

Article

The Role of Internal and External Factors for Code-Switching: A Study of Early Multilingualism in Germany with Special Reference to Catalan as a Heritage Language

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Abstract: In heritage language acquisition studies, it has been observed that heritage speakers may experience a shift of language dominance from the heritage language to the majority language due to input quantity and quality factors. The appearance of code-switching in the productions of multilingual speakers has been well attested and has been mostly linked to age and language dominance as well as family language policies and consistence of input, among other factors. For the appearance of code-switching, our cross-sectional study analyses language dominance (MLU) and fluency (w/minute) along with child-external factors, such as family language policies, family language and siblings' interaction, in sixteen multilingual children (mean age 5;7) being raised in Germany with German and Catalan (and another L1) simultaneously. In a nutshell, children who are dominant in the majority language ultimately code-switch more frequently than the other groups. Interestingly, balanced and heritage-language-dominant children present instances of intrasentential code-switching (particularly insertions and alternations), while intersentential code-switching is frequent across all groups. When families have chosen the 'one person-one language' strategy and do not have a family language, code-switching is almost absent. Finally, sibling groups using both the heritage and the majority languages in their interactions show low code-switching rates.

Keywords: heritage language; Catalan as a heritage language; code-switching; language dominance; fluency; family language policies; insertion and alternation



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1. Introduction

The bilingual child (2;8,7, i.e., years;months,days), raised in Germany with Catalan and German simultaneously at home, and her Catalan caregiver are preparing an afternoon snack and drink for some baby dolls who have just woken up from a nap:

Example (1)

Adult: i aquest bebé què té? 'and this baby, what does s/he have?'

Child: eine_{GER} flasche_{GER}/un_{CAT} got_{CAT} kann_{GER}auch_{GER} trinken_{GER}
a bottle/a cup can also drink
a bottle/(s/he) can also drink (from) a cup'

Example (1) clearly shows that the Catalan caregiver exclusively directs her speech to the child in Catalan, while the bilingual child opts for a combination of German, the community or majority language, and Catalan, her home language. In the second utterance, the child even incorporates lexical and functional material from both languages within a sentence.

A home language has been defined as the language spoken in the home environment (Eisenclas and Schalley 2020: 28f.). A heritage language (HL) is typically the home language that is only spoken in this context and, more importantly, "is not the dominant language from the larger (national) society" (Rothman 2009, p. 156, also cf. Aalberse et al.

2019). For Eisenchlas and Schalley (2020, p. 29), home and heritage languages refer to the same idea; yet while the HL can be potentially understood “as pointing towards the past [...], home language is set in the present”. A heritage speaker (HS) can, therefore, be considered a speaker who has acquired (at least) the HL at home as well as the majority language (MaL) either simultaneously or sequentially. And what is more important, according to Benmamoun et al. (2013, p. 133), the MaL has become the HS’ dominant language and the HL is now the speaker’s weaker language.

Instances such as those observed in example (1) are well attested in the literature on bilingual and trilingual first language acquisition. These show a smooth and subtle interchange between the child’s languages in spontaneous situations. Particularly, caregiver–child interactions in the HL typically display this linguistic behaviour more often than when interactions take place in the community language (CL). However, studies that have investigated the use of structures like those in example (1) by early simultaneous bilingual and trilingual children have reported that they represent less than 10% of the total amount of productions (Genesee et al. 1995; Schlyter 1999; Patuto et al. 2014; Chevalier 2015; Poeste et al. 2019). For some of the bilingual and trilingual children taking part in the cross-sectional study by Poeste et al. (2019), no mixing could be attested at all. In addition to these findings, the longitudinal study of Genesee et al. (1995) could perceive that the percentages of mixing were lower than the rates of those words containing more than one morpheme (multimorphemic utterances, MMU), which seems to indicate that children were mixing less than they could. Although the results from Genesee et al.’s (1995) study (and many others) seem to speak against a relationship between mixing and language competence, others seem to find a connection between these two. Especially if we follow Benmamoun et al.’s (2013) point of view that the HL is mastered worse than the MaL at some point during childhood, mixing could be taken as ‘filling the gaps’ that the HL has as compared to the MaL.

The observation that the linguistic competence of the MaL eventually overcomes that of the HL might be due to different factors related to the quantity and/or quality of input to both MaL and HL as well as to various degrees of literacy and formal education in the HL. Thus, mixing can also be examined taking these factors into consideration. This is, in fact, what a great number of empirical studies, starting in the 90s from the last century, have put the focus on, that is, to examine which quantity and/or quality factors in the children’s input may determine their use of mixing (e.g., Genesee et al. 1995; Lanza 1997; Schlyter 1999; Nicoladis and Secco 2000; De Houwer 2007, 2009; Cantone 2007; Müller et al. 2015; just to name a few).

Taking these research findings and others that will be extensively discussed in the literature (Section 2.2), we are interested in examining the following research questions: (1) Do dominant children show higher mixing rates than balanced children? (2) Is there a relationship between fluency (measured via words per minute) and inter-/intrasentential code-switching? (3) Does parents’ monolingual use reflect lower mixing rates in children’s output? (4) Does the absence of the MaL as a family language positively influence low mixing rates in the HL Catalan? and (5) Does input by older siblings have an impact on younger siblings’ output?

This article is structured as follows. Section 2 will present a brief theoretical background on code-switching (Section 2.1), followed by an extensive literature review on child-internal and child-external factors favouring code-switching in young children (Section 2.2). Section 3 will describe the Catalan speakers living outside the Catalan-speaking regions in Spain. After that, previous studies on the early acquisition of Catalan as an HL will be presented. Section 5 will focus on our empirical study and the results will be introduced in Section 6. Finally, the article finishes with a discussion section.

2. Code-Switching

2.1. Brief Theoretical Background

The use of language material from two languages in a discourse has been the focus of research for many linguists in the past decades. Our study will concentrate on the child-internal and child-external factors that favour mixing between the children's L1s. This is why we briefly summarise the main ideas and proposals that have been considered ground-breaking in this field and take the point of view considered in this article.

Code-switching (CS) has been described according to many different perspectives. Muysken (2000), for instance, defined this phenomenon as the sequence of lexical and grammatical items from two languages that come together in one sentence. In her definition, Treffers-Daller (2009) points to the alternation between larger units of language material from language A and B which, in turn, are not really close to each other. In this sense, Müller et al. (2015) found that CS could be best characterised as the smooth change of languages among bilinguals and trilinguals who have highly developed skills in both languages. CS seems, therefore, not to be linked to lower competence in one of the speaker's L1s (cf. Section 2.2 for a detailed discussion), and it has further been considered a pragmatic tool that seeks an effect on the listener's side (MacSwan 2000). When considering language mixing in young bilinguals and trilinguals, it is still unclear whether their use of language mixing follows the pragmatic properties of adult language mixing.¹ Nevertheless, when looking at the type of words children and adults code-switch, results from several empirical studies seem to agree on similar CS patterns in child and adult CS (cf. Treffers-Daller 2022 and references herein). Lexical insertions are commonly used by multilingual speakers because they might be accessed much quicker in language A than in language B. Discourse markers are frequently attested in multilingual speech data as well, since they are often placed at the sentence borders and do not require a high processing load. Functional words have also been observed in CS utterances, yet to a lesser extent than lexical categories. They have been the focus of numerous CS studies, since they convey grammatical information, and this is mostly language-specific. In her study of a simultaneous bilingual child, Petersen (1988) observes that functional categories only come from the dominant language (cf. Section 2.2.1). In her longitudinal study of six simultaneous Italian-German bilingual children, Cantone (2007) finds that functional words determine the base language of the utterance. These studies seem not to pay attention to the fact that there are numerous examples in the literature, where functional words from language A and language B are used in the very same sentence in child language, as in example (1) above: the child uses both a Catalan and a German functional category within the same sentence, namely a Catalan determiner and a German modal verb. Taking these cases into consideration, Deuchar (1999) and also Treffers-Daller (2022, p. 197) suggest that functional words, as opposed to content words, are not language specific in child language and, therefore, they can be combined in shared grammatical structures of language A and language B.

Other language contact phenomena, such as borrowings, may also appear in the speech of multilingual speakers. Borrowings seem to be difficult to tear apart from CS, especially when single words are being used (Deuchar 2020). If language material from languages A and B are used alternatively and it is composed of more than one item, it becomes easier to identify these linguistic chunks as instances of CS. Of course, language material can be integrated morphosyntactically to different degrees. For borrowings, no phonological integration takes place, although some morphosyntactic integration is possible, and, thus, these two processes can take place independently (Poplack 1980, 2018; Bullock 2009).

Let us turn now to the types of CS. The following CS utterances in example (2), taken from Poeste et al. (2019, p. 462) illustrate some instances of intersentential and intrasentential CS. Intersentential CS can be defined as producing language material in language A that corresponds to a fully-fledged sentence, while intrasentential CS describes the actual alternation between language A and language B within one single sentence.

Example (2)

(2a) Situation: The experimenter is carrying out a grammatical test in German (GER) with a bilingual child who acquires German and Spanish (SP).

Experimenter: genau_{GER}/die_{GER} spielen_{GER} gitarre_{GER} das_{GER} ist_{GER} ja_{GER} lustig_{GER}/
 'right/they play guitar it is funny'

Child: yo_{SP} vo_{SP} a_{SP} tocar_{SP} la_{SP} guitarra_{SP} así_{SP}
 'I will (to) play the guitar like that' (Olivia, 3;9,27)

(2b) Situation: The experimenter is carrying out a grammatical test in German (GER) with a bilingual child who acquires German and French (FR).

Experimenter: sur_{FR} ma_{FR} tête_{FR} ?
 'on my head'

Child: sur le baumstamm
 'on_{FR} the_{FR} trunk_{GER}' (Antoine, 4;10,04)

Taking intrasentential CS into account, Muysken (2000, 2013) proposed four types of CS strategies that are found in any multilingual community: insertion, alternation, congruent lexicalisation and backflagging. The degree of salience of these CS strategies in these communities depends on typological, social, linguistic and cognitive factors. Insertion (cf. Figure 1a and example in (3)) is defined as embedding specific chunks of language B into a sentence that otherwise belongs to language A. Generally, the language giving the grammatical frame (i.e., language A) is the home language, whereas the one supplying the lexical items corresponds to the majority language. Alternation (cf. Figure 1b and example in (4)) corresponds to the sequence of fragments in languages A and B in a sentence, that cannot be identified as belonging to A or B.

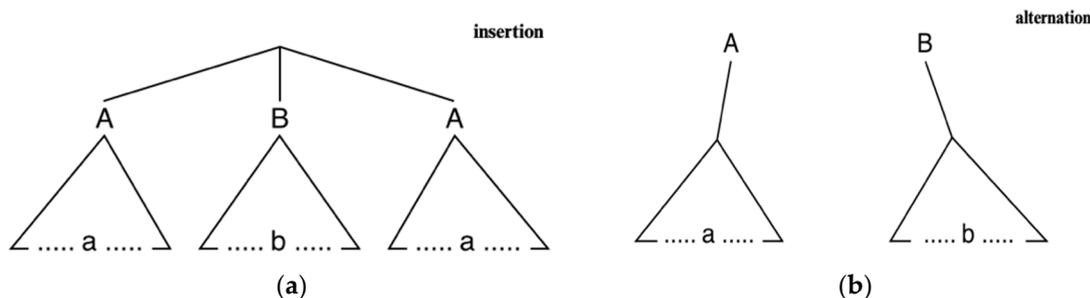


Figure 1. (a) Insertion and (b) Alternation (Muysken 2000, p. 7).

Example (3) Yo anduve *in a state of shock* pa dos días
 'I walked in a state of shock for two days'

Example (4) Andale pues and do come again
 'That's alright then, and do come again' Pfaff (1979, in Muysken 1997, p. 361)

The third type of intrasentential CS is called congruent lexicalisation (cf. Figure 2 and example in (5)). In this case, elements of both languages are used in a structure that is wholly or partly shared by both languages. This seems possible since they have substantial overlaps when it comes to their grammar, and the switching mainly takes place by inserting words from either language into a shared structure. This type of intrasentential CS is common in those cases where related languages with long traditions of language contact come into play.

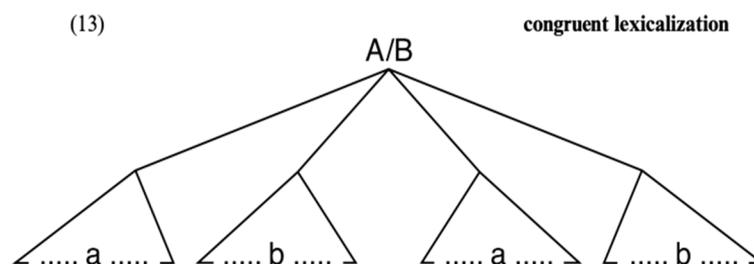


Figure 2. Congruent lexicalisation (Muysken 2000, p. 8).

Example (5)

Bueno, *in other words*, *el flight* [que sale de Chicago *around three o'clock*]

Pfaff (1979, p. 310)

Finally, backflagging corresponds to the fourth type of intrasentential mixing strategy that bilingual speakers might use. In this case, backflagging is characterised by introducing markers, that is, flagging elements, of language A into the discourse of language B. Language A is generally considered the speakers' HL (i.e., L1), whereas language B represents the CL (i.e., L2). These markers are mostly peripheral, are mainly single items that are simple and frequent in the HL and have a clear ethnic connotation. The following instances represent cases of backflagging (Muysken 2013, p. 713).

Example (6)

Q: What will you be when you grow up?

A: Ik ben doctor *wella* ik ben ingenieur.

I am doctor or I am engineer

"I will become a doctor or an engineer."

(Dutch/Moroccan Arabic; Nortier 1990, p. 142)

As mentioned before, the possibility of a bilingual speaker using one intrasentential mixing strategy or the another depends on typological, social, linguistic and cognitive factors. If, following Muysken (2013), these four strategies reflect the stronger or weaker presence of a bilingual speaker's languages (i.e., heritage and community language) in their mixing behaviour, they could be represented along a continuum in which the extremes represent the heritage and the community languages, respectively, as in Figure 3.

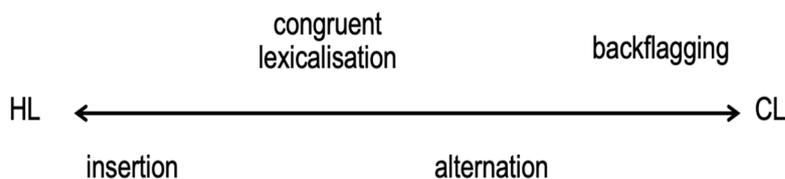


Figure 3. Intrasentential mixing strategies and the presence of heritage and community languages (adapted from Muysken 2013, p. 715).

When insertion is chosen, most of the grammatical and lexical properties have an origin in the HL, which functions as the matrix language in which material from the CL is inserted. However, if the speaker uses congruent lexicalisation, this means that s/he is producing structures and words that show some overlap in their properties in both the HL and the CL. The use of this strategy further shows a great mastery of both languages, since only those morphosyntactic structures in which both languages coincide are potentially filled with lexical items from both languages. For alternation, no underlying morphosyntactic structure for either language A or language B is assumed. Instead, 'universal combinatory principles' (Muysken 2013, p. 714) allow linguistic pieces of language A to be followed by others of language B. Finally, backflagging can be considered the strategy closer to the

CL since this language represents the speaker's main language of articulation in which some simple and frequent elements at the edge of the sentence are produced in the HL. Discourse markers, for instance, can be used by speakers in either the heritage or in the community language setting. Following [Treffers-Daller \(2022, p. 195\)](#), they should be seen as backflagging elements when they are used in the HL within the context of the community language. By contrast, if the discourse markers are produced in the language of the community in an HL context, we would be dealing with a case of alternation. One question still remains unanswered when talking about these four strategies: what role does the children's language dominance play when mixing intrasententially? Backflagging mainly implies the use of the CL with the production of some peripheral, simple and frequent words in the HL. By contrast, congruent lexicalisation requires a better understanding of both languages involved since only then can the realization of overlapping structures in the HL and CL take place.

Unfortunately, only a few studies that look at early child bilingualism have analysed [Muysken's \(2013\)](#) four intrasentential mixing strategies, yet they generally seem to observe cases of insertion, alternation and backflagging ([Treffers-Daller 2022](#)). For instance, in the study of [Poeste et al. \(2019\)](#) with early bilinguals, trilinguals and multilinguals (i.e., children acquiring more than three languages in early childhood) with a mean age of 4;8, the authors could identify 23 cases of intrasentential CS, and all instances could be classified as cases of insertion ([Poeste et al. 2019, p. 485](#)), irrespective of language dominance. More research has to be done in order to find out (a) whether all four types are equally present in early child bilingualism, (b) whether language dominance plays a role in choosing one strategy over the other and (c) whether there is a correlation between the type of intrasentential CS and age.

The following Section 2.2 will present some child-internal and child-external factors that might promote the use of CS in young children. This description will be supported with the aid of a literature review of some empirical studies that have focused on these aspects.

2.2. Child-Internal and Child-External Factors Favouring CS in Young Children

2.2.1. Child-Internal Factors

One of the factors that have been inevitably related to CS is age. Age can be analysed from different angles. For instance, when comparing child and adult mixing in terms of quality of mixing, [Genesee \(1989, p. 164\)](#) notes that "what is thought to distinguish bilingual children's mixing from adult mixing is the lack of systematicity or compliance to linguistic rules in the case of children". Literature on CS has tried to shed some light on the question of whether mixing by young bilingual children follows the same patterns as mixing by adult speakers ([Müller et al. 2015](#); [Poeste et al. 2019](#) and Section 2.1). More recent empirical studies, however, have found some counterevidence that seems to speak in favour of similarities between child and adult mixing, at least from age 3;0 ([De Houwer 1990](#); [Lanza 1997](#); [Vihman 1998](#); [Paradis et al. 2000](#); [Bosma and Blom 2019](#)). Age can also be seen as a chronological development from year one to year two to year three, etc. Looking at mixing rates and age under this perspective, earlier studies, such as the ones by [Volterra and Taeschner \(1978\)](#), [Redlinger and Park \(1980\)](#), and [Vihman \(1982\)](#), observed that children seem to mix more in the initial stages of acquisition rather than later in their development. [Hoffmann and Stavans \(2007\)](#) found, however, that children's mixing keeps increasing until age 9;0 and starts declining afterwards. For the study of Welsh-English adult speakers in [Deuchar et al. \(2016\)](#), the authors observed that the older the speakers, the less they tend to mix.

