Constructively combining languages

The use of code-mixing in German-English bilingual child language acquisition

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Language development in bilingual children is often related to differing levels of proficiency. Objective measurements of bilingual development include for example mean length of utterance (MLU). MLU is almost always calculated for each language context (including both monolingual and code-mixed utterances). In the current study, we analyzed the MLUs of three German-English bilingual children, aged 2;3–3;11 separately for the monolingual and code-mixed utterances. Our results showed that language preference was reflected in MLU values: the more children spoke in one language the higher the MLU was in that language. However, it was the mixed utterances that had the highest MLU for all three children. We support the results with a construction type analysis and suggest a potential usage-based explanation for these results based on individual differences in each child's developmental inventory of words and constructions.

Keywords: code-mixing, German – English, bilingual child, language proficiency, MLU

1. Introduction

Research into the acquisition of two languages in the context of bilingualism has often been concerned with the factors that influence the development and attainment in both languages. Compared to monolinguals, bilingual language input is naturally divided between the two languages, which potentially results in lower frequency of exposure to each language (Paradis & Genesee, 1996; but see De Houwer, Bornstein, & Putnick, 2014). Unbalanced input may result in unbalanced

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proficiency, e.g. one language developing faster or slower than the other language. This is generally referred to as 'language dominance', as it extremely rare for bilinguals to be equally proficient in both languages (e.g., Cantone, Müller, Schmitz, & Kupisch, 2008; McLaughlin, 1984; Müller et al., 2015).

Language proficiency and code-mixing

Bilingual children differ widely from each other in how their bilingualism develops. Terms such as language dominance and proficiency capture these differences (e.g. Bernardini and Schlyter, 2004; Silva-Corvalàn and Treffers-Daller, 2016). Whereas proficiency generally relates to some measurement of linguistic ability and fluency in both languages separately, dominance is often used to compare the attainment in the two languages of a bilingual. A dominant bilingual is generally referred to as "someone with greater proficiency in one of his or her languages […]" (Li Wei, 2000). Unequal proficiencies are the norm, especially in young bilinguals: the two languages tend to develop at different rates.

Measuring differences in proficiency is difficult, however, since bilingualism is *multidimensional,* and thus affected by many linguistic, psycholinguistic, and sociolinguistic features (see Luk & Bialystok, 2013). Unequal proficiencies can be observed in the lexical knowledge, processing abilities, amount of language use, fluency of speech and other factors, and for each of these domains different types of assessment are employed (Birdsong, 2016).

Bilingualism studies tend to make greater use of the notion of dominance, perhaps because it is less troubled by the problems involved in choosing a yardstick by which to measure proficiency. Dominance, on the other hand, gives a rough indication of which language a bilingual is 'better' in, an issue that holds inherent interest for both social and cognitive theories of bilingualism. Socially oriented theories use it to investigate which factors can help the maintenance of a language (if children grow up as dominant in Language B the ultimate survival of Language A may be threatened), while cognitive theories of bilingualism have always shown interest in how the two languages of a bilingual are represented in a speaker's mind, including whether they differ in the strength of representation and whether the language that is dominant can interfere with the weaker language. Although there is no consensus on how to best measure dominance, MLU is the most commonly used measurement to assess differences in the linguistic productivity of very young children. It is considered to be an objective and independent predictor of normal expressive language development (Brown, 1973). MLU is often viewed as problematic, particularly if one language is largely analytic and the other has high levels of inflectional morphology, but it nevertheless can be used to portray differences of competence in a reasonably reliable way (e.g. Bernardini

and Schlyter, 2004; Yip & Matthews, 2006; Schmeißer et al., 2016). In bilingual development the language of greater proficiency is the one that has a higher MLU compared to the other language (e.g. Bernardini and Schlyter, 2004). This language then is said to be the dominant language.

Studies employing MLU measurements usually calculate MLU for the complete corpus in a context, including mono- and bilingual utterances; dominance is then established based on the language with the higher MLU (e.g. Kupisch, 2008; Bernardini & Schlyter, 2004; Döpke, 1998). This seems problematic for a number of reasons: First, language dominance patterns are not stable as proficiency in a language can change with changes in a child's circumstances, such as an extended stay in an environment where only one of the languages is spoken. Dominance often correlates with frequency of exposure and use, the dominant language being the one a child hears or uses more often (e.g. Pearson, Fernández, Lewedeg, & Oller, 1997). Second, it is at least theoretically possible, perhaps likely, that a child's dominance pattern may differ across contexts and interlocutors, just like adult bilinguals may be dominant in Language A in informal registers and in Language B in formal ones. Third, if children's data were not collected in the individual language contexts but in a bilingual context it will be difficult to establish dominance. Fourth, many bilingual children also use code-mixing or the non-target language and including their MLUs in the calculation might distort results. Calculating separate MLUs for each language and for the mixed utterances would then help identifying proficiencies in each language.

In their production, bilingual children sometimes show patterns which deviate from monolinguals, most apparent when they use both languages in one utterance, known as code-mixing.[1] Many reasons and predictions have been proposed to account for code-mixing, among them an imbalance between the two languages (e.g. Schlyter, 1994; Bernardini and Schlyter, 2004). The suggestion is that children mix more while speaking in their weaker language (e.g. Schlyter, 1994; Bernardini and Schlyter, 2004). While speaking in their weaker language children fill lexical and syntactic gaps with material from their dominant language (e.g. Gawlitzek-Maiwald and Tracy, 1996; Genesee & Nicoladis, 2006). This strategy allows them to move beyond their lexical and grammatical abilities.

