

Editorial

Challenging Basic Assumptions in Code-Switching Research: New Linguistic, Sociolinguistic and Psycholinguistic Evidence

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The aim of this Special Issue is to bring together research evidence from studies into code-switching, that is, the alternation and mixing of languages as practiced on a daily basis by bilinguals throughout the world. Accounting for this behavior is challenging but is of great interest to linguistics and cognitive science. Code-switching can provide a window into the mind to study the ways in which the grammars and lexicons of two languages interact (Muysken 2000). The current Special Issue aims to shed new light on variability in code-switching patterns and further develops themes addressed in previous Special Issues on code-switching (Kaščelan and Deuchar 2021; Munarriz-Ibarrola et al. 2018; Treffers-Daller et al. 2021).

Specifically, the current SI aims to bring together research which focuses on disentangling the relative contributions of linguistic, sociocultural, and psycholinguistic variables to explain the variability we find in code-switching. According to Deuchar (2020), we still know little about the relative role of external sociolinguistic and internal psycholinguistic and linguistic factors in shaping code-switching. We suggest that it is only possible to make progress in our understanding of the variability of code-switching patterns if we bring together interdisciplinary insights from a range of research areas, such as linguistics, sociolinguistics, clinical linguistics, psycholinguistics, and neuroscience, and investigate code-switching variability in different sociocultural constellations, with typologically different languages and with different types of multilingualism and proficiency levels, and also across the lifespan. In the spirit of such a cross-disciplinary perspective, we have brought together empirical studies that address the following questions:

1. Do code-switching patterns follow certain “universal constraints”?
2. Is code-switching associated with a cognitive processing effort?
3. Is the likelihood of code-switching increased by the presence of lexical items or grammatical structures that overlap cross-linguistically?
4. Is code-switching in bilingual children a sign of lack of proficiency?
5. Which methods are most suitable for quantitative studies of code-switching?

The above-mentioned questions were formulated to challenge past or present assumptions about code-switching that continue to “linger” in either public or academic discourses. It should be noted that the questions do not relate to real hypotheses brought forward by current bilingualism researchers. Rather, they are intended to serve as hypothetical departure points to generate an open discussion and debate in this Special Issue. Whilst many bilingualism researchers today take a critical stance toward the assumptions underlying our questions, some of the assumptions remain prevalent amongst non-academic audiences. For the purpose of engaging with the general public, it is crucial that research addresses the attitudes and beliefs that non-academic audiences hold about code-switching. Given that code-switching remains a stigmatized bilingual practice, in particular in European and North American communities (Garrett 2012; Jaworska and Themistocleous 2018), parents of bilingual children frequently raise concerns about their children’s code-switching. In the



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spirit of open science, we believe that academics should incorporate such concerns into their research agendas and provide constructive responses in the shape of empirical findings.

1. Do code-switching patterns follow certain “universal constraints”?

For several decades, code-switching research was dominated by the search for “universal constraints” on the combination of the grammars of two or more languages. While it is clear that CS is not a free-for-all in that any combination of words and morphemes in a sentence is equally likely, there are counter-examples to all constraints and principles that have been formulated so far (Gardner-Chloros and Edwards 2004). One of the reasons for the problems facing researchers working on grammatical constraints is the variability in code-switching patterns, which is linked to sociocultural variables, as well as to processing (Muysken 2000). The studies in this Special Issue further confirm this observation by examining the diversity of code-switching patterns.

Treffers-Daller et al. (2022) investigate the diversity of code-switching in Malay–English bilingual speech. They identify numerous incidences of code-switches involving function words, which is highly restricted in most language pairs (Lehtinen 1966). This confirms previous observations by Muysken (2000), who suggested that highly dense forms of code-switching involve linguistic co-activation at the grammatical level, i.e., involving function words. Whilst Muysken proposed that such dense forms of code-switching (labelled as “congruent lexicalization by Muysken) Fare more likely in typologically similar languages, the novelty of the contribution of Treffers-Daller et al. is that they attest such dense code-switches of function words in a typologically distant language combination, i.e., Malay–English. Hence, their study further challenges the assumption of “universal constraints”. It also proposes a more cautious version of this assumption, namely that constraints are less pronounced in dense code-switching. The authors provide an insightful discussion of how typological distance and structural (dis)similarity of the languages under study may shape the diversity of code-switching patterns.

Taking an approach based on optimality theory, Bhatt and Bolonyai (2022) also address the variability found in code-switching patterns. They propose five socio-pragmatically motivated constraints shaping bilingual speech but acknowledge that, under certain conditions, these constraints may be violated if it would lead to more optimal communicative outcomes. They emphasize the potentially transient nature of code-switching norms as they discuss the continuous friction between the emergence and violation of constraints that shape bilingual practices. Hence, they emphasize the importance of sociolinguistic factors, suggesting that optimality may be shaped by community norms. Bhatt and Bolonyai discuss the validity of their framework, drawing upon a wide range of diverse language combinations, including bidialectal settings.