Finally, age could be considered as the point at which bilingual children start having exposure to L_B , i.e., either at the same time, that is, from birth, together with the L_A or after having already been in contact with L_A for a certain period of time. Broadly speaking, the former group is composed of simultaneous bilinguals, whereas the latter can be considered (early) sequentials (cf. [Montrul 2008](#)). [Poplack \(1980\)](#) investigates the mixing rates of those speakers who were born in the US or who arrived there in early childhood and compares

them to those bilinguals arriving in the US in adulthood. The results show that the former group used more mixing than the latter group. When it comes to the distinction between inter-/intrasentential CS and age of acquisition, [Deuchar et al. \(2016\)](#) further noted that there is a negative correlation between age and type of CS: intrasentential CS is more used by simultaneous than by sequential bilingual speakers. As for the four different CS strategies, [Muysken \(2013: 714f.\)](#) noted that one of the social factors that could play a role in the speaker's choice of one of these strategies may have to do with what he calls network membership. Especially for the difference between first- and second-generation speakers, he predicts that the former would prefer insertional CS. However, a prolonged contact between these speakers may result in a closely-knit network that would opt for congruent lexicalisation. By contrast, second-generation speakers would be more characterised by the use of backflagging.

As a means to capture the child's linguistic competence in their respective L1s, numerous studies have used different linguistic tools in order for the children to be classified by language dominance. As [Schmeißer et al. \(2016, p. 38\)](#) pointed out, language dominance could be defined as "the difference in proficiency in a bilingual's two languages". [Lanza \(2000\)](#) argued that a distinction between factors of use and factors of proficiency should be considered. When assessing the child's language dominance, mean length of utterance (MLU), word types and multi-morphemic utterances (MMU) ([Jisa 2000](#); [Genesee et al. 1995](#)) could be considered factors of proficiency, since they attempt to tap into the child's linguistic competence (cf. [Bernardini and Schlyter 2004](#) for an overview). MLU, for instance, is frequently used in empirical studies to assess children's language development and proficiency due to its objective and independent character. Therefore, MLU could be assumed to be a quantitative measurement that tries to capture the child's linguistic development qualitatively. In order to calculate the MLU values of the child's L1s, some well-known strategies to balance cross-linguistic differences have been taken into consideration ([Müller et al. 2007](#)). By contrast, those tools that could be considered factors of use ([Lanza 2000](#)) are fluency, language preference or mixing with the other language. Considering factors of use, we are interested in the automatism, i.e., in the more-or-less quick access to the child's L1s when speaking ([Müller et al. 2007](#); [Arencibia Guerra 2008](#); [Hager 2014](#)). Fluency, i.e., words per minute, has been used in previous literature as a criterion for language dominance as well ([Müller and Kupisch 2003](#); [Cantone et al. 2008](#)), since the more developed language is generally the one which is used the most ([Arencibia Guerra 2008](#)).

When it comes to the link between language dominance and CS use, [Petersen \(1988\)](#) proposed the Dominant Language Hypothesis, which claims a connection not only between language dominance and mixing but also with respect to the type of elements that can be potentially mixed. Specifically, she observed in a bilingual Danish–English child that functional categories are mixed into the non-dominant language, whereas those from the non-dominant language are not attested as mixing units in the dominant language ([Petersen 1988: 482ff.](#)). With respect to lexical categories, they can be mixed in both the dominant and the non-dominant language ([Petersen 1988](#); [Gawlitzeck-Maiwald and Tracy 1996](#) but see [Nicoladis and Genesee 1998](#) for different results).² In this sense, language dominance seems to indicate the direction in which mixing will take place as well as the categories that will be mixed ([Schlyter 1993](#); [Lanza 1992, 1997](#); [Nicoladis and Genesee 1997](#)). But what are the reasons for mixing more in the non-dominant language? In their famous study of five Swedish-Italian/French children aged between 2;0 and 4;0, [Bernardini and Schlyter \(2004\)](#) claimed that mixing serves as a type of gap-filler in the weaker language, i.e., in the language that has not developed some characteristics that are already available in the other language. The Ivy Hypothesis thus assumes that the weaker language grows like ivy on the structural tree of the stronger language, so that only elements of the lower parts of the syntactic tree come lexically from the weaker language. For the children analysed in their study, they observed that mixing took place with elements that are high in the syntactic structure, and that came from the stronger language ([Bernardini and Schlyter 2004: 65f.](#)). A similar approach in which mixing is

taken as a strategy instead of as a consequence of language dominance has been taken by [Gawlitzek-Maiwald and Tracy \(1996\)](#) in their Bilingual Bootstrapping Hypothesis. They consider that “something that has been acquired in language A fulfils a booster function for language B” ([Gawlitzek-Maiwald and Tracy 1996](#), p. 903). The analysis of the spontaneous productions of a simultaneous English–German bilingual child shows that she is able to acquire both languages separately. However, for some particular phenomena, one language seems to be acquired faster than the other. The authors claimed that Hannah’s mixing patterns show evidence that “the language that develops at a slower rate for one particular type of construction profits from the faster language compared to monolinguals” ([Gawlitzek-Maiwald and Tracy 1996](#), p. 908). In her study of five simultaneous Italian–German bilingual children (1;6–5;0), [Cantone \(2007\)](#) has played down the relationship between mixing and language dominance. She pointed out that “directionality in mixing could be explained by dominance, but that dominance does not imply that mixing must be unidirectional.” ([Cantone 2007](#), p. 138). Put differently, children’s mixing patterns are not necessarily linked to language dominance, since, for instance, children do not always mix for lexical needs, as [Deuchar and Quay \(2000\)](#) have claimed. The cross-sectional study by [Poeste et al. \(2019\)](#) of bilingual, trilingual and multilingual children comes to similar conclusions, namely that CS and language dominance seem not to be directly related. If mixing is due to unequal grammatical development, as [Gawlitzek-Maiwald and Tracy \(1996\)](#) and [Bernardini and Schlyter \(2004\)](#) support, the Italian–German bilinguals in [Cantone’s \(2007\)](#) study should mix in those structures that have not been acquired in one of the languages yet. The analysis of mixed utterances in the critical periods of these bilingual children shows, however, that no evidence for booster or ivy effects could be attested ([Cantone 2007](#): 151f.).

Thus far, we have tried to summarise longitudinal studies that take the child’s language dominance/language preference into consideration. These have been defined on the basis of different quantitative and qualitative criteria as well as on the basis of certain types of constructions in language A that are more developed than in language B. Some studies have taken these two measures interchangeably in order to quantify the development of children’s L1s (but confer the empirical study of [Arnaus Gil and Jiménez-Gaspar \(2022\)](#) for a separated examination of each of these tools, namely MLU for language dominance and words per minute for language fluency). Some authors have considered mixing as a whole, while others have considered lexical vs. functional categories and higher vs. lower portions of syntactic structure. In what follows, we would like to consider those studies that have distinguished between different types of CS and have observed some relationship with language dominance. When it comes to the difference between intersentential and intrasentential mixing, [Nortier \(1990\)](#) observed that speakers with high proficiency in both languages produced a large quantity of intrasentential mixing. The studies by [Genesee et al. \(1995\)](#) and [Nicoladis and Genesee \(1998\)](#) only found a relationship between the type of CS and language dominance for intersentential mixing. Specifically, based on the production data of five French–English bilingual children living in Montreal, those that were dominant in one of their L1s presented high rates of intersentential CS in the children’s non-dominant language. For the balanced children participating in this study, intersentential CS could be attested at similar levels in both of their L1s. The longitudinal study of four French–German bilingual children by [Schmeißer et al. \(2016\)](#) follows from the studies of Genesee and his colleagues and examines intersentential and intrasentential CS in the children’s L1s. The authors also observed a connection between the former and language dominance: only those children that could be classified as being dominant in one of their languages present high rates of intersentential CS in the non-dominant language. As for balanced bilinguals, the authors observe that they do not use intersentential CS but prefer to mix within a clause (i.e., intrasentential CS).

Another way of looking at mixed utterances is to follow [Muysken’s \(2013\)](#) four mixing strategies, namely insertion, congruent lexicalisation, alternation and backflagging (cf. Section 2.1). When associated with the speaker’s choice for one of these strategies,

Muysken (2013: 714f.) claimed that this has to do with social, cognitive and linguistic factors. Concerning cognitive factors, language proficiency plays an important role: a higher proficiency in the languages under consideration will lead to congruent lexicalisation or alternation, since these strategies make use of both languages structurally and lexically “in real time”. By contrast, insertion (and probably also backflagging) requires less proficiency from the speaker’s side. As Treffers-Daller (2022) indicated, Muysken’s (2013) approach to CS by using these four strategies was described for adult speakers and it is still open whether this description can also be applied to child CS.

In the following section, we will discuss some child-external factors considered in the literature and that could influence the appearance of CS in the children’s L1s.

2.2.2. Child-External Factors

Community/Majority Language

When it comes to the impact of the majority language (MaL) in the use of CS, in her longitudinal study of six bilingual children who were raised simultaneously with English and Swedish in Sweden, Schlyter (1999) observed that children often used the vocabulary of the MaL into the context of the minority language (i.e., heritage language). The reasons for this pattern reside in the fact that some words in the MaL might best describe certain notions for the bilingual speakers who always speak the MaL but not the HL to a similar extent. A follow-up longitudinal study from Bernardini and Schlyter (2004) on five Swedish–French/Italian children aged between 2;0 and 4;0 living in Sweden also noted that, in the HL, children respond 50% of the times in the MaL, whereas they behave monolingually in the recordings in the MaL Swedish.

Nicoladis and Secco (2000) examined the mixing patterns of a simultaneous bilingual child between 1;0 and 1;6 being raised with Brazilian Portuguese and English and living in the US. They observed that more mixing occurred in the conversations with the parent who speaks the HL (26%) as opposed to the conversations with the parent speaking the MaL (7%). Patuto et al. (2014) investigated the appearance of intrasentential CS in both a longitudinal and a cross-sectional study with simultaneous bilingual children with the language combinations German–French/Italian/Spanish and French–Italian aged between 1;6 and 5;0 and living in Germany, Italy or Spain. The 19 children of the longitudinal study mix intrasententially to a higher extent in the HL than in the MaL. For 46 participants in a cross-sectional study, similar results could be attested, although the rates for intrasentential CS in the HL and the MaL were quite low for both (3.10% and 0.15%, respectively, cf. Patuto et al. 2014, p. 203). In another cross-sectional study carried out by Yamamoto (2001) on 167 Japanese–English children living in Japan, 85% of the children attended schools in the MaL and most of them had Japanese friends. Here, the author also observed a strong influence of the country of residence, i.e., the MaL, in the children’s use of the HL at home. Specifically, they tend to use Japanese in English conversations with their parents.

Family Language Policies

From a sociolinguistic point of view, family language policies (FLP) or family language strategies (Arnaus Gil et al. 2020) try to capture how and to what extent intergenerational transmission of the family’s language(s) takes place. Following Montoya and Mas’ (2012, p. 111) typology of parents’ linguistic practices, we are interested in families belonging to types (1) and (4). Families of type (1) are composed of parents who speak the same language, which is, at the same time, the language transmitted from parents to children. By contrast, type (4) is characterised by heterogeneous couples with heterogeneous linguistic practices. In these cases, the parents have different L1s and their children are exposed to both. Descriptions of intergenerational language transmission in this vein have their history mainly in speaker communities in which (at least) two languages have co-existed for long periods of time, such as Galician, Catalan and Basque in Spain. In this respect, some kind of societal bilingualism is present in these societies, in which there might be a language that expands its linguistic contexts of use at the expense of another language that

might experience some kind of recession (Fishman 1991, 2001). When it comes to exploring bilingualism from an individual point of view, research has focused much more on how language transmission might work for those languages in families that do not find any support outside the family nucleus. In this case, FLPs have attempted to give an account of the consistency in which the HL and the MaL are displayed within and outside the home. Consistency in the FLP chosen by a multilingual family seems to be tightly linked to the child's competence in their L1s. Chevalier (2015), as well as Kasuya (1998) and Lanza (2004), observe that a straightforward preference for the HL at home also promotes consistency in the child's output. From the six types of FLP put forward in Romaine's (1995) work, the strategy 'one person-one language' (OPOL) has been the one that has captured most of the body of research in this field, maybe due to its popularity and to the fact that it was one of the first strategies to be identified and recommended for a successful early child bilingualism (Ronjat 1913). Following Arnaus Gil et al. (2020, p. 3), four family language strategies or FLPs can be considered, as can be seen in Table 1:³

Table 1. Family language policies (adapted from Arnaus Gil et al. 2020, p. 3).

FLP 1: 'one person-one language'(OPOL) with home support of the majority language
FLP 2: OPOL with an extra majority language outside the home
FLP 3: 'one language-one environment'
FLP 4: bilingual parents with mixed languages

Other aspects tightly connected to the family choice for a certain linguistic policy seem to be of great importance, such as the HL-competence of the non-native parent (or at least HL-understanding) and whether the family has decided to speak one language when all family members are present (Arnaus Gil and Jiménez-Gaspar 2022, p. 43). Furthermore, implicit language ideologies might also shape not only the decision on FLP, but also how family members interact with each other and influence their language behaviours (Curdt-Christiansen 2009, 2013; Schwarz and Verschik 2013; Lanza and Curdt-Christiansen 2018).

In the 90s, some studies had already pointed out that children seem to code-switch less with people that do not accept CS and, thus, follow a straight monolingual strategy when interacting with the child (Lanza 1990; Döpke 1992; Schlyter 1999). Therefore, the Interaction Hypothesis claims that mixing patterns in the input may affect children's output, something that the study of Allen et al. (2002) confirmed. They found out that the proportion of mixed utterances is similar for children and caregivers within each child caregiver pair, and thus, children seem to mix at similar rates to their adult interaction partners. Nicoladis and Genesee (1997) analysed the rates of parental and child CS in seven families in two different age periods and noted that this relationship could only be attested when children were between 3;0 and 3;6 (and not between 2;0 and 2;6). In the same vein, if parents are successful in keeping the strategy OPOL, we might predict low mixing rates in children's speech. In fact, this is what the influential work by Lanza (1990) also found. In the one-to-one interactions of Siri, a bilingual English-Norwegian child, with her parents, she mostly addressed them in the desired language. In triadic interactions, she mostly switched languages when speaking to each interlocutor. Genesee et al. (1995) investigated whether parental mixing may influence children's speech, at least when it appears systematically in the input. They analysed spontaneous data from five families living in Montreal. Three families indicated following the OPOL strategy and two were said to mix their languages when talking to their children. The results of the study show, as in Lanza (1990), that children differentiate between their languages in their monolingual and triadic interactions. Moreover, they could attest to a higher rate of intra- rather than intersentential CS from the parents when addressing their children (although the rates were generally quite low). This behaviour did not cause more mixing in the children's utterances, which indicates no relationship between the two. The cross-sectional study by De Houwer (2007) looked at different language use patterns in relation to child language

use for 4.556 bilingual children (1.899 families) aged between 6;0 and 10;0 who lived in Flanders and acquired simultaneously Dutch and another L1 (or X). The patterns of the parents' language use were classified according to three categories: (i) OPOL (11.4%), (ii) partially overlapped, in which one parent is monolingual Dutch or X and the other is bilingual with Dutch and X (33.52%) and (iii) entirely overlapped, where both parents are monolingual speakers of X or both are bilingual speakers of X and Dutch (55.34%). [De Houwer \(2007\)](#) found a great discrepancy between parental input and child language use. Specifically, she observed that parents tend to stick to a monolingual use of their L1s, while children mostly opt for the use of the bilingual strategy Dutch + X. She further detected a decrease in language use in X (from 40% in the parents to 20% in the children). In the previous section, we have already described the study of [Patuto et al. \(2014\)](#) concerning the results of longitudinal and cross-sectional studies in CS use depending on the variable MaL–HL. Now, we would like to report on the results concerning FLP in the cross-sectional study. With the aid of a background questionnaire, the authors could gather information on FLP and family language (FL) for some of the children who participated in the study. For the sake of exposition, the authors displayed the results with respect to FLP by dividing the children into those who received OPOL and those who received another strategy different to OPOL. With respect to the use of intrasentential CS, the 46 bilinguals participating in the cross-sectional study code-switched at similar rates irrespective of the FLP chosen by their respective families ([Patuto et al. 2014: 205f.](#)). [Poeste et al. \(2019\)](#) analysed the mixed utterances in a large cross-sectional study with 122 children being raised bi- or trilingually with a focus on the early acquisition of Spanish, French, Catalan and German. From these participants, the authors could obtain information on FLP from 57 children with the aid of a background questionnaire. Of the children who code-switched, only 37% had parents using OPOL; the rest of the children (63%) received mixed input from one of the parents at least. Of the 38 children who did not code-switch, the FLP most frequently used was OPOL (58%). These results indicate that choosing OPOL may in fact help to keep CS rates low in the child's productions. Finally, we would like to report on a recent empirical study by [Cantone \(2019\)](#) on multilingual families, FLP and the child's language use. Four families that could be divided into two groups, depending on their family language profiles were recruited. Families 1 and 2 were composed of bilingual fathers and mothers who followed OPOL with no MaL presence at home. The children of these families were raised trilingually. Families 3 and 4 included one bilingual and one monolingual parent, the latter speaking the MaL to the child. The MaL was present at home, and thus, their children were raised bilingually. The study further incorporated information on grandparents' input ('extended families', cf. [Cantone 2019, p. 11](#)). An analysis of relative input showed that children in family 4 spoke the MaL to everyone, irrespective of their conversation partner, and that trilingual children from families 1 and 2 used all languages to a different extent. [Cantone \(2019, p. 10\)](#) observed that parents of bilingual families (i.e., families 3 and 4) did not consistently transmit the HL, whereas parents of families 1 and 2 did, probably because their partners also spoke an HL to their children.

Family Language

To our view, only a few studies have addressed this question when dealing with mixing utterances in multilingual children's productions. From the study by [Genesee et al. \(1995\)](#), three families indicated using English and French when addressing to each other, one family indicated that the father spoke French and the mother used English when talking to each other, and the last family used English in these situations. The results considering children's language use showed no influence on family language choices. [Cantone's \(2019\)](#) study on four multilingual families reported that the language between the parents was, for all families, German, since there was little competency in the partner's HL. This increases, in fact, the amount of German input in all families, especially for those who raise their children bilingually (i.e., families 3 and 4 in her study) and facilitates higher rates of German output in the children's productions. Finally, the cross-sectional study of [Poeste et al. \(2019\)](#)

also informs on the FL choice that could be extracted from the background questionnaire. Families indicated whether they had an FL or not and, if so, whether they used one FL or more. The authors observed a one-way relationship between mixing and FL-availability: “[...] having more than one family language does not cause code-mixing but children who mix their languages do often speak more than one language in their family communication.” (Poeste et al. 2019, p. 480). Therefore, it seems to be the case that having more than one FL shows a positive acceptance of CS from the parental side, which might also be found in the children’s productions: “A liberal attitude towards code-mixing on the part of the parents will possibly give rise to a liberal use on the part of the child as well.” (Poeste et al. 2019, p. 480).

