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What sign languages teach us about bilingualism

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There is currently a boom in research on sign languages contributing not only to a better understanding of how sign languages work but also to a variety of theoretical discussions in linguistics. Indeed, sign languages present several specificities that allow researchers to take a fresh look at a number of research questions, old and new alike.

For example, sign languages are generally new languages —most of them with less than 200 years of use— and as such offer a privileged look into language creation which was addressed mainly through the study of Creoles and Pidgins. In particular, the study of homesign languages —created by children who do not have access to *any* input— gives us the rare opportunity to observe the fundamentals of human language (Goldin-Meadow et al. 2014). Sign languages are also of special interest because they rely on the manual modality and therefore offer a window onto cognition, beyond what can be observed through the study of co-speech gesture. Also, bilingualism involving sign languages is another fascinating aspect that has recently been the focus of attention and is discussed in several articles in the present volume.

As summarized in Zeshan and Panda (2015), three lines of research can be identified for bilingualism involving a sign language (see Table 1):

- a) Research on *sign bilingualism*, targeting the study of bilinguals who use in parallel a sign language A and a spoken language B in its written form.
- b) Research on *bimodal bilingualism*, examining the hearing individuals who use a sign language A and a spoken language B.
- c) Research on *sign multilingualism*, considering the bilinguals who use more than one sign languages.

Table 1. Language contact in sign languages

sign bilingualism	bimodal bilingualism	sign multilingualism
sign language A & spoken language B in writing	sign language A & spoken language B	sign language A & sign language C

The articles in this volume focus on two of the above-mentioned types of bilingualism, i.e., bimodal bilingualism and sign multilingualism.

Bimodal bilinguals use in parallel a sign language, which relies on manual and non-manual (facial) signs, and a spoken language. Studies on bimodal bilinguals therefore allow us to observe the *simultaneous* articulation of two languages, a co-articulation which is impossible for spoken languages as they both unfold in the same modality. Interestingly, the sequential use of a sign language and a spoken language, similar to codeswitching observed in spoken languages, is rare. The two ways of language mixing, simultaneously or consequently, therefore seem to largely depend on language modality. According to Emmorey et al. (2008), the fact that bimodal bilinguals prefer using both languages rather than suppress one of them indicates that this inhibition mechanism is associated to high cognitive costs.

Researchers note that the parallel use of a sign language and a spoken language develops naturally among hearing children of deaf parents.¹ Studies show that, despite inter-speaker variation, the spoken language is generally dominant in bimodal bilingual communication (also see Müller de Quadros, Lillo-Martin, and Chen Pichler, this volume). The interpretation of this finding is still under debate with some researchers considering that it is due to the fact that spoken languages are dominant in the broader sociolinguistic context, others suggesting that this preference may be reflecting a more general human preference for spoken language (Lillo-Martin et al. 2014), and others yet indicating that the focus is likely to depend on the communicative setting (Zeshan and Panda 2017 mention that the bimodal individual may adopt different styles depending on her primary and secondary audiences).

Bimodal bilingual communication should be differentiated from what is termed Simultaneous Communication, a form of bimodal communication which is used in formal settings, such as meetings and lectures, and which explicitly targets the parallel use of sign and spoken languages. Bimodal bilinguals, in contrast, do not explicitly aim at the use of the two languages, but this co-articulation arises spontaneously and often becomes the default mode of communication. This clearly indicates that both languages are active for the bimodal bilinguals, thus supporting results from unimodal bilingual studies which indicate that both languages are “on” among bilinguals. Similar to the well-documented capacity of bilinguals to choose the appropriate code since an early age, the present studies also demonstrate that bimodal bilinguals are sensitive to the communicative context and to their interlocutors and can suppress one of the two languages when appropriate.

A widely-used method for the study of bimodal bilingualism is the corpus-based analysis of semi-spontaneous interactions and this is the method that prevails in the studies of this volume. Corpus-driven research of naturalistic communication is a popular method for the study of bilingualism in general although grammaticality judgments and experimental research are equally widespread for spoken languages. However, this does not seem to be the preferred option for the study of sign languages even though some experimental research is being conducted. The privileged use of corpora for the study of bimodal bilingualism might be due to the fact that sign languages are not yet well described, bringing the methodological concerns closer to those that dominate more generally the study of lesser-described languages.