2. Is code-switching associated with a cognitive processing effort?

A common assumption about code-switching is that it is associated with increased levels of cognitive effort in comprehension and production, compared to single-language utterances. Neuroscientific approaches focusing on brain reactions to code-switching in real time reveal the neurophysiological correlates of code-switching, confirming this assumption to some extent (Ruigendijk et al. 2016; Van Hell et al. 2018). However, due to limitations of the experimental paradigms, neuroscientific approaches usually focus on a limited range of code-switching structures. Hence, they struggle to explain processing in relation to the many different code-switching patterns observed in real life. The studies in this Special Issue investigate the cognitive efforts associated with different types of code-switching using novel methodological approaches that aim to incorporate the diversity of code-switching.

Johns and Dussias (2022) use pupillometry to compare the effort associated with the comprehension of single-word versus multi-word code-switches in Spanish–English bilinguals. They compared single-word insertions syntactically integrated into another language to juxtaposed standalone multi-word units. The authors confirmed the assumption that code-switching elicits increased pupillary reactions compared to linguistic stimuli without

switches, which indicates cognitive effort. This effort applied “universally” across both types of stimuli, as they found no further differences between the two types of switching investigated. Overall, their study confirms the assumption of a cognitive effort associated with code-switching, but challenges the assumption that the degree of syntactic integration modulates the cognitive effort associated with different code-switching types.

The cognitive effort associated with the production of code-switching was investigated by Hofweber and Marinis (2023). They used a novel sentence repetition paradigm to elicit code-switching in a group of German–English bilinguals. Based on a typology developed by Muysken (2000), they compared three different types of code-switching that differed in their degree of language separation and simultaneous linguistic activation (Hofweber et al. 2020). In line with Johns and Dussias, they attested an increased processing effort associated with code-switching in general, in comparison to single-language control sentences in the tested bilinguals’ more proficient first language. However, they found a differential effect of code-switching type in that the type of code-switching requiring the highest levels of cross-linguistic integration required the most effort for bilinguals to repeat. Moreover, the result was modulated by dominance and proficiency: code-switching was not more effortful when compared to single-language sentences in bilinguals’ non-dominant second language.

Given that the brain constantly adapts to environmental needs (Korenar et al. 2023), bilinguals’ sociolinguistic habits may be a crucial variable affecting the processing of code-switches. The study by Hui et al. (2022) highlights the importance of controlling for bilinguals’ sociolinguistic habits when considering processing effort. Whilst they confirmed the general assumption that code-switching is effortful, this effect was modulated by usage patterns. Hui et al. detected evidence of an increased processing effort associated with code-switching in Cantonese–English bilinguals who rarely code-switched, but no such increased effort was found in bilinguals who regularly engaged in code-switching. This suggests that regular practice at code-switching (or other language practices) may alter bilingual processing qualitatively. Hui et al. speculate that regular code-switchers make re-course to chunks stored as “pre-fabs” in long-term memory. However, alternative explanations are possible; the practice of code-switching could, for instance, become proceduralised as a result of frequent usage, which would also result in reduced effort (Ullman 2004).

3. Is the likelihood of code-switching increased by the presence of lexical items or grammatical structures that overlap cross-linguistically?

In his extensive review of bilingual speech patterns, Muysken (2000) suggested that the typological similarity between languages may influence the quantity and quality of code-switching between them. One marker of cross-linguistic similarity are cognates, i.e., lexical items from separate languages that reassemble each other formally (Levenshtein 1966). According to Green’s model of bilingual processing (Green 1998), cognates in different languages are closely connected in the bilingual mental lexicon. In line with the notion of representational overlap between cognates, Clyne (1980) proposed the “triggering hypothesis” suggesting that the presence of cognates may heighten the probability of code-switches. Neveu et al. (2022) tested this hypothesis with Spanish–English bilinguals using a picture-naming task presenting cognate and non-cognate stimuli in different language modes (single-language versus mixed language). The study did not confirm the triggering assumption, revealing no difference between cognate and non-cognate stimuli. However, future research could investigate this issue further by systematically comparing code-switching in language combinations involving different amounts of cognates/different degrees of overlap in the lexicon and grammar. The amount of cognates is closely linked to the notion of typological distance. A crucial aspect of typological distance is mutual intelligibility, which in turn is often driven by shared cognates (Oktavia 2019). So, comparisons of contexts involving different degrees of typological distance may shed further light on cognate effects. Differences in typological distance may affect the connectedness of languages and resulting spreading activation patterns.