Siblings

Most studies in the previous sections seem to indicate that mixing patterns in children’s input may affect their output. So far, we have focused on the parents’ speech addressed to children. However, one important figure in family interactions is that of siblings, since they are the siblings’ direct play mates, and the interaction with peers of the same age may develop differently from that with their parents. Therefore, they are an important source of language for younger siblings and act as ‘input givers’. In his study from 2001 with 167 Japanese–English children living in Japan, Yamamoto also analysed the collected data from his 1985 and 1990 studies. He reported that when interacting with each other, siblings used Japanese in 80% of the cases. The remaining 20% of siblings’ productions were composed of English or mixed (i.e., Japanese and English) productions. The bilingual Japanese–English data collection, carried out in 1990 in international schools in Japan, showed that, in this case, 54% of siblings used the MaL, 31% used English and only 15% mixed both. These results indicate that siblings continue preferring MaL Japanese in their everyday conversations, although attending international schools where HL English finds some kind of support seems to favour HL use in almost one-third of the cases. We also observed from this study that siblings mostly opt for using one language rather than mixing them. Another important study was carried out by Barron-Hauwaert (2011) on 105 families that were composed of 74 sets of siblings. She was interested in the language(s) the child preferred to speak when addressing their siblings. More than half of the sibling pairs preferred to use one of their parents’ languages with their siblings, followed by mixed language use (cf. Barron-Hauwaert 2011, p. 59, fig 3.1). Again, children seemed to prefer to communicate with their siblings in a more monolingual way. When considering the language choice between siblings and the language at home and at school, she noticed that school language works as an important factor in deciding the siblings’ choice of a preferred language. Hoff et al. (2014) reported similar results to those in Barron-Hauwaert (2011). In this case, they analysed the data from 47 Spanish–English bilingual children living in the US aged between 1;0 and 2;6. In a nutshell, they noticed that older siblings increased the exposure of the younger siblings to MaL English, and this took place not only by using more English with them but also by influencing the frequency of English used by their mothers. Cantone (2019) also states that the presence of siblings affects FLP within the family. As an example, she reports on the differences between trilingual siblings when interacting with different family members (these were families 1 and 2 in her study, i.e., the parents used OPOL, they were both bilingual and spoke the respective HL with their children, cf. section FLP) and finds relevant differences between first-born and later-born children: while the former adapted their language use according to the conversation partner, later-born children addressed every family member in MaL German. Finally, we would like to report on a recent cross-sectional study on siblings’ language use of Catalan (HL) and German (MaL) by Jiménez-Gaspar and Arnaus Gil (2022). Sixteen bi- and trilingual children participated in this study; they were composed of two sibling groups with two siblings and one sibling group with four children; the remaining eight children either had no siblings or were first-born children with siblings who were too young to participate at the time of data collection. With respect to the interaction between younger siblings and

their parents, the study shows that they used Catalan 60% of the time, when speaking with the Catalan-speaking parent. The remaining 40% of time was spent addressing the parent speaking the HL in German only or code-switching. For the parent speaking the MaL, the younger siblings spoke in German in 80% of the cases and they code-switched in 20%. Older siblings behaved similarly to younger siblings when it came to the use of MaL German (high rates of monolingual German, no Catalan with the German-speaking parent, some mixing). By contrast, when addressing the Catalan-speaking parent, we observe an even distribution of Catalan only (33.3%), German only (33.3%) and mixed utterances (33.3%). This seems to indicate that the input in the MaL increases drastically with school attendance and, therefore, output in the HL decreases. Lastly, we turn to the siblings’ language use when interacting with each other. Jiménez-Gaspar and Arnaus Gil (2022, p. 196) show that from all three sibling groups, none of them used the HL exclusively (Catalan) as a communication tool. One sibling group used MaL German exclusively, whereas the other two sibling groups used both the MaL and one of their HLs (i.e., Catalan or English) as their means of communication.

Section 3 focuses on the Catalan community living outside the Catalan-speaking regions in Spain. Since our main interest resides in the Catalan-speaking community living in Germany, we will mostly focus on this speaker community.

3. Catalan Speakers Abroad

Currently, there are more than 350.000 Catalan native speakers (henceforth CatS) living abroad (INE (Instituto Nacional de Estadística) 2022). They came from the three Catalan-speaking territories in Spain, namely Catalonia, the Valencian Community and the Balearic Islands. Germany is the third country with the most CatS, following France and Argentina. Figure 4 shows the fifteen countries where the most CatS reside at present (INE (Instituto Nacional de Estadística) 2022):

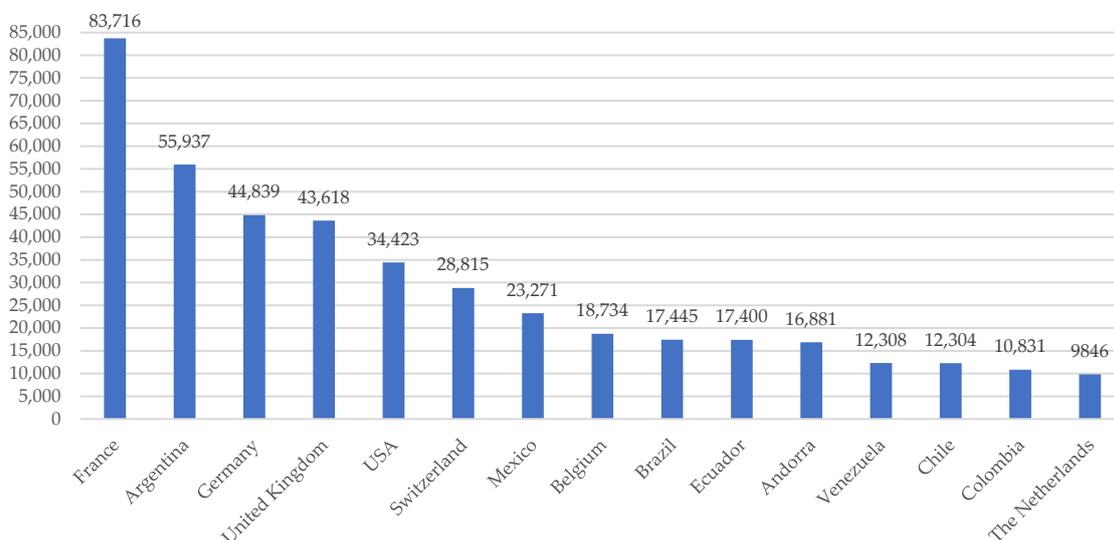


Figure 4. Number of CatS living abroad during 2021 (INE (Instituto Nacional de Estadística) 2022).

If we focus on the number of CatS residing in Germany in the last decade, the Spanish Institute of Statistics INE reports an increase of 60% from around 18.000 in 2011 to almost 45.000 in 2021; that is, there are 27.000 more CatS living in Germany. Looking at the data from 2021 of CatS residing in Germany according to age, we observe that the vast majority belong to the age group between 16–64 (around 30.000 CatS that constitute 67% of the total), followed by the group of CatS under 16 (around 12.000, that is, 27%) and, finally, the group comprised of CatS aged 65 and above (6%, around 3.000 CatS). Therefore, it is possible to consider that the population above 16 constitute the first generation of CatS immigrants from Catalan-speaking areas of Spain living in Germany. Likewise, those children and

teenagers under 16, who were generally born in Germany, can be considered as the first generation of speakers of the HL Catalan. The participants of our study mainly come from Hamburg. The increase of CatS in this German city is of 210.8% when comparing the electoral list of the last ten years (Federació Internacional d'Entitats Catalanes [FIEC \(Federació Internacional d'Entitats Catalanes\) 2022](#)) with the total of 2.141 registered CatS in the current electoral list.

Due to the rise of the Catalan community in Germany, there exist different associations that help newcomers and organise meetings with other CatS to promote and encourage the use of Catalan in this community. In the case of children, classes of Catalan as an HL are offered by native Catalan adults twice a month. According to the Generalitat de Catalunya ([GENCAT 2020](#)), the Balearic Government ([Buades Crespí et al. 2001](#)) and the Valencian administration (SEACAVA, cf. Centre Valencià a l'exterior [CEVEX \(Centre de Valencians a l'Exterior\) 2020](#)), there are ten Catalan communities (promoted by their respective regional governments) with more than 750 active members in different cities, namely Essen, Kiel, Hamburg, Cologne, Munich, Berlin, Stuttgart, Frankfurt, Berlin and Mainz (see [Arnaus Gil and Jiménez-Gaspar 2022](#), for more information). This fact is relevant, given that the data of the present study have been gathered from children who belong to one of these associations, namely *El Pont Blau*. With the aid of this Catalan association, we were able to contact different families composed of at least one Catalan-speaking native parent speaking Catalan to their children (see Section 5 for more information related to the children of this study).

4. Previous Studies on the Early Acquisition of Catalan as an HL

The literature focusing on Catalan as an HL is negligible and it is mainly located in the United States, primarily in New York. [Casesnoves-Ferrer and Juarros-Daussà \(2015\)](#) analysed 62 Catalan-speaking participants with the administration of a questionnaire composed of seven sections with a total of 68 questions. This analysis aimed to determine the factors that promote intergenerational transmission, the use of languages in the media, the speakers' linguistic attitudes towards Catalan, Spanish and English and their identities across the different cultures (Spanish, Catalan and American). Given that 33 out of 62 speakers had children, the analyses focused on those participants in detail. The authors concluded that Catalan has more possibilities to be transmitted from one generation to the other when Catalan-speaking parents presented high competencies in Catalan, when they had not lived in the US for so long, and when their attitudes towards Spanish culture were more indifferent (that is, they identified more with Catalan culture than the Spanish culture and language).

[Casesnoves-Ferrer and Juarros-Daussà \(2012\)](#) and [Juarros-Daussà \(2013, 2021\)](#) described a part of this Catalan community from a qualitative perspective, considering the linguistic practices of these families, their ideologies and other qualitative factors, in order to analyse the reason for transmitting Catalan to the next generation. All these families were composed of (at least) one native speaker of Catalan who had been raised bilingually in Catalonia and attended public schools in the period right before or after democracy was restored in Spain.⁴ More specifically, they interviewed 15 Catalan-speaking families (belonging to the (upper)middle class) with a total of 29 children during the period between 2008 and 2018. Catalan, Spanish and English were considered in the linguistic transmission analysis. The authors stated that the transmission of the MaL English was guaranteed due to the fact that children received input in this language not only outside but also at home. However, when comparing the situation of Spanish and Catalan, the authors noticed that in nearly 80% of cases, Catalan was prioritised over Spanish. It was clear from the families' language goals that they wanted their children to acquire advanced skills in Catalan. However, only 13 of 20 Catalan-speaking parents indicated that they had similar expectations for Spanish ([Juarros-Daussà 2021](#)). This observation is interesting if we consider that both Spanish and English are common languages within the community, more frequently than Catalan and English. If we focus on Catalan as an HL in Germany,

we find that the literature is scarce; however, little by little more research is being done on this topic due to the rise of Catalan speakers living in this country (cf. Section 3).

Arnaus Gil et al. (2020) examined child linguistic data obtained with the aid of several elicitation tasks from a cross-sectional study considering bi-, tri- and multilingual children (mean age 4;9) who acquired Catalan, Spanish, German and French either simultaneously or as early sequentials (Arnaus Gil et al. 2021). In order to measure language competence in the children's L1s, the authors administered the *Peabody Picture Vocabulary Test* (PPVT). The children were born and were living in Germany or in the Catalan regions in Spain. That means that data could be gathered for Catalan, Spanish and German as majority and heritage languages, while French was only considered as an HL. The authors compared the data from four children (mean age 5;0) living in the German cities of Berlin and Hamburg and acquiring Catalan as an HL to the twelve children (mean age 5;6) growing in the Spanish city of Palma de Mallorca, where Catalan and Spanish are official languages. In a nutshell, three out of four children living in Germany showed a balanced competence of Catalan with at least one of their other L1s (the MaL German or other HLs, Spanish or French). Moreover, regarding the Catalan PPVT, both groups of children (from Germany and from Spain) presented similar scores (Poeste et al. 2019). Two recent studies by Arnaus Gil and Jiménez-Gaspar (2022) and Jiménez-Gaspar and Arnaus Gil (2022) offer a different approach to measuring the children's development of Catalan as an HL considering child-internal (language dominance and language use, cf. Section 2), and child-external factors, such as FLP and FL. The results of the two previously mentioned studies show that the factors FLP and FL (either choice of the MaL or the HL as FL or even no FL at all) present significant differences across children when comparing their development in their L1s.

5. The Study

5.1. Participants

Sixteen simultaneous Catalan–German children participated in our cross-sectional study, with a mean age of 5;7 (aged between 2;6 to 13;0). Fourteen of them were born in the German city of Hamburg, while one child (Lena 2;8,10) was born in Essen (Nordrhein-Westfalia, Germany) and another (Alba 10;6,22) in Barcelona (Catalonia, Spain). All children received Catalan input at home from one (or both) of their parents, who are native speakers of Catalan⁵; 12 out of 16 children also received German input from their parents, and 4 out of 16 were exposed to German at school or in preschool. Thus, they received Catalan from one parent and another language (L_C , cf. Table 2) from the other parent. Most of the families participating in this study were, therefore, composed of at least one Catalan-speaking parent ($N = 15$), while the family of Duna consisted of two Catalan-speaking parents. Likewise, while 12 children were Catalan–German bilinguals, 4 were trilinguals, with Catalan, German and another language (L_C), namely, English or Thai. In that regard, children who present an L_C were exposed to that language at home. More specifically, Pau receives Thai from his mother and Emily receives English from her father. In the case of the siblings Nil and Mila B., their father speaks two languages to them, namely German and English, and their mother directs her speech in Catalan and English (see Section 6.3.1 about the FLP of each child).

Table 2 recapitulates the information expressed in this section according to the age and L1s (L_A , L_B and L_C) of each child:

Table 2 can be divided into two groups of children: (i) siblings and (ii) first-born children.⁶ The first eight children in Table 2 form three groups of siblings. Group 1 is composed of Jan and Julia K., Group 2 has four sisters, Kenya, Dana, Mila and Nina P., and Group 3 is represented by Nil and Mila B. The remaining eight children (from Lena to Alba) are grouped as first-born children without siblings.

Table 2. Children according to age and L1s.

Child	Age	L _{A+} L _B	L _C
Jan K.	5;2,25	Catalan - German	
Julia K.	7;7,15	Catalan - German	
Kenya P.	2;11,21	Catalan - German	
Dana P.	5;10,22	Catalan - German	
Mila P.	11;2,18	Catalan - German	
Nina P.	13;3,22	Catalan - German	
Nil B.	4;3,11	Catalan - German	English
Mila B.	5;9,10	Catalan - German	English
Lena	2;8,10	Catalan - German	
Duna	3;11,25	Catalan - German	
Pau	4;3,22	Catalan - German	Thai
Magalí	4;10,23	Catalan - German	
Emily	5;1,16	Catalan - German	English
David	5;8,18	Catalan - German	
Júlia S.	5;9,16	Catalan - German	
Alba	10;6,22	Catalan - German	

5.2. Methodology

We analysed synchronic data from two different sources: (i) spontaneous recordings and (ii) input questionnaires. First, children were video-taped for approximately 30 min in each of their L1s at their homes without the presence of their parents. The spontaneous conversations were engaged with native Catalan- and German-speaking adults. Moreover, trilingual children were recorded in their third language English (in the case of Nil, Mila B. and Emily) and Thai (in the case of Pau). The order of the L1s in the recordings was established according to the children’s preferences; that is, if children felt more comfortable speaking Catalan than German, researchers decided to begin with that language to obtain a more relaxed atmosphere. After recording the spontaneous conversations, Catalan and German native speakers transcribed them and calculated the MLU and fluency values (cf. Section 5.3). After that, other native speakers double-checked the transcriptions as well as the calculations of MLU and fluency assessments. The second part of the study consisted of a questionnaire that the parents filled in. The questionnaire focused on current and cumulative input based on the works of Unsworth (2013) and Torregrossa and Bongartz (2018). The questionnaire is composed of 11 different sections centred on the quantity and quality factors of the input that children receive(d) from their different L1s (cf. Arnaus Gil and Jiménez-Gaspar 2022, for a more detailed description). Regarding quantity factors, we examined the amount and cumulative input, as well as FLPs and FL. Concerning quality factors, we analysed the family’s linguistic competences, the cultural contact, the children’s linguistic domains and the family’s support of bi-/multilingualism.

5.3. Language Dominance and Language Fluency

The bilingual and trilingual children participating in this study were classified according to language dominance and fluency. One of the tools to best capture a child’s language development is by using MLU (mean length of utterance) (cf. Müller et al. (2007), for an overview of other linguistic tools for language dominance). The MLU measure allows us to determine the language proficiency of the child’s different L1s. In this study, the MLU values were considered, taking into consideration some strategies to balance cross-linguistic differences (see Müller et al. 2007 for more information). For the sake of representation and in order to avoid small groups with arbitrary cut-off points, we have followed the works by Treffers-Daller and Korybski (2015) and Wu and Struys (2021) on representing language dominance as a continuous variable.

Figure 5 presents the MLU values for the HL Catalan (orange) and the MaL German (blue) for all 16 children. The children are ranked according to the difference calculated by subtracting the German MLU from the Catalan MLU (MLU difference or MLUD⁷). At the

left end of the MLUD dotted line we find Nina (13;3,22), who presents the highest negative MLUD value, showing a strong dominance towards Catalan, while Magalí (4;10,23) at the right edge of this line with the highest positive MLUD value, indicates her dominance towards German, the MaL.