Analysis of a variety of naturalistic corpora, in general and in this volume in particular, indicates that bimodal bilinguals do not *continuously* use jointly the two languages, i.e., the spoken language and the sign language. This may be due to restrictions related to the cognitive load involved in the use of two languages in a single interaction, much like what has been experimentally shown for spoken language alternation. However, I would like to suggest that the systematic use of a sign language and a spoken language in daily communication, as practiced by highly proficient bilinguals, most likely attenuates processing costs as demonstrated in a study involving bilingual speakers that frequently codeswitch in everyday life (Adamou and Shen 2017). Moreover, constant parallel use of the sign and spoken language is attested in Simultaneous Communication among trained individuals who develop this specific skill (see “A community profile of “sign-speakers” at the Indore Deaf Bilingual Academy” this volume), similar to what has been reported for professional interpreters who demonstrate greater cognitive ease with language alternations (Ibáñez, Macizo, and Bajo 2010). Memory and processing limitations could therefore be considered as biases, but not necessarily as the triggering factors for this bilingual behaviour.

Since parallel use of a sign language and a spoken language is partial, the contexts in which such parallel use does occur are of great interest for linguists. For example, while most studies show that there is generally semantic congruence between the sign and the spoken

¹ The French film *La Famille Bélier* (2014) by Eric Lartigau nicely illustrates such bimodal interactions.

language, i.e., same meaning expressed in the signed and spoken components, it appears that structural congruence is not required. Again, when comparing with the literature on codeswitching, recent studies show that although structural congruence is a facilitating factor, it is definitely not a prerequisite for codeswitching (Torres Cacoulios and Travis 2015, Adamou 2016). It is of course widely documented for spoken languages that structural congruence can be obtained through calques and indeed calques are encountered in the bimodal data as well. We present in (1) an example from Müller de Quadros, Lillo-Martin and Chen Pichler (this volume) that illustrates, on the one hand, the semantic congruence of the two languages and, on the other hand, a syntactic calque in a bimodal utterance where the spoken component, here English, follows the word order of the signed component, in this case American Sign Language (ASL).

1. MOTHER WHERE [ASL]
 Mommy where [English]
 ‘Where’s Mommy?’

Müller de Quadros, Lillo-Martin, and Chen Pichler (this volume) suggest that the observed semantic congruence in bimodal bilingual interactions, indicates that bimodal bilinguals form a single proposition (following Emmorey et al. 2008).

Müller de Quadros, Lillo-Martin, and Chen Pichler (this volume) further argue that bimodal bilinguals use a single derivation, i.e., the mental linguistic computational system incorporates elements from the two languages into a single derivation. The study presented in the paper entitled “A Minimalist Perspective on Code Blending in TİD – Turkish Bimodal Bilingualism” (this volume) supports this approach. The authors show that the elements from the spoken language, Turkish, are not only partly mirrored in the sign language, but that there is a common verb phrase to which the two languages contribute lexically. This can be seen at the level of the verb phrase where ‘watch’ is expressed in Turkish and ‘movie’ in the Turkish Sign Language (TİD), as illustrated in example (2).

2. Ben de gid-ip izle-me-di-m [TURKISH]
 I too go-CONJ watch-NEG-PAST-1SG
 I GO MOVIE NOT [TİD]
 ‘I didn’t go to watch the movie either.’

However, Zeshan and Panda (2017) provide counter-evidence from Indian Sign Language and Hindi (with minimal English) showing 48% syntactic and/or semantic mismatches. What Zeshan and Panda (2017) find instead is that the two propositions share the same communicative intent. To account for the differences in these bimodal bilingual interactions, Zeshan and Panda (2017) refer to their data as “sign-speaking”. Such differences are reminiscent of the differences between patterns described in “classic codeswitching” (see Myers-Scotton and Jake 2016) and atypical phenomena encountered in mixed languages and in their prior stages of formation (Meakins 2013; Adamou and Granqvist 2015; Adamou and Shen 2019).

