3) There is a large literature on how hearing and speaking children combine speech and gesture systems during language development. In a nutshell, it seems that gesture works with spoken language to bring about 'synthesis' or what McNeill calls 'growth points' in communication (McNeill, 2005). If the linguistic system is able to deal with these two modalities already in development, what is stopping hearing children from putting their sign language into the slot normally filled by gesture? Instead of a co-speech gesture architecture, bimodal-bilinguals have a co-speech signing system. In this latter interpretation of the code blending data (co-speech – signing) what young hearing children are doing is speaking and co-gesturing with conventionalised symbols (lexical signs). In the co-speech gesture literature, these two systems (speech

and gesture) are synthesised but only one of them (the speech) is constrained directly by a grammar, the other (the gesture) mostly follows the patterns of the speech as the matrix language.

In summary, the LQC paper is a welcome direction of research in linguistics and bilingualism especially. In order to strengthen this approach, the simultaneous nature of sign-speech mixing could be clarified more. What data can distinguish between typical errors in acquisition of English and patterns more suggestive of a bilingual separation of grammars? Equally, it is necessary to discount the use of SSS or conventionalised gestures. Further research could also describe later stages of sign-speech synthesis in older children. Why this is relevant is once hearing CODAS go to school they will generally see very little sign language around them. It is not clear if this leads to some stagnated development of their sign language or even attrition of the less used system.

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Author's address

Gary Morgan
 Dept. Of Language and Communication Science
 City, University of London
 Northampton Sq, London, EC1V0HB
 UK
 g.morgan@city.ac.uk