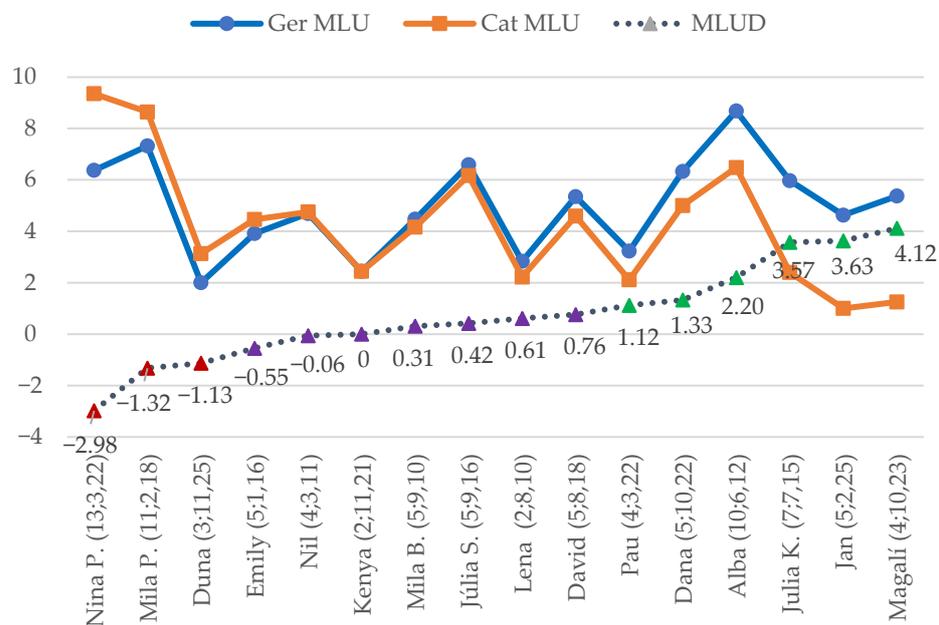


Figure 5. Children’s MLU in the MaL German and the HL Catalan and MLUD.

Taking the MLUD values into consideration, we can classify the children according to their language dominance. Following [Arencibia Guerra \(2008\)](#), the children that present an MLUD between 0 and 0,9 are balanced bilinguals; that is, their language proficiency is similar in both languages. If the MLUD value is 1 or more, a dominance towards one of the child’s L1s is attested: (i) three children are Catalan-dominant (Nina, Mila P. and Duna), marked with red triangles, since their MLUD value is higher than 1 and negative; (ii) seven children are balanced (from Emily to David, marked with purple triangles), given that their MLUD values are between 0 and 0,9; (iii) six children are German dominant (from Pau to Magalí, marked with green triangles) because their MLUD values start at 1.12 (positive values). We observe an even distribution of balanced and German dominant children, which makes out 80% of the data, followed by three Catalan dominant children (19%). Put differently, 63% of the multilingual children are balanced or show dominance in the HL Catalan. By examining the relationship between language dominance in a certain language dominance is not attested at a particular age. Therefore, it is not the case that the older the children are, the more dominant they are in MaL German. In fact, if we compare the MLUD in the different groups of siblings, no similar patterns can be observed: (i) in the first group, both Jan and Julia K. are found at the right edge of the continuum, indicating a dominance towards German; (ii) the first-born Mila B. and her youngest brother Nil are balanced, and (iii) the four sisters are located at different parts of the language dominance continuum (the older siblings Nina and Mila P. are to be found at the left, the youngest child Kenya is in the middle and Duna, the third-born child, can be observed at the right of the continuum).

Another important criterion that allows us to describe the children’s linguistic development is language use. This measurement can give us insights into language automatism, that is, how quickly the child accesses their L1s when speaking ([Müller et al. 2007](#); [Arencibia Guerra 2008](#); [Hager 2014](#)). Previous studies have proposed the use of quantitative tools to assess children’s language use, such as fluency based on words per minute ([Arencibia Guerra 2008](#)), as well as children’s number of utterances in speech directed to their parents both in the target and in the non-target language ([Döpke 1992](#)). In this study, we assessed

fluency, as calculated via words per minute, by counting all Catalan words in the Catalan recording and doing the same for German in the German recording. Later, we divided the total amount of words of each recording by the length (in minutes) of the recording (cf. [Arencibia Guerra 2008](#)).

Figure 6 depicts three different pieces of information for each of the sixteen children participating in the study, organised again in a continuum from the child who presents a higher fluency in Catalan, Emily, to the child with a higher fluency in German (Nil). Similar to Figure 5, the values of fluency in German are represented with the blue line, the ones for Catalan are shown in orange, and the difference between the German and Catalan fluency values (FluencyD) is displayed with a dotted line:

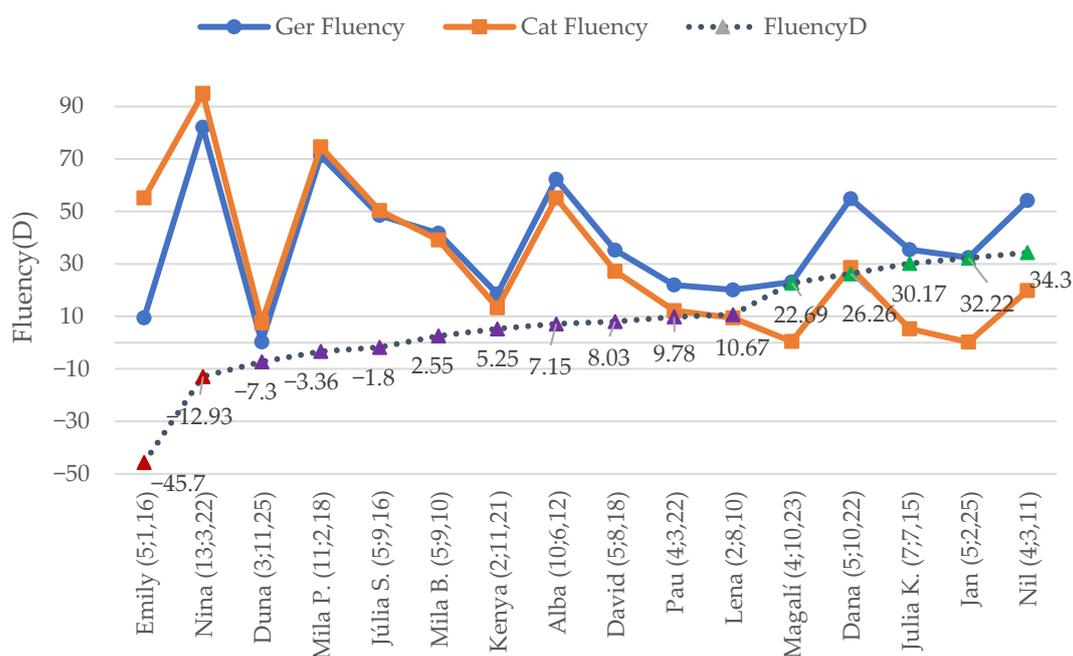


Figure 6. Children’s fluency in the MaL German and the HL Catalan.

Following [Arencibia Guerra \(2008, p. 127\)](#), a similar language fluency is achieved when the FluencyD value is up to 11.99 words per minute. This can be calculated by subtracting the German fluency values from the Catalan ones. If the FluencyD value results in 12 words per minute or higher, the child is more fluent in one of the languages (positive value: towards German; negative value: towards Catalan).

What we can observe in Figure 6 is that many children (10⁸ out of 16) have a similar language fluency in both languages (cf. purple triangles in Figure 6). Of the remaining six children, five are found at the right edge of the dotted line (and, thus, showing a higher fluency in German), and are marked with green triangles, and one child is located at the left end of this line (marked with red triangles), presenting a higher fluency in Catalan. In this respect, we can identify ten children (62.5%) that display a similar fluency in both languages, German and Catalan, while six children (37.5%) show a higher fluency towards the MaL or the HL.

When comparing the language fluency of the different groups of siblings, we observe similar results, as opposed to what has been reported for MLU; that is, there seem to be no differences across age: (i) Jan and Julia K. present similar fluency values, which are higher towards German. (ii) Nil and Mila B. show different fluency values: the youngest child, Nil, is to be found at the right end of the continuum, indicating a higher fluency in German, while Mila’s fluency in both languages is similar; (iii) three out of four sisters (Nina, Mila P. and Kenya) have similar fluency values in both languages, while Dana’s FluencyD value is located towards the right end of the continuum.

5.4. Research Questions and Hypotheses

After having discussed previous studies focusing on CS and the impact of child-internal (language dominance, fluency) and child-external factors (FLP, FL and the role of older siblings), we aim to be able to answer the following research questions (RQs). Our hypotheses (H) for each RQ are based on the literature previously explored in Section 2. Research questions RQ1–RQ2 relate to child-internal factors, while RQ3–RQ5 are related to child-external factors.

RQ1: Do dominant children show higher CM rates compared to balanced children?

Hypothesis 1 (H1): *Several authors (Lanza 1992, 1997; Schlyter 1993; Nicoladis and Genesee 1997) have argued that language dominance establishes the direction of CS. Specifically, Bernardini and Schlyter (2004) indicated that CS is a tool that acts as a gap-filler in the weaker language, mainly in the cases where children have not developed some elements in their weaker language that have already appeared in their dominant language. Thus, we predict that if children are dominant in language A, higher rates of CS should be attested in language B, that is, in the non-dominant language.*

RQ2: Is there a relationship between fluency and CS types (inter-/intrasentential)?

Hypothesis 2 (H2): *Following Arnaus Gil and Jiménez-Gaspar (2022), fluency deals with the promptness with which children access their different L1s. In this study, we assess fluency according to words per minute. Therefore, if fluency represents the more-or-less quick access to the child's L1 when speaking, children with a similar fluency in their L1s should be able to access their L1s in a similar way, and, thus, they should be able to use linguistic material from both languages within a sentence.*

RQ3: Is there a relationship between parents' monolingual use of their language and low mixing rates in children's output?

Hypothesis 3 (H3): *Considering that the families are successful in using OPOL, children who follow FLP1 (OPOL) and FLP2 (OPOL + MaL) should show lower mixing rates than children from FLP3 and FLP4. Children's output would, thus, reflect children's input.*

RQ4: Does the absence of the MaL as FL positively influence low mixing rates in the HL Catalan?

Hypothesis 4 (H4): *If so, following De Houwer (2007, 2009), we predict low rates of CS in Catalan in those families that have chosen Catalan as their FL. For those families with no FL, FLP becomes relevant.*

RQ5: Does the input provided by older siblings have an impact on young siblings' output?

Hypothesis 5 (H5): *If older siblings are seen as 'input-givers' and they are exposed to the MaL at home, it could be the case that they present higher rates of CS in the HL Catalan.*

6. Results

6.1. General Results

Several child-internal and child-external factors have been analysed based on the input questionnaire provided to the participating families in order to cross-check whether they have an impact on the production of CS in the majority and heritage languages. Concerning internal factors, we focused on the children's language dominance and language fluency (Section 6.2). In Section 6.3, external factors, such as FLP and family language, as well as siblings' interaction, will be analysed. Before exploring the relationship between these factors and the CS productions, we present some general results. Specifically, we would like to show the CS rates that each child produces, the language where CS typically appears

(either in the MaL German and/or the HL Catalan), the type of CS (intra- or intersentential), as well as the possible relationship between age and CS productions.

In a nutshell, when considering both German and Catalan recordings together, the whole data set is composed of a total of 5.965 structures. From these approximately 6.000 structures, 5.392 were produced in the language expected by the adult. This represents 90.5% of the data. Instances of CS were found for 573 structures, which constitutes 9.5% of the data. Furthermore, when we examined the children’s productions separately, we observed that only a few children code-switched.

Figure 7 shows the total amount of children’s productions by subtracting (i) the basis, that is, the monolingual productions that were uttered in the desired language, and (ii) the structures where the child code-switched, based on the language of the recording, but not the type of the CS. Put differently, Figure 7 presents the data for the Catalan and German settings separately and ranks the children according to the CS rates in the Catalan and German recordings. The Catalan recordings are located in the y-axis between 0 and –100% and consist of monolingual productions (dark blue, i.e., the basis) and CS (light blue). The representation of Catalan with negative percentages does not mean that Catalan develops negatively; it is a way to show both sets of data for each child in the same column. The German recordings are displayed in the y-axis between 0 and +100% and are also distributed according to the monolingual productions (dark orange) and CS (light orange). The children are ranked according to the highest amount of CS in the HL setting.

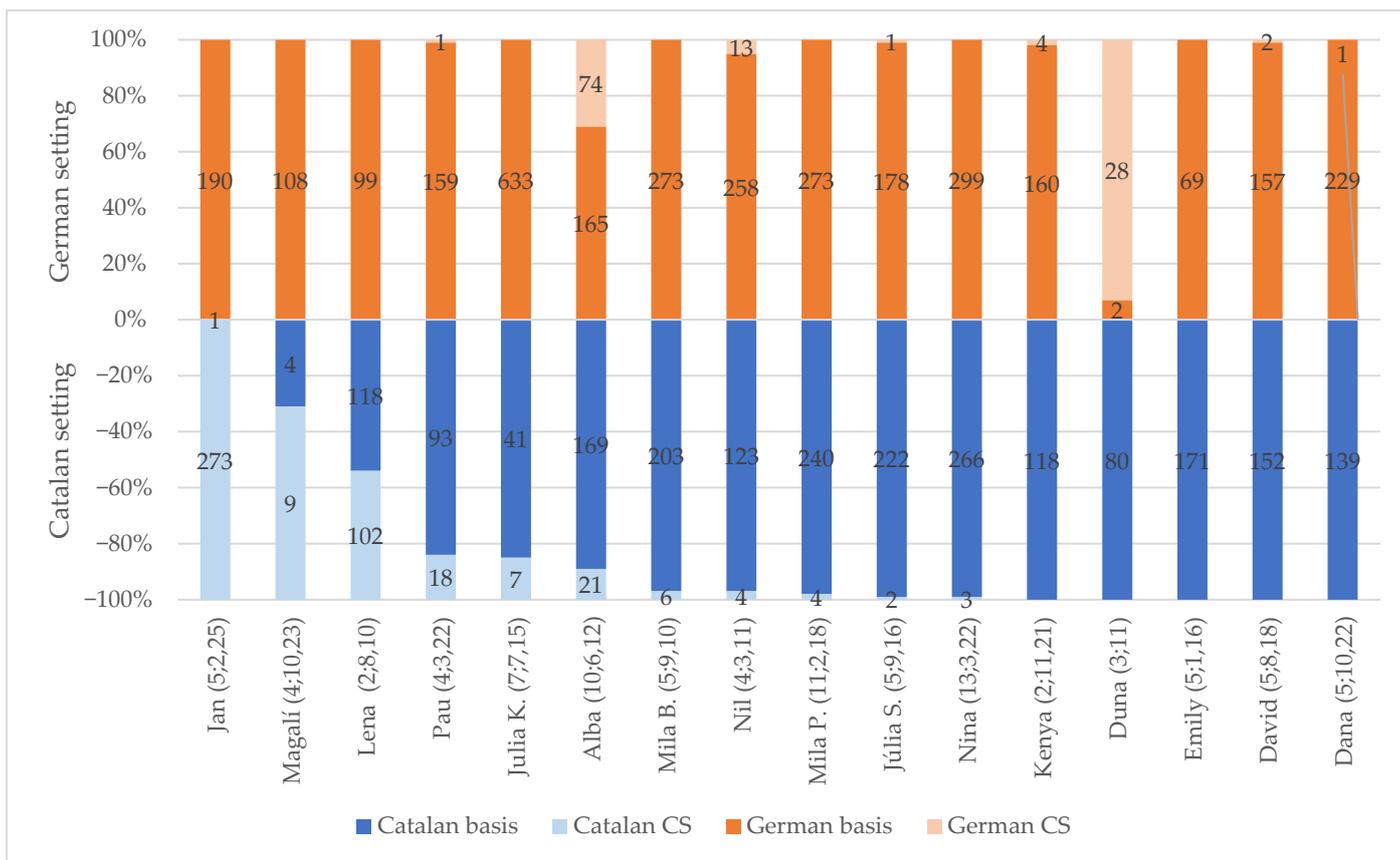


Figure 7. Total amount of monolingual productions (basis) and CS depending on the language of the recording for each child.

What we can observe from this figure is that eleven out of sixteen children (Jan, Magalí, Lena, Pau, Júlia K., Alba, Mila B., Nil, Mila P., Júlia S. Nina and Kenya) code-switch to different degrees when speaking in Catalan, while eight present CS in German (Pau, Alba, Nil, Júlia S., Kenya, Duna David and Dana). Likewise, note that out of sixteen children,

only four (Pau, Alba, Nil and Júlia S.) code-switch in both languages, and one child, Emily, does not code-switch at all. Taking a closer look at Figure 7, we can further observe that there are seven children that display CS rates higher than 10% (five in Catalan and two in German). Of these seven children, two produced CS in almost the entire recording, namely, Jan in Catalan (100%) and Duna in German (93%). Interestingly, these two children do not present CS in the other language (that is, in German for Jan and in Catalan for Duna). Magalí and Lena also present high CS rates in only one of the recordings, namely, in HL Catalan (69% and 46%, respectively). They are followed by Pau (16%) and Júlia K. (13%) with CS in HL Catalan too. The remaining children who code-switched produced between 8% (Alba) and 1% (Nil, Mila B., Mila P., Júlia S. and Nina) CS in Catalan, while Kenya, Duna, Emily, David and Dana did not produce CS in the Catalan setting. In the German data, in addition to Duna, who code-switched in 93% of the cases, only one child, Alba, code-switched more than 10%. The rest of the children who used CS presented percentages between 1% and 5% (Pau, Nil, Júlia S., Kenya, David and Dana). Interestingly, eight out of sixteen children did not present any mixed structure in the German recordings.

In a nutshell, we have observed that there are cases where the presence of CS is at its minimum. For example, Dana and David only produced one or two mixed structures in German. A similar pattern is found in Kenya's productions, which only exhibited four CS utterances in German. Júlia S. code-switched three utterances, one in German and two in Catalan. What is important from Figure 7 is that CS is more frequent in the HL Catalan than in the MaL German.

Let us go a step further by looking at the CS rates, considering the effect of child-internal (Section 6.2) and child-external factors (Section 6.3). In Section 6.2, we examine the rates and the types of CS (inter- and intrasentential), considering child-internal factors such as language dominance and language fluency.

6.2. Child-Internal Factors

Thus far, we have looked at some general results concerning the overall appearance of CS in the spontaneous recordings from the bilingual and trilingual children participating in the study with Catalan (and eventually another language) as the HL and German as the MaL. We have shown how frequent CS is, how this mixing is distributed according to the heritage and majority languages and, finally, whether all children code-switched to a similar extent. In what follows, we would like to be in line with the literature presented in Section 2.2.1 and see whether child-internal factors, such as language dominance and fluency, might explain the CS patterns found in the data.