Based on the bimodal bilingual data, Müller de Quadros, Lillo-Martin, and Chen Pichler (this volume) elaborate the Language Synthesis model and suggest that the model can account for all bilingual competence, bimodal and unimodal alike. More specifically, the Language Synthesis model is a late lexical insertion model, i.e., abstract roots first enter into the computation of a sentence and Vocabulary Insertion takes place once the Syntactic Derivation is accomplished. In contrast, MacSwan (2014) has elaborated an early lexical insertion model to account for codeswitching, i.e., Select draws the Lexical Items from the two lexicons of the

bilingual into the Lexical Array, at which stage, Word Order follows the Lexical Items' properties. Then Merge and other operations lead to the Spell Out in the Phonological Component and the Covert Component. Alternative accounts are based on the psycholinguistic model of speech production in Levelt (1989), namely the Matrix Language Frame model which was elaborated for bilinguals (see for an updated version Myers-Scotton and Jake 2016) and the model elaborated by Emmorey et al. (2008) for bimodal bilinguals. In future work, the challenge for any model of language production will be to account for both the unimodal bilingual data and the bimodal bilingual data.

A number of interesting findings also come from the studies on sign multilingualism. The paper entitled "Burundi Sign Language-Indian Sign Language bilinguals' community of practice" (this volume) reports on a study that documents the process of constitution of a small bilingual community using two unrelated sign languages, the Burundi Sign Language and the Indian Sign Language. It appears that the bilingual signers develop an unmarked way of communicating which is a mixed way, independent of the duration of stay in India and therefore exposure to the Indian Sign Language. This result brings to mind the data from small bilingual communities which also appear to have patterns of mixing in terms of proportions independent of exposure to the dominant language and dominance (Adamou 2016). Similarly, Zeshan and Panda (2017) report that, in a trilingual setting, Indian Sign Language and Hindi are frequently used in combination in a typologically rare manner, characterized by frequent syntactic and semantic mismatches, whereas English insertions are more rare and follow the more typical patterns of bimodal bilingual communication, despite dominance of the speakers. This differential treatment in trilingual settings is also found in the interactions of Roma from Greece who exhibit a typologically-rare Romani-Turkish mixing whereas insertions from Greek, the state's official language, follow classic codeswitching patterns (Adamou & Granqvist 2015).

In terms of proportions of signs in the Burundi and Indian community of signers, Zeshan and Panda (2015: 111) have shown that each of the two sign languages contributes 25% to 35% signs that could be clearly identified as being Burundi or Indian. This proportion is more balanced than the proportion found in most bilingual corpora from small communities in which one language is clearly numerically-dominant and the other at best contributes with up to 35% word-tokens (Adamou 2016). A possible interpretation of this result could be due to the remaining 40% of similar signs that constitute the majority of the corpus. Indeed, Zeshan and Panda (2015: 111) report that these signers used roughly 40% of signs that the researchers were not able to categorize as belonging to either the Burundi or the Indian sign languages. More generally, unrelated sign languages are known to share a relatively large proportion of signs. This similarity is only partly due to a shared contact language, i.e., American Sign Language, which is the sign language introduced in sign education across the world. The shared vocabulary observed in such cases is mainly due to the iconicity of the manual modality, allowing for signs to be understood without prior knowledge of the language. This feature is of course absent from spoken languages and constitutes a major difference between the languages that rely on the manual modality and those that rely on the spoken modality.

In conclusion, the studies that investigate bilingual communication involving sign languages are of great interest for researchers working on bilingualism and language contact. They allow to shed new light on the theoretical questions that are at the centre of attention in contemporary linguistics and cognitive science. There is no doubt that this is a research field that will continue to grow and contribute to our understanding of the bilingual mind and the use of two or more languages in society. As a linguist working on bilingualism in lesser-known languages, I will definitely continue to follow these developments closely.

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