4. Is code-switching in bilingual children a sign of lack of proficiency?

Care-givers want to choose language policies supporting proficiency in the home language/heritage language, but of even greater concern is often development in the majority language associated with upward social mobility. A common concern of care-givers of bilingual children is that code-switching could delay or negatively affect the children's proficiency in each language. Anecdotally, the first author of this editorial had a first-hand experience of these types of negative assumptions about code-switching recently: in an annual review of their bilingual child's performance, professional nursery staff praised the child's general linguistic development, but also expressed their concern about the child's continued code-switching, describing it in a derogatory fashion as "Misch-Masch" (German for "hotchpotch").

The studies presented here show that code-switching is far from a sign of deficiency, especially with regards to the majority community language. Rather, code-switching in bilingual children reflects the socio-linguistic practices they are surrounded by and the resulting input they receive. [Arnaus Gil and Jiménez-Gaspar \(2022\)](#) analyzed German–Catalan code-switching. Its occurrence varied greatly depending on children's language dominance and language family policy. Crucially, this study demonstrates that code-switching does not threaten bilingual children's proficiency in the majority language. On the contrary, children who were dominant (and therefore more proficient) in the majority language were found to code-switch most frequently, ruling out the possibility that code-switching could be associated with poor skills in the majority language.

In line with this observation, the study by [Gross et al. \(2022\)](#) examining code-switching in Spanish–English bilingual children confirmed that the observed code-switching patterns were independent of children's proficiency. Instead, code-switching was determined by a range of complex factors. The focus of this study was the influence of contextual factors. The results emphasize the importance of interactive alignment. Children accommodated to the usage patterns of their adult interlocutors, i.e., they engaged in code-switching patterns similar to those of their adult interlocutors. The importance of input is also highlighted by [Quick and Backus \(2022, see below\)](#) in their paper on the trace-back method reporting results from a study with German–English bilingual children. Taken together, the three studies suggest that bilingual children's code-switching patterns reflect the input of their caregivers, rather than a lack of proficiency in the majority language.

5. Which methods are most suitable for quantitative studies of code-switching?

Some bilingualism researchers have argued that the "gold standard" of code-switching research are corpora of authentic speech data ([Poplack 2018](#)). Whilst authentic instances of code-switching may be the most ecologically valid assessment method of bilinguals' language practices, the transcription of large amounts of speech data is often not viable in quantitative psycholinguistic research involving large numbers of individual participants. Hence, code-switching research needs to develop representative experimental methods for the usage in large-scale studies. The assumption that experimental studies are not suitable for the study of code-switching was challenged by [Gullberg et al. \(2009\)](#), who proposed a range of experimental methods suited for code-switching research. Experimental methods in code-switching research are also the focus of a recent Special Issue edited by [Munarriz-Ibarrola et al. \(2018\)](#).

The studies presented in the current Special Issue demonstrate that experimental and quantitative studies on code-switching provide insightful results. They report empirical results based on a range of methods as diverse as pupillometry, sentence repetition, eye tracking, or picture-naming. Gross et al. successfully evoked naturalistic conversation contexts, revealing results in line with observations from conversation analyses of authentic exchanges. In addition to the experimental methods used, Quick and Backus present another innovative approach to how code-switching can be studied quantitatively. The trace-back method allows for the systematic investigation of the role of input in the emergence of code-switching patterns amongst children. However, the trace-back method is not only useful for studying the role of input in child code-switching. Future research may further develop the trace-back method for the systematic differentiation between ad-hoc code-

switching and borrowing. Overall, the studies in this Special Issue encourage innovation in code-switching research methods.

Based on the variety of observations made in this Special Issue, it could be concluded that the most universal feature of code-switching is the diversity of patterns generated by bilinguals' linguistic creativity. Indeed, code-switching has been linked to divergent thinking and creativity (Kharkhurin and Li 2015). However, the fluidity and diversity of code-switching patterns does not mean that there is no red thread. The studies reveal some general trends, e.g., a baseline trend that code-switching requires effort, although they also showcase that all basic assumptions proposed in research on code-switching can be overridden by factors acting on other levels. Assumptions made in linguistic research on code-switching, e.g., in terms of constraints, can be overridden by sociocultural and psycholinguistic factors. Likewise, assumptions made in psycholinguistic research, e.g., in terms of higher processing costs for code-switching, can be overridden by linguistic and sociocultural ones. This raises the question whether code-switching constraints are fluid and transient, i.e., whether they may temporarily operate "universally" within a given speech community, but remain continuously negotiable, just like unilingual grammars do when we take a descriptive approach to them. Crucially, this Special Issue suggests that the usage of novel methods in code-switching research may shed new light on existing questions and assumptions.

Conflicts of Interest: The authors declare no conflict of interest.

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