Let us start with the relationship between CS and language dominance. We classified the participants according to their language dominance, which we calculated according to the MLUD (cf. Section 5.1). Figure 8 shows the relationship between basis, CS and language dominance.

The 16 children participating in this study are, once again, ranked according to their MLUD values. Moreover, we opted to mark each child's monolingual dotted bars with the aid of red, purple and green colours in order to display the information on Catalan dominance, balanced behaviour or German tendency, respectively, following children's MLUD values in brackets after each child's name. As can be seen in Figure 8, the children who have been identified with more than 10% of mixing rates (Duna, Lena, Pau, Alba and Jan) are found along the language dominance continuum. On average, balanced children and children at the left edge of the continuum have CS rates between 3% and 5.6%, respectively. These CS rates are in line with the results from previous studies on CS, which have reported percentages that are not higher than 6%. Interestingly, by looking at the children located on the right side of the continuum, we observe fairly high CS rates. If comparing all three groups categorically (i.e., balanced, Catalan- and German-dominant), their differences are statistically significant ($\chi^2(6, N = 16) = 260.14, p < 0.00001$).



Figure 8. Basis and CS according to children’s language dominance (child (MLUD)).

In the next step, we would like to explore whether the CS rates displayed in Figure 8 are found in both Catalan and German recordings or whether there is a tendency towards higher CS rates in the HL, as stated in the literature. This information is shown in Figure 9.

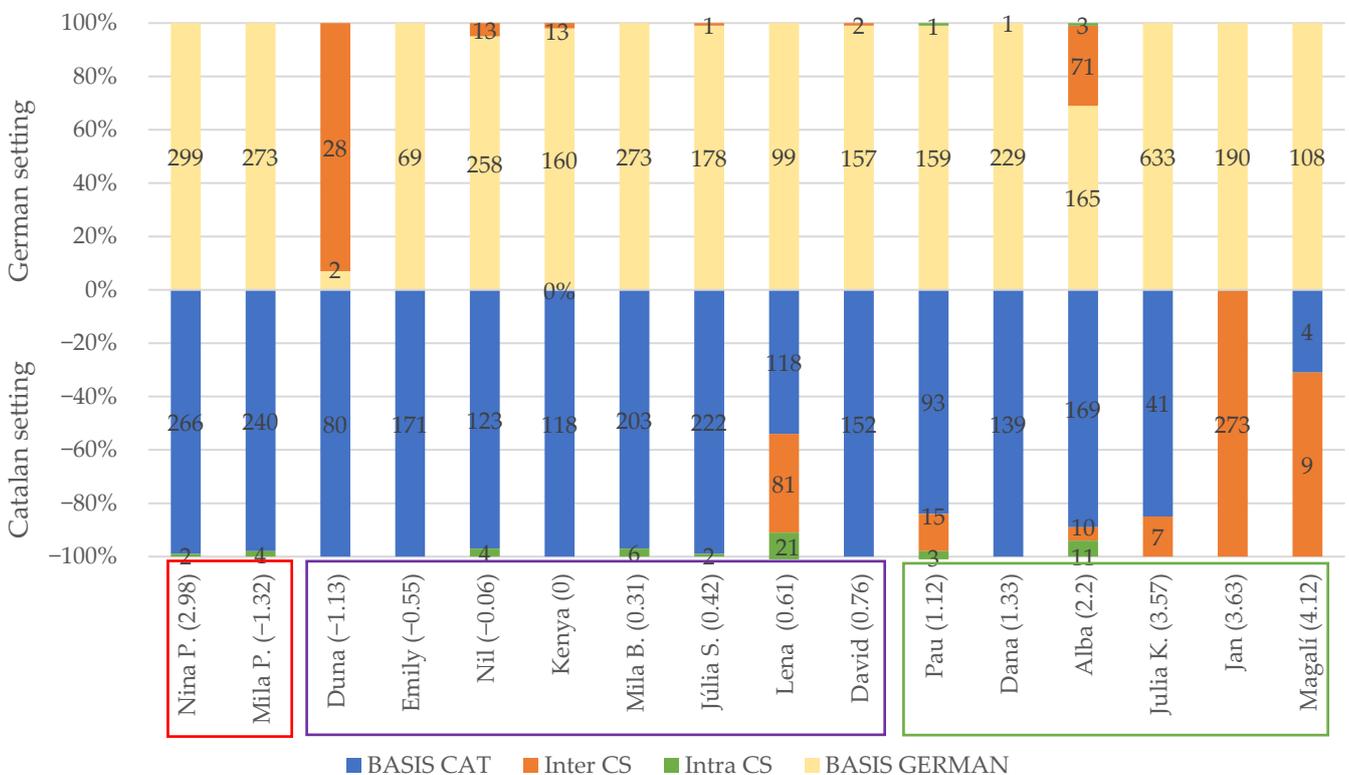


Figure 9. Inter- and intrasentential CS according to children’s language dominance (child (MLUD)).

By looking at the language of the recording, we clearly observe that children with an MLUD higher than 1.0 (green square) mixed their languages in the Catalan recordings

in 81% of the cases, while Catalan–dominant children with an MLUD from -1.0 did so in the German recordings 90% of the times. Balanced and German–dominant children mixed to similar degrees, namely, more frequently in the HL recordings (85.1%). Figure 9 further examines whether inter- and intrasentential CS is used differently along the language dominance continuum, as already observed in the literature. First of all, we can observe a clear and general tendency towards a more frequent use of intersentential CS. By contrast, intrasentential CS seems to be almost non-existent for the German–dominant group; it reaches rates between 27% and 17% for balanced and Catalan dominant children, respectively. The difference between all three groups is statistically significant ($\chi^2(6, N = 16) = 53.61, p < 0.00001$). In this sense, we cannot confirm that intersentential CS is mostly used by dominant children, as previous studies have observed, since our balanced participants also show high rates of this CS type. When it comes to language mixing within the sentence, it becomes clear that balanced bilinguals are the ones showing higher rates of intrasentential CS (almost 30%), supporting the claim that this CS type needs greater mastery of the child’s L1s in order to be used. Moreover, it is important to highlight the group of Catalan dominant children in Figure 9 at the left edge of the continuum. The children also display about 20% of intrasentential CS. This observation seems to speak against the idea that intrasentential CS is mostly used by balanced children. Those children who are dominant in the HL also produce high rates of this CS type.

Finally, we would like to compare these results concerning language dominance with the fluency factor. As described in Section 5.1, the trilingual children Emily and Nina could be classified as having a preference for the HL Catalan. Moreover, some of the children who were classified as balanced according to language dominance are more fluent in German, although the majority are equally fluent in both L1s. This is why we have opted to showing all children according to their FluencyD values along a continuum. Figure 10 parallels Figure 8 in which the total amount of monolingual utterances (basis, bars with dots) and the total amount of CS productions can be observed. We further display (i) in purple those children with similar fluency values in German and Catalan and (ii) in red and green those children with a FluencyD values higher than 12. In these cases, red stands for a tendency towards the heritage language and green for a tendency towards the majority language.

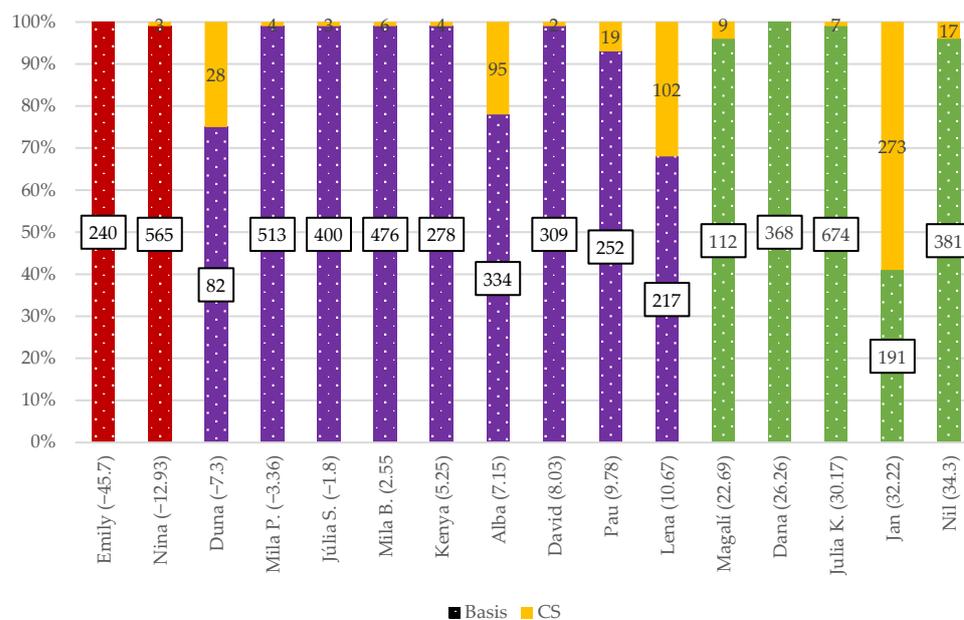


Figure 10. Basis and CS according to children’s fluency (child (FluencyD)).

We can clearly observe that those children who code-switch more than 10% are spread over the fluency continuum. Interestingly, half of these ‘frequent switchers’ are similarly fluent in both the heritage and the majority languages. Having a look at the children who

code-switch between 10% and 5%, it seems to be the case that they are located towards the middle and right side of the fluency continuum. However, in which setting do we find CS more frequently? And, most importantly, do they use inter- and intrasentential CS in a similar way? This is what Figure 11 shows.

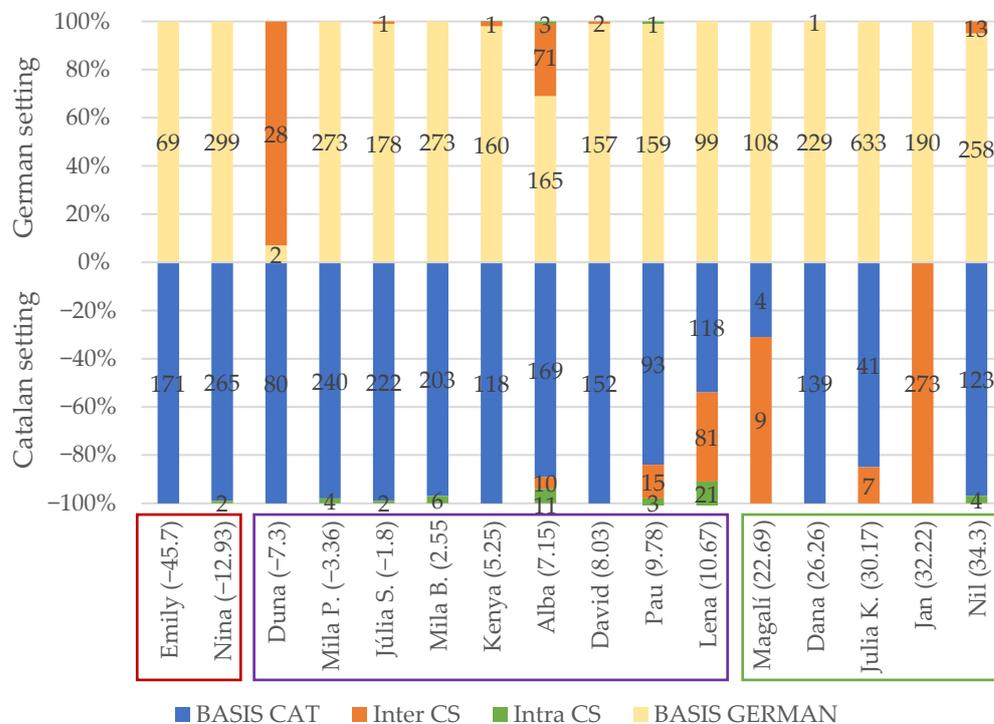


Figure 11. Fluency and inter- as well as intrasentential CS according to children’s FluencyD values (Child (FluencyD)).

Parallel to Figure 9 on language dominance, Figure 11 displays CS rates in the Catalan (negative *y*-axis) and German (positive *y*-axis) settings for intrasentential and intersentential CS, marked in green and orange, respectively. This time, we have also opted for ranking the bilingual and trilingual children on the *x*-axis according to their FluencyD values. These values are also displayed after the children’s names in brackets. By ranking the children according to their FluencyD values and by showing both settings separately, we can identify certain patterns. First, intersentential CS appears in both the heritage and the majority language settings, although to a lesser extent in the latter (15% vs. 8%, respectively). Second, intrasentential CS generally is less frequent than intersentential CS and reaches an average of 2% in the Catalan setting. Third, mixing in the Catalan setting becomes more frequent the higher the children’s FluencyD value is (i.e., the more fluent the children are towards German, the MaL). This is also true for those children that could be considered to have similar fluency in both languages (marked by the dotted bars in purple) but reached FluencyD values near 12. This is the case for Pau and Lena. By contrast, mixing in the German setting seems to be more presented by those children located at the left side of the fluency continuum and who seem to be more fluent in Catalan.

The next section will discuss the results on CS as connected to some of the child-external factors reviewed in Section 2.2.2, such as FLP, FL and the role of (older) siblings.

6.3. Child-External Factors

Let us start analysing different external factors related to children’s cumulative and current input. The aim of examining these factors is to know what similarities in the development of the MaL German and the HL Catalan can be found across the different children and whether they can explain the CS rates of each child.

As mentioned, we focus on the following external factors: FLP (Section 6.3.1), FL (Section 6.3.2), and sibling's direct speech (Section 6.3.3). All these factors are related to the percentage of CS that each child presents in their data, both in the HL Catalan and the MaL German.

6.3.1. Code-Switching and Family Language Policies

In this section, we examine the number of structures that the children produced in German and Catalan with(out) the presence of CS considering FLPs. As explained in Section 2, the children of this cross-sectional study follow one of these four different FLPs. This is what Table 3 shows.

Table 3. Children's Family Languages Policies.

FLP 1: 'One person—one language' (OPOL with support to MaL).
FLP 2: OPOL with MaL outside the home.
FLP 3: 'One language—one environment'.
FLP 4: Bilingual parents with mixed languages.

The first FLP is a strategy that consists of the use of the parents' native languages with the child. In this case, one of the parents speaks MaL German, while the other speaks HL Catalan to the child. Therefore, the MaL is supported at home. Ten out of sixteen children follow this language strategy (Lena, Kenya, David, Júlia S., Magalí, Jan, Julia K., Mila P. and Nina). The rest of the FLPs (FLP 2, FLP 3 and FLP 4) contain a lower presence of the MaL at home. FLP2 is a strategy that still follows OPOL, but the presence of MaL German is kept outside the family. For example, Pau and Emily are trilingual children who are exposed to MaL German outside the home (i.e., at preschool) and receive two HLs at home. Pau's parents speak Catalan and Thai each, while Emily's mother speaks Catalan to her and her father speaks English. In the case of FLP 3, children only receive one language at home; in our study, this is Catalan. The other language (German) comes from outside. In our study, Alba and Duna exclusively receive Catalan at home and are exposed to German at school or in preschool, respectively. Finally, FLP 4 is a multilingual strategy since both parents provide two different languages. In the present study, the family of the siblings Nil and Mila B. follow this strategy. Their mother is a Catalan-Spanish bilingual, and their father is an English-German bilingual. Therefore, at home, Nil and Mila receive more than two languages, namely, Catalan, German and English.⁹

Figure 12 depicts the difference between the groups of children who follow FLP 1–FLP 4, taking the percentage of CS and the basis into account for the whole set of data (i.e., German and Catalan settings have been collapsed). Note that the FLP 1 group is composed of ten children (62.5%). The other six children (47.5%) are to be found in the other FLPs (two children in each FLP, each group making up 15.8%).

The blue bars show the rates of monolingual productions in the desired language according to every FLP group, while the orange bars represent the CS rates. The data of both languages have been collapsed in Figure 12. When comparing the FLP and the rate of CS, we observe an important pattern: children who follow FLP 1 (OPOL) or FLP 3 (Catalan at home only), are those who present higher rates of CS (irrespective of the language of the recording), namely 10% and 23%, respectively. The rest of the children who speak two or more languages at home (keeping the presence of the MaL low at home to a certain extent) seem to favour the presence of monolingual utterances in the adult's desired language.

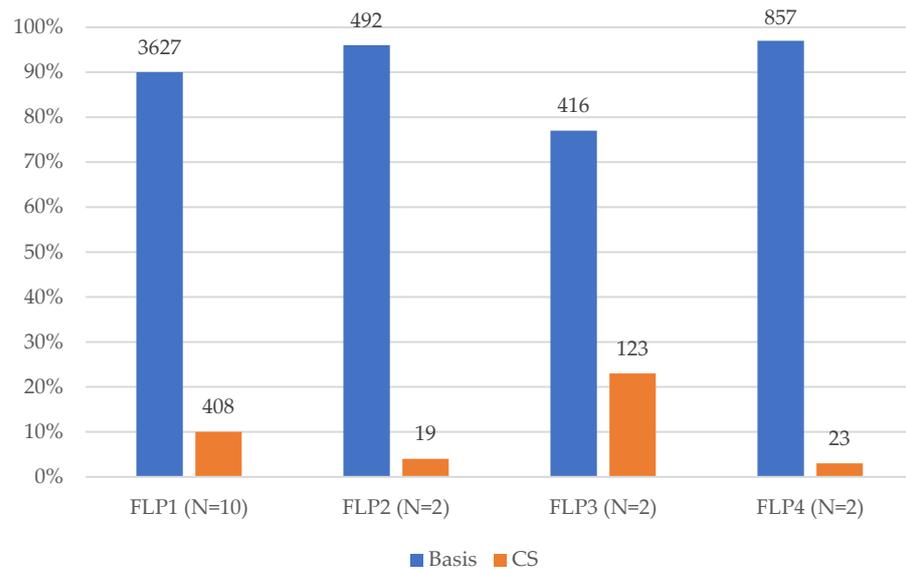


Figure 12. Children’s basis and CS across FLP.

Let us examine with Figure 13 what happens if we compare the range of CS depending on the language of the recording (German or Catalan) and FLP:

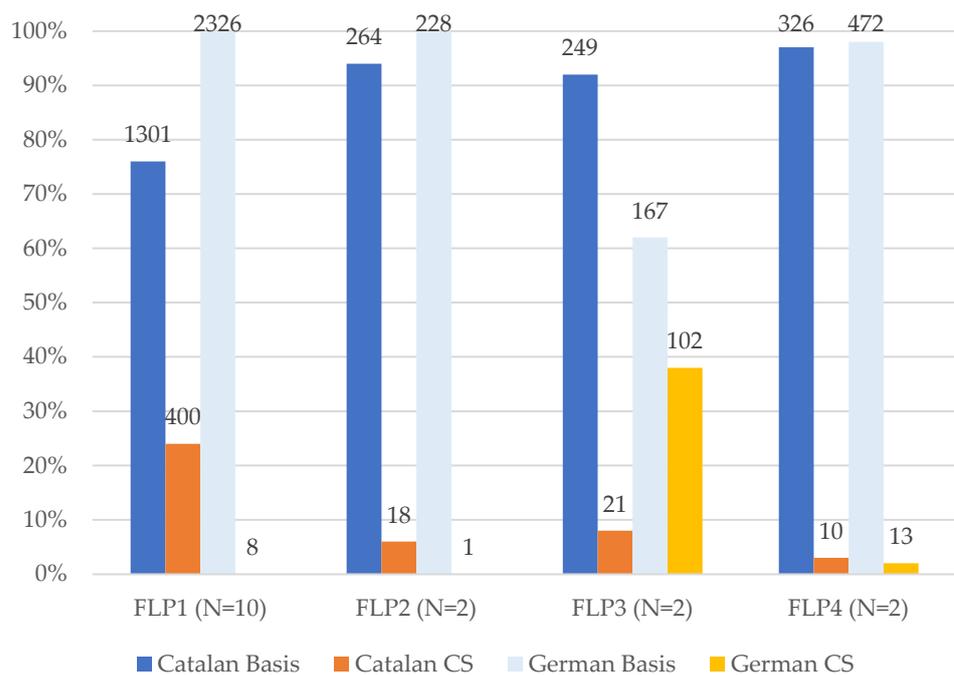


Figure 13. Children’s German and Catalan basis and CS across FLP.

We can observe two groups that depend on the amount of German exposure. The first group (FLP 1) is composed of ten children who receive German from one of their parents as well as in (pre)school. These children thus receive support for the MaL at home. By contrast, a great part of the German input is received outside the home for the remaining six children (FLP 2, FLP 3 and FLP 4). Four of these six children are only exposed to German outside the family nucleus, while the other two (the siblings Mila B. and Nil) receive German together with another language (English) from their father, as well as from outside (FLP 4). That means that, although they are also exposed to German at home, the quantity of German input is essentially less than the German input FLP 1-children receive. Therefore, we can observe an important difference between the two groups of children (i.e., FLP 1

vs. other FLPs). Considering the data from the Catalan context represented in the dark blue (basis) and the orange (CS) bars, children who follow FLP 1 show 24% of CS in the Catalan setting, while children of the FLP 2 and FLP 3 groups present 6% and 8% of CS, respectively. Children of the FLP 4 group only present 3% CS in the HL setting. The data from the German context depicted with the light blue (basis) and the yellow (CS) bars, seem to go in the opposite direction to what has been reported for the Catalan recordings: Children who code-switch more when speaking German are those who follow FLP 3 (38%), that is, the strategy in which Catalan is the only language available in this environment. Nil and Mila B. (FLP 4) also code-switch in German, but they also do so in the Catalan recordings to a similar extent (2%). Finally, it is noticeable that the groups FLP 1 and FLP 2 exhibit no rates of CS in the MaL. The two children of the latter group (Pau and Emily) receive two HLs at home, and exposure to German comes from outside the family.

Concerning the type of the CS and the language of the recording, Table 4 displays the difference between inter- and intrasentential CS across the different FLPs. Put differently, the data shown in the orange (for Catalan CS) and yellow (for German CS) bars in Figure 13 are specified in Table 4 in terms of inter- and intrasentential CS.

Table 4. Inter- and intrasentential CS and the FLP.

	CS in the Catalan Recording		CS in the German Recording	
	Inter CS	Intra CS	Inter CS	Intra CS
FLP1 (N = 10)	371/408 (91%)	29/408 (7%)	7/408 (1.7%)	1/408 (0.3%)
FLP2 (N = 2)	15/19 (79%)	3/19 (16%)	0/19 (0%)	1/19 (5%)
FLP3 (N = 2)	10/123 (8%)	11/123 (9%)	99/123 (80.5%)	3/123 (2.5%)
FLP4 (N = 2)	0/23 (0%)	10/23 (43.5%)	13/23 (56.5%)	0/23 (0%)

In general, as already described in Section 6.2, intersentential CS prevails in the whole set of data irrespective of the language of the recording. In Catalan, while children following FLP 1 and FLP 2 present 91% and 79% of intersentential CS, respectively, those who follow FLP 3 only present 8% and children of the FLP 4 group do not show any intersentential CS, but 43.5% of intrasentential CS. In the case of German, the group that presents the highest percentage of intersentential CS is FLP 3, with 80.5%. Note that the linguistic strategy followed at home is ‘one environment-one language’, and for these families, the language at home is Catalan. Moreover, the family with two siblings who follows FLP 4 also shows more CS in the majority language rather than in the Catalan language, especially when it comes to intersentential CS. By contrast, the children following FLP 1 and FLP 2 present low rates of CS in the German setting.

In addition to the analysis of the FLPs, it is important to consider whether the families have decided to use a particular language when all family members participate in a conversation, that is, whether the families have chosen a family language (FL). This information can be seen as an extension of the family’s linguistic strategy, since it might influence the linguistic landscape within the family, established with a certain FLP. Moreover, it could be the case that the presence of an FL may also have an impact on the presence of CS.

6.3.2. Code-Switching and Family Language

This section investigates whether the presence or absence of a FL at home influences the use of CS as well as its direction and type. If the family has chosen a FL, this is the language chosen by the family when all family members are participating in the same conversation. The investigation of this kind of linguistic situations is relevant since families might change their FLP when both parents with different L1s speak together with their

children. We compare three different possibilities: (i) the use of the MaL as the FL, (ii) the use of one HL (Catalan or English in this case) as the FL, and (iii) no FL has been chosen. More specifically, we consider whether the family decides to speak the community language, German, or an HL acquired at home. Moreover, we also consider the possibility that families may decide to continue using the arranged FLP with the child; that is, they do not present any FL.

Figure 14 allows us to examine inter-individual differences among the participants depending on the FL group to which they belong. Specifically, every column presents the whole set of data for each child considering three possibilities: (i) Catalan basis in the blue bar, (ii) German basis in the green bar and (iii) Catalan and German CS in the orange bar. As seen in previous figures, we present the data with positive percentages in German and with negative percentages in Catalan.

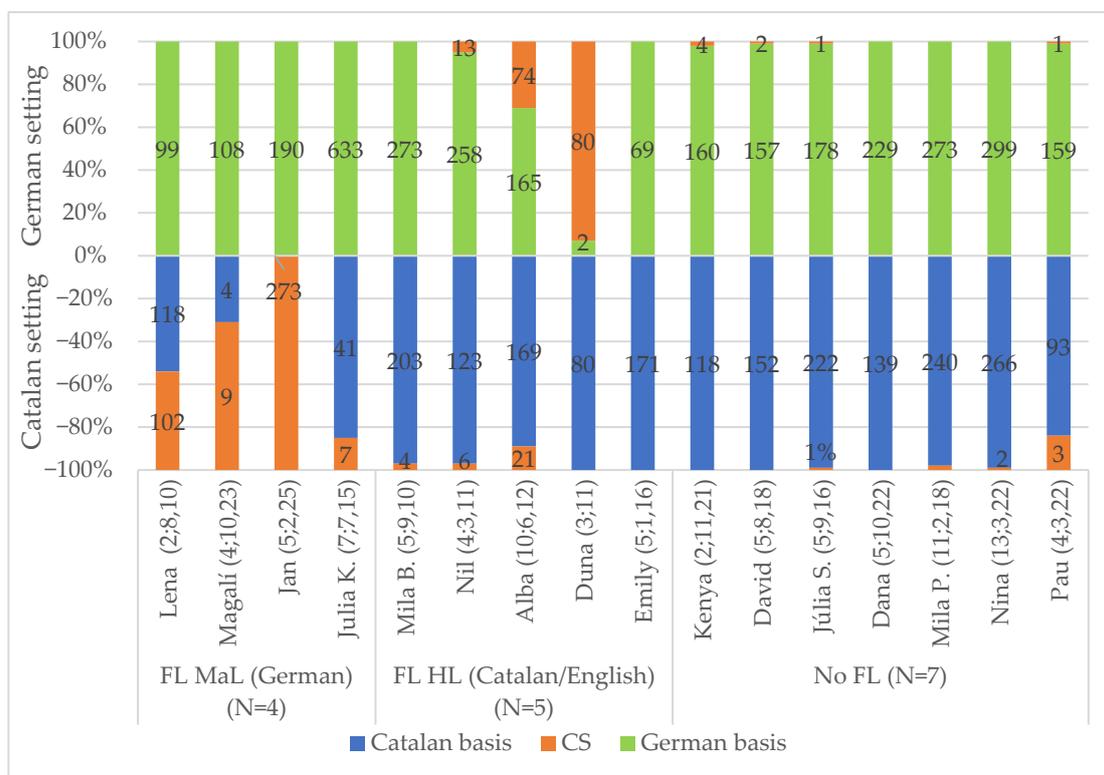


Figure 14. German and Catalan basis and CS according to the child’s FL.

In general terms, we identify high CS rates (an average of approx. 70% for all four children) in the Catalan recordings for the group of children with German as the MaL. CS in the German setting is completely absent for this group. We further notice relevant differences across the other FL possibilities in terms of CS use: The families that have chosen an HL (Catalan or English) as the FL are raising children that code-switch approx. 4% in the Catalan setting, but 13% in the German recording. The children who code-switch in German most frequently are Duna and Alba, who only speak Catalan at home and who follow FLP 3 (‘one environment–one language’). In the case of children without an FL, the CS rates in both recordings were very low (between 1% and 2% in German and Catalan, respectively).

When comparing the three groups of children with different FLs, we observe some interesting patterns. First, children who use German as their FL present more Catalan CS than the rest of the children who have Catalan as the HL or no FL at all. Second, the opposite occurs with the children who use an HL (Catalan or English) as their FL, given that they present more CS in the German recordings. This is the case for Alba and Duna. The remaining children, Nil, Mila B. and Emily, do not present high frequencies of CS in the

MaL, but their basis in both recordings is very heterogeneous (cf. the blue and the green bars). Finally, the group of children who do not use any FL are those who exhibit almost inexistent CS rates, irrespective of the language of the recording. The only child with no FL who used some CS is Pau, namely in the Catalan setting.

As shown in Table 4, Table 5 offers a classification of CS according to inter- and intrasentential CS, extracted from Figure 14, represented with the orange bars, and across the three FL groups.

Table 5. Inter- and intrasentential CS and FL.

	CS in the Catalan Recording		CS in the German Recording	
	Inter CS	Intra CS	Inter CS	Intra CS
FL MaL German (N = 4)	370/391 (95%)	21/391 (5%)	0/391 (0%)	0/391 (0%)
FL HL (Cat/Eng) (N = 5)	10/146 (7%)	21/146 (14%)	112/146 (77%)	3/146 (2%)
No FL (N = 7)	16/36 (44%)	11/36 (31%)	7/36 (19%)	2/36 (6%)

When comparing the three groups of children according to their FL, we can observe important results that allow us to understand the direction and the type of CS. Children who use German when all family members participate in a conversation present 95% of intersentential CS in Catalan, while they do not code-switch in the German setting. By contrast, the rates of Catalan CS are lower in the groups of children that speak an HL or do not present any FL. In these cases, families continue using their chosen FLP (OPOL or FLP 3, as in the case of Alba and Duna, who are exposed to Catalan at home exclusively). Furthermore, children with an HL as their FL present more CS in the German recordings (79%) than in the Catalan recordings (21%); again, the type of CS that prevails is intersentential.

6.3.3. Code-Switching and Languages Spoken by Siblings

This section examines the rate of CS when comparing the language used among siblings. This information has been extracted from the input questionnaire (cf. Section 5.2). Out of sixteen children, we considered eight participants, given that they form three groups of siblings: (i) Jan and Júlia K., (ii) Nil and Mila B. and (iii) Kenya, Dana, Mila and Nina P. Moreover, we compare the groups of siblings considering the percentages of monolingual productions in the desired language and CS in both settings separately.

First, we classified the eight children depending on the information given by the parents about the language they use among themselves. First, Jan and Júlia K. speak German to each other. Then, Nil and Mila B. speak German, together with English, to each other. Finally, the four sisters speak to each other in the following way: The older sisters, Mila and Nina, speak Catalan to the younger ones; Duna, the third sister, only speaks German to her sisters; and Kenya, the youngest sister, speaks both Catalan and German to her sisters. Figure 15 depicts three groups of columns that correspond to the three groups of siblings (i)–(iii) describe above.

Let's start with the description of the first sibling group. Jan and Júlia K. present less than 15% of Catalan monolingual utterances, while this percentage reaches 100% in German. Therefore, productions in the Catalan setting are approx. 90% instances of CS. The second group of siblings, Nil and Mila B., display the same percentage of CS in both languages (3%). Finally, sibling group (iii) includes the four sisters, who have very low CS rates in both contexts. Following these results, one could argue that the exclusive use of the MaL German between siblings, as in the case of the first sibling group, increases the possibility of a higher rate of CS utterances in the HL context. As we can see in the other two sibling groups, HL use between them supports the production of monolingual HL utterances and, thus, CS rates are kept low, not only for the HL, but also for the MaL.

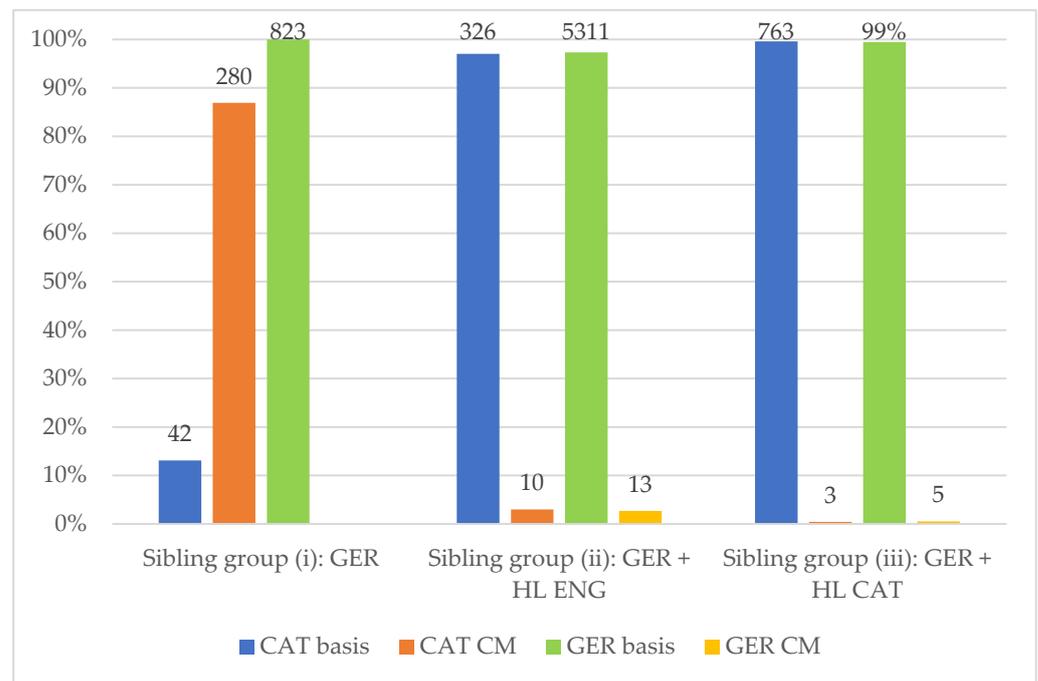


Figure 15. Catalan and German basis and CS depending on reported language use among siblings.

As described in Section 2.2, it is relevant to compare the results of each child to know whether there are differences across younger and older siblings. Figure 16 shows the monolingual and CS productions in the Catalan and German recordings by each sibling from each sibling group.

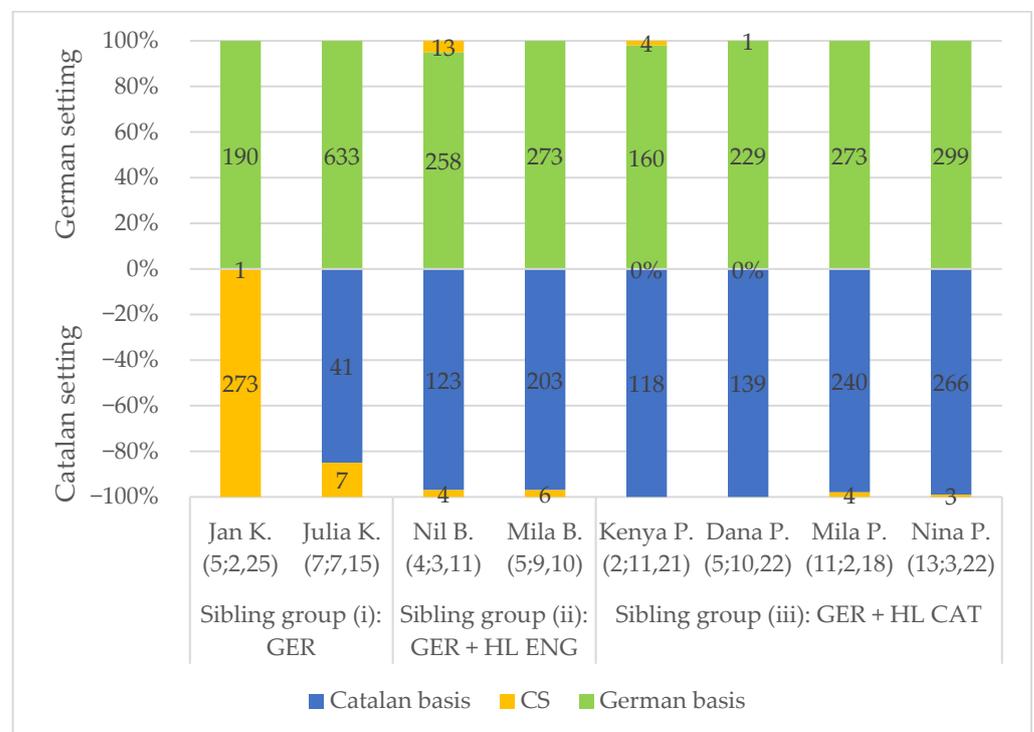


Figure 16. Siblings' Catalan and German basis and CS.

Figure 16 compares the data of siblings individually in order to observe the extent to which older or younger siblings present more German or Catalan CS. Again, as displayed in the previous Figures 9, 11 and 14, we classify the data by considering the monolingual

productions in each setting, as well as the CS that the children produced in each of those recordings. For the sake of exposition, we have divided the two languages into two different parts in the *y*-axis, namely German with positive values and Catalan with negative values. The information is divided into basis (blue for Catalan and green for German) and CS (in yellow). Remember that we present three groups of siblings: (i) Jan and Júlia K., (ii) Nil and Mila B, and (iii) Kenya, Dana, Mila and Nina P. Each group of siblings is organised from the youngest to the oldest child. The first group of siblings showed relevant differences in comparison to the other groups. Jan, the youngest sibling, behaves monolingually in the German recordings, yet his monolingual productions in the Catalan context are 0%. This means that Jan, during the spontaneous recording in Catalan, was able to maintain a conversation with the Catalan native speaker, but he only used German when interacting with her. The case of his older sibling is different. She presents some CS in the Catalan recording (13%) and, thus, she was able to maintain and interact in Catalan during the spontaneous game situation in almost 90% of the cases. The second group of siblings, Nil and Mila B., presented very low CS rates in both settings. Mila B. only presents 3% of CS in the Catalan recording, while her youngest sibling, Nil, exhibits 5% of CS in the German recording. Finally, the third group of siblings is composed of four sisters. Although their CS rates are also very low, as it was the case for the second sibling group, we observed that the youngest sister, Kenya, produced 2% of CS when speaking German. Dana, the third-born sister, behaved monolingually in both recordings (she only presented one CS-sentence in the German setting). Finally, Mila and Nina, the older sisters, produced 2% and 1% of CS in the Catalan setting, respectively. Summing up for this last sibling group, we can say that all four sisters behave similarly in both languages, namely, they all interact in the desired language with the interaction partner.

Table 6 considers the percentages and the type of CS in the three different sibling groups. Again, we show the totality of the data for each group of siblings, that is, we consider the total of structures with CS in both languages and we separate them depending on the language of the recording and the type of CS.

Table 6. Inter- and Intrasentential CS according to each sibling group.

	CS in the Catalan Recording		CS in the German Recording	
	Inter CS	Intra CS	Inter CS	Intra CS
Sibling group (i): German	280/280 (100%)	0/280 (0%)	0/280 (0%)	0/280 (0%)
Sibling group (ii): German + English	0/23 (0%)	10/23 (43.5%)	13/23 (56.5%)	0/23 (0%)
Sibling group (iii): German + Catalan	1/12 (8.5%)	6/12 (50%)	4/12 (33%)	1/12 (8.5%)

The differences across the three groups of siblings are noticeable: Jan and Julia K., forming the first group, speak German to each other and only present CS when speaking in a Catalan setting. The type of CS used is exclusively intersentential, that is, German monolingual utterances in the Catalan recording, which means that their main language of communication with the Catalan interaction partner is German. However, it is relevant to explain that while the youngest sibling, Jan, produced 273 German structures in the Catalan recordings, Julia only did so in 7 cases (see again Figure 16). In the case of the second group of siblings, Nil and Mila B. speak MaL German and English to each other. Interestingly, the differences between the language of the recording and the type of CS are noticeable. They code-switched more in the German recordings (56.5%, 13 sentences) than in the Catalan recordings (43.5%, 10 sentences). However, while intrasentential CS was more frequent in the Catalan setting, we observed more cases of intersentential CS in the German recordings. Finally, we will describe the data for the last sibling group composed of four sisters. As already mentioned, they speak different languages among them, and

this would explain why we find instances of CS in both languages. From Table 6 we can infer that while intrasentential CS prevails in the Catalan setting (50% of the whole set of data, six sentences), the German recordings are characterised by gathering more cases of intersentential CS (33%, four sentences).¹⁰ In this sense, the sibling groups who use the majority language as well as (one of) the HL as a means of communication showed similar patterns, namely, more intrasentential CS in the HL recordings and more intersentential CS in the German setting. This is the case for sibling groups (ii) and (iii).

Section 6.4 reviews the most important results regarding the production and types of CS, considering the different child-internal and child-external factors examined.

6.4. Combination of Different Child-Internal and Child-External Factors Favouring CS

This section focuses on the comparison of all internal and external factors analysed in this study, with the aim of determining which of them ultimately promote the production of CS in the majority and heritage languages.

Table 7 summarises all the information concerning child-internal (language dominance and language fluency) and child-external factors (FLP, FL, and the language spoken among siblings) analysed previously in Sections 6.2 and 6.3. Likewise, it depicts the differences and similarities of the 16 children with regard to the rates and CS types (inter- and intrasentential). We display not only the total percentages of CS that the children produced but also the CS rates in both recordings. The children are ranked according to the total amount of CS (in %).

Table 7. Children’s CS depending on internal and external factors.

Children	Total CS	% of CS		Type of CS		Dominance (MLUD)	Fluency (FluencyD)	FLP	FL
		GER Context	CAT Context	INTER	INTRA				
Jan K. (5;2,25)	59%	0%	100%	273	0	3.63	32.22	FLP1	GER
Lena (2;8,10)	32%	0%	46%	81	21	0.61	10.67	FLP1	GER
Duna (3;11,25)	25%	93%	0%	28	0	−1.13	−7.3	FLP3	HL
Alba (10;6,12)	22%	31%	11%	81	14	2.20	7.15	FLP3	HL
Pau (4;3,22)	7%	1%	16%	15	4	1.12	9.78	FLP2	None
Magalí (4;10,23)	7%	0%	69%	9	0	4.12	22.9	FLP1	GER
Nil B. (4;3,11)	4%	5%	3%	13	4	−0.06	34.3	FLP4	HL
Kenya P. (2;11,21)	1%	2%	0%	3	1	0.00	5.25	FLP1	None
Mila P. (11;2,18)	1%	0%	2%	0	4	−1.32	−3.36	FLP1	None
Nina P. (13;3,22)	1%	0%	1%	1	2	−2.98	−12.93	FLP1	None
Julia K. (7;7,15)	1%	0%	15%	7	0	3.57	30.17	FLP1	GER
Mila B. (5;9,10)	1%	0%	3%	0	6	0.31	2.55	FLP4	HL
David (5;8,18)	1%	1%	0%	2	0	0.76	8.03	FLP1	None
Júlia S. (5;9,16)	1%	1%	1%	1	2	0.42	−1.8	FLP1	None
Dana P. (5;10,22)	0%	0%	0%	1	0	1.33	26.26	FLP1	None
Emily (5;1,16)	0%	0%	0%	0	0	−0.55	−45.7	FLP2	HL

First, we would like to compare the total CS produced by each child. We provide the total amount of structures, considering both languages, German and Catalan, and subtracting those where CS was present. Thus, the column ‘TotalCS’ indicates the overall percentage of CS per child. What we can observe is that only four out of sixteen children participating in this study code-switched more than 10%, namely, Jan (59%), Lena (32%), Alba (22%) and Duna (25%)¹¹. If we consider the language of the recording where these children code-switched to a higher extent, we can see that Jan spoke in German during

the Catalan recording, and, therefore, he presents a rate of 100% of CS in Catalan. Lena presents 46% of CS in the Catalan setting; Duna code-switched in 93% of the cases in her German recording, that is, she used more Catalan than German language material in the German recording. By contrast, in the case of Alba, we observe that she code-switched in both languages, namely 11% in the Catalan recording and to a higher extent in the German setting (31%). Note that while Jan and Lena follow FLP 1 and present MaL German as their FL, Duna and Alba follow FLP3 and only receive Catalan at home. Regarding language dominance, this factor does not seem to play a crucial role for these children, since Lena's MLUD is lower than 1, Alba and Jan could be considered to be dominant in German and Duna's MLUD is higher than 1 and negative, which indicates a dominance towards Catalan. Fluency does not seem to explain these findings either. Lena, Duna and Alba are equally fluent in both L1s. However, only Alba code-switches in both languages, while Lena and Duna do so only in one specific context (i.e., Lena in Catalan and Duna in German). Jan shows fluency in German, which may explain his CS results, according to Table 7. Let us turn to the results related to the type of CS (inter- or intrasentential) for these four children. We can observe that intersentential CS generally prevails beyond intrasentential CS. Children who show higher rates of intersentential CS are those who are producing a large amount of CS in one of their languages. Specifically, Jan and Lena presented 273 and 81 intersentential CS incidences in the Catalan context, respectively, while the rate of structures where they produced intrasentential CS is much lower (0 from Jan and 21 from Lena). In the case of Alba and Duna, they also present more intersentential CS (81 and 28, respectively).

The rest of the children code-switched less than 10%, if we consider the total amount of CS in the first column of Table 7. Nevertheless, when comparing the CS rates in each language, we observe some interesting traits for some children, such as Magalí and Pau. Magalí presents 69% of German CS in the Catalan context, while she did not code-switch in the German setting. Pau code-switched 16% of the cases in the Catalan recording and only 1% in the German context. If we analyse their external factors in detail, we notice that both have MLUD values above 1, and thus, they could be considered to have a dominance towards the MaL. In terms of FLP and FL, their families follow different strategies: Magalí follows FLP 1 and has German as the FL, while Pau's family follows FLP 2 and has no FL. From these facts, we can infer that Magalí receives more German input at home than Pau. Pau is only exposed to German outside the home since he receives two HLs at home (Thai from his mother and Catalan from his father).

What happens with the children who code-switched less than 5%? The only external factor that seems to shed light on these results is FL since these children (Kenya, Dana, Mila P, Nina, Nil, Mila B, Emily, David and Júlia S.) either have an HL as their FL or their families have chosen not to have any FL. In the latter case, the families simply follow their FLP. For the families in our study, all of them follow OPOL (i.e., FLP 1).

Finally, let us examine what happens when we compare the three groups of siblings. Recall from Table 2 that two groups of eight children could be observed: (i) those who are siblings and (ii) those who have no siblings or who were first-born children with younger siblings who were too young to participate in our study. Concerning the groups of siblings, we consider three different groups (located at the beginning of Table 2, from Kenya to Mila B.): (i) the siblings Jan and Júlia K, (ii) the siblings Nil and Mila B, and (iii) the four sisters Kenya, Dana, Mila and Nina. The other group of children without siblings is also composed of eight children located in the last part of Table 2 from Lena to Alba. Regarding the groups of siblings, the results in Table 7 show that the only group that exhibits differences with respect to the other sibling groups is the one formed by Jan and Júlia K. Jan is the youngest sibling and presents 100% of German CS in the Catalan context, that is, he responds in German to the Catalan native interviewer. However, his sister uses German when interacting with the Catalan native interviewer in 13% of the times. They both follow FLP 1 and their FL is German, which implies that the MaL has a great support at home. They both have a clear tendency towards German, if we consider their MLUD

values, and they also have a higher fluency towards the MaL. Hence, what is different between these two siblings? The difference in terms of CS rates in the Catalan recordings could be explained by the fact that Júlia is Jan’s older sister and, thus, his ‘input-giver’ who speaks German to him. This finding confirms the observation made in the literature that first-born children can intensify the MaL presence at home, also for the communication with younger siblings. Furthermore, when considering Júlia’s MLUD and FluencyD values, we observe values much closer to zero than for Jan. This implies that Júlia might have received more Catalan input than Jan at home when she was young and, thus, her competence and fluency in both languages is more developed than for her younger brother Jan. When comparing this sibling group with the other two groups, we notice that the FL differs. The four sisters do not have any FL, while Nil and Mila B.’s family have chosen to use both HLs as FLs at home (Catalan and English). This distinction seems to be relevant since only one out of these six children has a dominance towards German (Dana P.), while the other five have similar MLU values for Catalan and German (Kenya P., Nil B. and Mila B.) or they even show a dominance towards the HL Catalan (Mila P. and Nina P.).

6.5. A Note on Muysken’s (2013) Four Types of Intra-CS

In Section 2.1, we have briefly discussed Muysken’s (2013) four CS strategies when mixing within a sentence: insertion, alternation, congruent lexicalisation and backflagging. In what follows, we will analyse the 60 cases of intrasentential CS and explore whether they can be assigned to one of these categories.

Of all sixteen participants, a bit more than half (N = 9) produced instances of intrasentential CS. Interestingly, when looking at the language dominance of the nine children, five children showed an MLUD lower than 1 and four children above 1 (cf. Figure 16¹²). Generally speaking, insertions make up almost 50% of the total amount of intrasentential CS, followed by alternations (42%) and congruent lexicalisations (10%). Examples of backflagging were not attested in the data. As can be seen from Figure 17, children showing MLUD < 1 used alternations and insertions to a similar extent, while the two children showing language dominance generally used insertions. Examples in (7), (8) and (9) display some of the cases found in the sample (the use of italics corresponds to German; no format refers to Catalan).

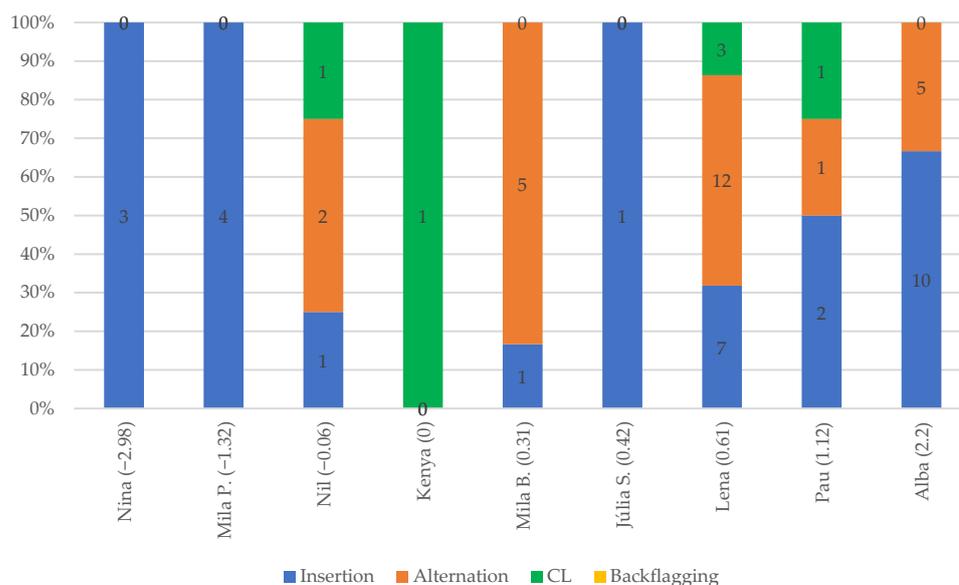


Figure 17. Four CS types according to language dominance.

Example (7)

Balanced children

(7a) Insertion

un *snulli* [Schnulli] Lena (bilingual, Catalan–German, 2;8,10)
 Det pacifier
 ‘a pacifier’

(7b) Alternation

té el cabell ros *oder* no? Mila B. (bilingual, Catalan–German, 5;9,10)
 Has the hair blond or no?
 ‘does he have blond hair or he doesn’t?’

(7c) Congruent lexicalisation

nein gloc Kenya (bilingual, Catalan–German, 2;11,21)
 no yellow
 ‘no, (it’s) yellow’

Example (8)

German–dominant children

(8a). Insertion

Primer està fet només de *mehl* Alba (bilingual, Catalan–German, 10;6,12)
 first is done only of flour
 ‘first of all this is only done with flour’

(8b). Alternation

is das un tren? Pau (trilingual, Catalan–German–Thai, 4;3,22)
 is this a train?
 ‘is this a train?’

(8c). Congruent lexicalisation

Dort, pàrquing? Pau (trilingual, Catalan–German–Thai, 4;3,22)
 There, parking?
 ‘is there a parking?’

Example (9) Insertion

Catalan–dominant children

o sigui vui anar alguna vegada a Dinamarca- ah no no a Dinamarca a la *USA*?
 Nina (bilingual, Catalan–German, 13;3,22)

so want some day to Denmark- ah no no to Denmark to the USA?

‘so, I want to go to Denmark someday- ah no not to Denmark, to the US?’

Since the linguistic data examined in this study have shown higher rates of CS within the recordings in the HL, we wanted to see whether this is also the case for the four CS strategies. Figure 18 shows the results.

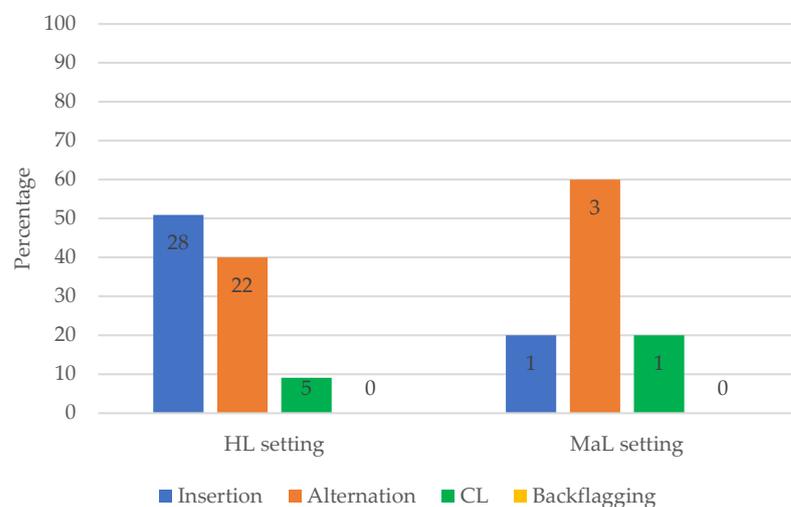


Figure 18. Four CS strategies and HL/MaL setting.

Figure 18 clearly shows that three of the four CS types are represented in both the HL and the MaL settings. However, they are not used at the same rates in both contexts. Whereas insertions and alternations seem to be very widespread in the HL setting, alternations are more common in the context of the MaL. Examples of backflagging are absent in both settings. Muysken’s (2000) CS strategies represented along a continuum from the heritage (left) to the majority language (right) in Figure 3 (Section 2.1), seem to be confirmed, although CS instances are relatively low.

As already discussed in Section 2.1, there are different possibilities in which words can be integrated into a switched utterance. Following the literature review, we have briefly discussed lexical and functional insertions as well as the use of discourse markers. Figure 19 presents all cases of intrasentential CS produced by the nine children, classified according to the base language of the sentence uttered (Catalan or German). If the base language could not be determined, the language of the setting was chosen. As in previous sections, the nine multilingual children are organised along a continuum, according to their MLUD (less than 1 = balanced; more than 1 = dominant).

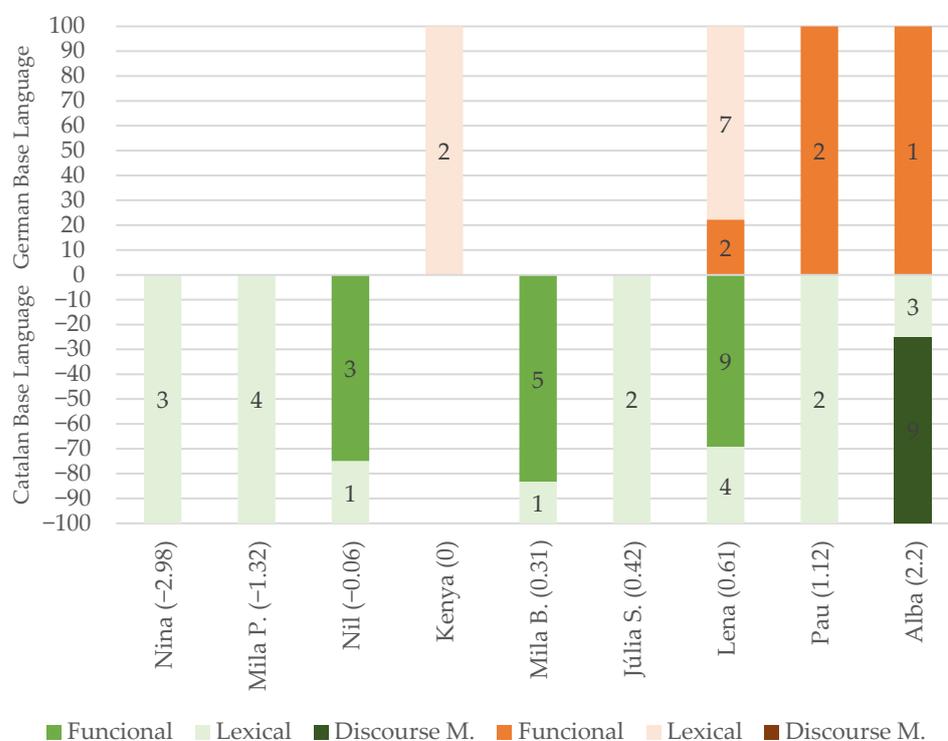


Figure 19. Functional and lexical intrasentential CS, discourse markers according to the base language and child’s language dominance (child (MLUD)).

Again, most of the code-switched cases found in the data are in the HL context. It is also in this setting where we find a similar percentage of lexical and functional insertions (43% and 37%, respectively). By contrast, lexical insertions make up approximately two thirds of the productions in German contexts. Furthermore, we detect a relationship between the type of insertion and language dominance. Those children considered to be balanced (MLUD < 1) are the ones who insert German functional words in the HL, whereas those children at the right edge of the x-axis (and who are considered dominant in the MaL) give those (few) cases of insertions of Catalan functional words in the majority language German. Interestingly, those children at the left edge of the x-axis (dominance with a tendency towards the HL Catalan) do not show any cases of insertions of Catalan functional words into the German base language. Although the data are very scarce, it is interesting to find Catalan functional insertions in the German setting by children who have been considered to have a dominance towards the MaL. Showing language dominance as a

continuous variable lets us infer that these children (Pau and Alba) are ‘very close’ to what is considered an even development, namely, $MLU < 1$.

7. Discussion

The present study has investigated the presence of CS in children acquiring Catalan and German (and another HL) simultaneously. Following the literature, the use of CS has been related to child-internal factors such as language dominance and fluency, and input factors that are quantitative and qualitative in nature and that might have affected the appearance of CS in the children’s productions.

Our first research question looked for the possibility of shedding some light on the traditional connection between CS use and language dominance (cf. Section 2.2). Various authors, such as Lanza (1992, 1997), Schlyter (1993), and Nicoladis and Genesee (1997), have argued that language dominance increases the possibility of CS and establishes the direction in which CS occurs. In this sense, we predicted that if children are dominant in language A, higher rates of CS should be attested in language B, that is, in the non-dominant language. The results from Figure 8 in Section 6.2 partially confirm this hypothesis, since German–dominant children code-switched on average 16% of the time as opposed to low mixing rates for balanced children (6%). Catalan–dominant children were predicted to mix languages to a similar degree as the German–dominant group, yet this is not the case: Catalan–dominant children used a total of 6% of CS productions compared to the balanced group. If we further investigate the direction of CS, the data clearly show that children mostly code-switched in the non-dominant context (cf. Figure 9 in Section 6.2). Interestingly, balanced children code-switched much more in HL Catalan, to a similar extent as the German–dominant children. Some interesting results concerning intra- and intersentential CS could also be observed in Figure 9. Intersentential CS was the most frequent option for all three groups, and thus, we could not confirm the findings of previous studies, which found much more frequent use of this CS type by children showing language dominance. When it comes to language mixing within the sentence, it becomes clear that balanced bilinguals are the ones showing higher rates of intrasentential CS (almost 30%), supporting the claim that this CS type needs a great mastery of the child’s L1s in order to be used. The Catalan–dominant children also showed high rates of intrasentential CS—they displayed about 20%. In this respect, this observation seems to speak against the idea that intrasentential CS is mostly used by balanced children. Those children who are dominant in the HL also produce high rates of this CS type.

Finally, we come to the last research question concerning child-internal factors, which is fluency measured via words per minute. In this RQ, we predicted that children with a rather similar fluency in their L1s should be able to access them in a similar way, and thus, they should be able to use linguistic material from both languages within a sentence. Looking at the results in Figure 10 in Section 6.2, we noticed that children with a similar fluency in the heritage and majority languages produced lower CS rates (7%) as opposed to those bilinguals and trilinguals that have higher fluency in the MaL German. In terms of the type of CS, Figure 11 supports our prediction, since intrasentential CS is only present in the group of children showing a similar fluency in both L1s. By contrast, children with a German preference produced exclusively intersentential CS.

This study has also focused on previous studies examining the impact of child-external factors in the production of CS, such as FLPs, FL and the language used among siblings. Our third research question examined whether there is a relationship between the parents’ monolingual speech and low CS rates in the children’s production. Following Lanza (1990), Döpke (1992) and Schlyter (1999), children should present low CS rates when they are exposed to monolingual strategies. Therefore, we expected to find low mixing rates in children’s output when their parents use OPOL. The results of Section 6.3.1 seem not to confirm our hypothesis if we consider the whole set of data, given that the group of children following FLP 1 is extremely heterogeneous and comprises ten children as opposed to the other FLPs with two children each. However, when taking the FLPs and the rates of

CS considering the language of the recording (cf. Figure 13, Section 6.3.1), different CS patterns among the four FLP groups emerge. The ten children following FLP 1 are exposed to the MaL not only at home but also outside the home. These children present a CS rate of 23% in HL Catalan, while they do not produce mixed structures in the German context. The remaining six children are spread over the other FLPs. They are less exposed to the MaL at home and show the opposite trend, with higher rates of CS in the German context. Remember that four children of FLP 2 and FLP 3 only receive German outside the family, while the other two, following FLP 4, receive three languages at home (Catalan from their mother and German/English from their father). Concerning the children from FLP 4, it is true that they are also exposed to German at home, yet they receive much less German input than children following FLP 1. The comparison between children following FLP 1 and those who follow another FLP has yielded relevant results. The children of the FLP 1 group code-switched 23% in the Catalan context, while children of the other FLPs only presented 6% of CS utterances. By looking at the German recordings, we find the opposite pattern. Children following FLP 1 did not produce CS utterances, while those belonging to the FLP 3 group presented 38% of CS. These results do not confirm our hypothesis but seem to be in line with the results from De Houwer's empirical studies, namely, that the MaL should be kept outside the home as much as possible in order to promote the HL.

The fourth research question considers the possibility that the absence of the MaL German as an FL could positively influence the production of low mixing rates in the HL Catalan. We predicted, based on the studies by De Houwer (2007, 2009), that families that have chosen Catalan as their FL have children that produce low CS rates in the HL Catalan. By contrast, families that have chosen German as their FL should present higher CS rates in the HL. In the case that a family does not follow any FL, it will be necessary to examine the FLP chosen at home again. As expected for this research question, the cases where the MaL German was kept outside the family nucleus exhibited lower mixing rates. In Section 6.3.2, we see that the FL chosen when all family members are interacting together, in addition to the FLP followed at home, plays an important role when dealing with CS rates. We classified children into three different groups depending on the FL of the family: (i) the MaL German, (ii) the HL English or Catalan, and (iii) no FL (cf. Figure 14, Section 6.3.2). In the case of the Catalan recordings, children whose families decided to speak German as their FL presented higher rates of CS (70%) as compared to children who had an HL, Catalan or English, or even no FL (2–3%). In the case of the German setting, children speaking German as their FL did not present CS rates in this context, in contrast to children who used an HL as their FL, who code-switched 14% in the German context. Children who did not follow any specific FL only code-switched 2% and 1% in Catalan and German, respectively. When considering the type of CS (inter- and intrasentential), language setting and FL (Table 5), Section 6.3.2, has shown that intrasentential CS is generally present in the HL context and used by those children who are growing up in families with either an HL as FL or no FL.

In general, we can confirm that children with German as their FL code-switch much more (70%) than children growing up in a family that has chosen to speak an HL (14%) or that has decided on no FL at all (2%). The former presented only CS in the HL Catalan, while children using an HL as an FL displayed more CS in the German setting (14%) than in the Catalan setting (3%). In the case of children who do not present any FL, we must take their FLP into consideration. Figure 20 shows the difference across FL for children following FLP 1 since they code-switch much more than the rest of the FLP groups. We have further split the information according to the language of the recording. In this figure, two groups have been formed: (i) those (four) who present German as their FL, and (ii) those (six) who do not present any FL. Furthermore, all children are ordered from the youngest to the oldest child in each group.

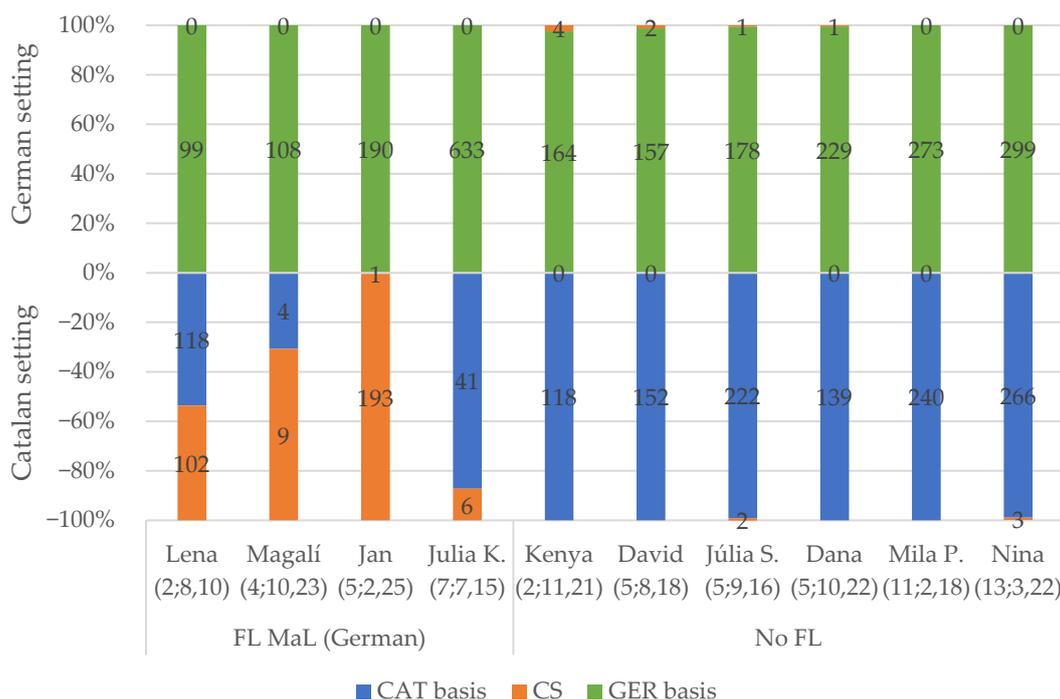


Figure 20. Children following FLP 1 with FL German or no FL: Catalan and German setting.

The difference between both groups is clear. The four children from the FLP 1 group who have the MaL German as their FL are those who presented higher rates of CS in the HL Catalan. By contrast, those who do not have any FL minimally code-switch in the German setting. That means that not only does the FLP followed at home play an important role, but it is also in combination with the presence/absence of an FL factor. Ultimately, our research questions 3 and 4 are confirmed following the results described above. If parents follow OPOL (and no FL is chosen), CS rates in both the heritage and the majority languages should be low.

Finally, our fifth and last research question takes into consideration the impact of the input provided by older siblings to their younger peers. In accordance with this question, we expected to find higher rates of CS in the productions of younger children who interact using MaL German with their older siblings. Note that our data sample is composed of sibling groups all belonging to families following FLP 1 and using MaL German as their FL. The eight siblings participating in this analysis were divided into three groups: (i) Jan and Júlia K., (ii) Nil and Mila B., and (iii) Kenya, Dana, Mila P. and Nina. For these groups of siblings, we examined two different factors: the language spoken among themselves, extracted from the input questionnaire (cf. Section 5.2), and the different rates of CS between younger and older siblings during the spontaneous recordings with the respective adult native speakers. The first factor aims at determining whether there are differences between the three sibling groups depending on the language they use, given that the first sibling group uses German, the second uses German/English and the third group uses German/Catalan. Our hypothesis has been confirmed for the children who speak German among themselves (sibling group (i): Jan and Júlia K.). They show higher mixing rates in HL Catalan (90%), and they do not code-switch in German. The second group of siblings (Nil and Mila B.) uses MaL German and another HL, English, and shows similar CS rates in both languages (3%). Finally, the third group of siblings, composed of four sisters, shows very low CS rates (1% in the German context and no CS in the Catalan recording). This group of siblings speaks German and Catalan to different degrees. From the results related to all three sibling groups, we could state that the use of MaL German among siblings causes an increase in the CS rate in the HL. However, if the MaL is spoken together with an HL, this seems to favour lower CS rates, irrespective of the language

setting (i.e., the MaL or the HL). We further investigated whether young and older siblings code-switch differently, given that the latter can be seen as ‘input givers’ for younger peers. In fact, only some differences could be attested for sibling group (i) (they follow FLP 1, have German as their FL and the siblings speak German to each other). While the second-born child, Jan, presents 100% of German CS in the Catalan recording, his older sister, Júlia K., presents 13% of CS in the same context. The other two sibling groups show mixing rates of around 1% and 5%, irrespective of birth order.

In a nutshell, it can be confirmed that children present higher rates of CS when they are more exposed to the MaL German at home, they follow FLP 1 and their families have chosen the MaL as their FL. In these cases, it is expected that older siblings also interact with their younger siblings in German. Therefore, the exposure to the MaL increases within the family and mixing rates in the HL are higher.

We are in the progress of collecting more data and establishing more homogeneous groups to obtain stronger conclusions. Furthermore, we aim to analyse other child-external factors related to the quantity and quality of input, such as the Catalan knowledge of the non-Catalan-speaking parents, the number of trips to the Catalan-speaking territories per year, and the language exposure not only during the first year of life but also during primary and secondary school (in older children). Finally, it is relevant to know the children’s linguistic attitudes towards the HL and how important it is for them to acquire the HL. These factors, together with an even more exhaustive analysis of the CS data from a linguistic point of view are meant for future research.

Finally, our study contributes to a better understanding on the relation between CS and language dominance and how other factors in multilingual’s children development play a relevant role for the appearance of CS in childhood. Future research should deeply explore the role of siblings in their one-to-one interactions, as well as Muysken’s typology on intrasentential CS in young multilingual children.

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Notes

¹ Although it might be difficult to ascertain whether adults and children follow the same pragmatic rules when using CS, the Editor notes that, syntactically, there are clear differences when looking at the characteristics of adult and child CS. We agree with the Editor that children use language creatively, that they are able to make use of their knowledge of language and exercise it in original and ingenious ways. This can be clearly seen in their code-mixing patterns, such as the one presented in example (1).

² As a matter of fact, considering trilingual children in this picture, one might assume that they mix more than bilinguals, since trilinguals have at least one weak language (Hoffmann 2001). Poeste et al. (2019), however, did not find any correlation between the number of languages acquired and the frequency of CS use.

- 3 Following Romaine's (1995) work, some variations of the original FLP have been proposed, such as the ones by De Houwer (2009), Barron-Hauwaert (2011) or Arnaus Gil (2022), among others.
- 4 A detailed description of the public school and university system in Catalonia is presented in a recent book chapter by Trenchs-Parera (2019). She further reports on linguistic practices by younger generations in Catalonia, which "seem to be going from past compartmentalized bilingualism to flexible bilingual (even multilingual) practices" (Trenchs-Parera 2019, p. 25).
- 5 Note that although Catalan-speaking parents are Catalan—Spanish bilinguals, they did not include Spanish in the family setting.
- 6 We grouped together the children who do not have any siblings and those who have younger siblings without linguistic data available.
- 7 A positive MLU difference shows a tendency towards the MaL German, while a negative MLU difference represents a tendency towards the HL Catalan.
- 8 The oldest child, Nina, presents a FluencyD value of 12.63 w/min. That means that she must theoretically be classified as having a higher fluency in Catalan. However, we consider that being less than one word away (0.64) from being classified as similar fluent in both languages can be taken as a reason to classify her as such.
- 9 Mila and Nil's mother, although bilingual in Catalan and Spanish, decided to speak Catalan to her children.
- 10 Interestingly, the older siblings, Mila P. and Nina, considered to be Catalan-dominant speakers in Section 5.1, are those who present more CS in the Catalan recordings. Dana, the third-born child, who was classified as German-dominant, only presented 1 CS structure in the German setting and none in Catalan. Kenya, the youngest one, a balanced speaker, presented four utterances with CS in German.
- 11 Note that the differences across the percentages of the column entitled 'Total CS' and the column entitled '% of CS in German and Catalan' correspond to a different counting. In the first column, all CS utterances, on the one hand, and all monolingual productions, on the other hand, make up 100%. By contrast, the second column distinguishes, for each language, how much CS was produced as opposed to the monolingual productions in the language of the recording. We show the percentages in this second column for German and Catalan individually; thus, they correspond to the CS rates for each language separately.
- 12 The four children with a MLUDs above 1 are placed to the left and to the right of the children showing a more balanced behaviour, i.e., MLUD < 1). A negative MLUD represents a tendency towards Catalan; a positive value shows a tendency towards German.

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