However, not all children's code-mixing results from gap-filling or unequal development (e.g. Liceras et al., 2008; Cantone & Müller, 2008). For example Jorschick, Quick, Gläßer, Lieven, and Tomasello (2011) have investigated mixed DPs in three German-English bilingual children and have shown that most of

1. In this paper, we use the term code-mixing for all instances in which a child uses both languages in one utterance. We are aware that there is a large literature on the differences between code-switching and code-mixing, but space precludes us from discussing this in this squib.

the time the translation equivalent was available. This suggests that other factors have to be considered as well such as amount of parental code-mixing, similarity and saliency of structures, or degrees of accessibility or entrenchment, which are known to influence processing and activation of linguistic elements (e.g. Comeau, Genesee, & Lapaquette, 2003; Pfaff, 1979; Backus, 2015; Quick, Lieven, & Tomasello, 2016; Bybee, 2010).

Code-mixing and entrenchment – a usage-based suggestion

Following a usage-based approach (e.g. Tomasello, 2003; Lieven, Salomo & Tomasello, 2009), we assume that word usage and syntactic patterns reflect the way children have built up their lexicons and grammar on the basis of past usage and innate cognitive skills. This requires that we look at the patterns of language use the child produces. The basic question will be why code-mixing occurs at all, despite the fact that the input emphasizes the separation of languages and, as we will see, the child knows the translation equivalents of the inserted other-language words.

Work on children's language acquisition as well as on adult second language acquisition has shown that when children acquire their language(s) they extract structure from usage, track statistics of sequences and items, and pay attention to saliency and form-function mappings (e.g. Tomasello, 2003; Bybee, 2010; Ellis, Römer, & O'Donnell, 2016). Children's early utterances are characterized by a high number of lexically fixed utterances, and over time show a development toward increasing productivity, i.e. the building of schematic patterns, or syntax. Throughout their development, children build up an inventory of constructions which differ in their degrees of complexity and abstractness, ranging from completely lexically fixed (chunks), e.g. *Don't know,* to fully schematic patterns, e.g. NP VP NP. In between are partially schematic constructions which consist of a lexically fixed part and an open slot, e.g. *I want x*. Since language is a dynamic system, it may be hypothesized that a child's grammar will feature many partially schematic constructions that together, in a further process of abstraction, give rise to the construction of maximally schematic patterns. At the same time, we should expect the grammar to contain many multiword units that instantiate such patterns but are nevertheless stored as conventional units. Entrenchment therefore can be understood as a cognitive process of memory consolidation, a process of automatization and chunking. It is influenced by many factors, most prominently frequency and salience (Schmid, 2017). The more frequent and/or salient lexical items and constructions are, the more likely they will be established as cognitive 'routines', become more entrenched, and get activated more easily as units in the next speech event in which they are appropriate (Langacker, 1987; Schmid, 2017).

This approach predicts individual differences between children in the patterns of construction learning because each child has different input, though they will ultimately converge towards more or less the same inventory of schematic patterns because of the relative similarity in input as far as the variety of patterns that are present. Ultimately, most schematic patterns occur often enough to trigger acquisition.

In this paper we are interested in the relationship between individual bilingual children's MLU developments and their code-mixing patterns. Generally, language proportions should be reflected in utterance length, the higher the proportion the longer the utterances and vice versa. Concerning code-mixing, it is harder to know what to expect. Utterances could be shorter, equally long or longer than monolingual ones. For example, if children experience a lexical gap in one language, they could abort the utterance which results in a shorter utterance. If, however, they fill the gap with an element from the other language it results in a mixed utterance that is of the same length as its monolingual equivalent would have been. However, most research on bilingual acquisition suggests that children's code-mixing is usually not the result of filling lexical gaps. Therefore if, on the other hand, code-mixing is often the result of the activation of highly entrenched partially schematic units with slots into which words or phrases from either language can be inserted, code-mixed utterances as a group could well end up being longer than monolingual utterances, partially because they were evidently not aborted and partially because the combination of functional elements from two languages may often involve doubling or redundancy (e.g. Quick et al., first view, 2016; Backus, 2015; Wasserscheid, 2016).

Therefore, in the current study we calculated MLU not only for the whole language context but also for non-target and mixed utterances separately. We analyzed three high-density corpora of German-English bilingual children between 2;3 to 3;11, coded each utterance as "German monolingual", "English monolingual" or "code-mixed", and calculated MLUs separately for these three types of utterances. Because it is problematic to rely exclusively on MLU as a measure of language proficiency, we support the MLU scores with a complexity analysis. For this, we coded utterances as "phrase level constructions", such as NPs, PPs etc., "sentence level constructions", such as SV, SVO, or "fragments".

2. Method

2.1 Participants

We included three German-English bilingual children Silvie, Lily, and Fion in the study. Because we were interested in the separate development of the two languages, one recruitment criterion was that the parents reported that they used a *one parent-one language* approach (OPOL) but in reality they did not strictly adhere to this strategy. Most of the time, however, each parent spoke his or her native language. Older siblings sometimes used code-mixing. All children came from a middle-class household, are simultaneous German-English bilinguals, and lived with their parents in a German city.

The first child, Silvie, was the only child of an English-speaking mother and a German-speaking father. Since the father's proficiency in English was rather limited the parents spoke German to one another. During the first year the mother stayed home with the child and from 18 months onwards, Silvie started attending a German kindergarten for 45 hours per week. All recordings took place at home during free play situations, meals, or while reading a book. Most of the time, both parents were present, resulting in a bilingual context. The recordings covered a span of 18 months, starting at the age of 2;4 until she was 3;10, averaging to about 2.5 hours of recorded data per week (about 20 session each month). For our analyses we included a total of 38,220 utterances.

The second child, Lily, had a brother who is two years older. The mother was the English speaker and the father spoke German. Since both parents spoke their non-native language quite well, they used both German and English as the family language. Additionally, Lily's brother was also raised bilingually and used code-mixing. As in the case of Silvie, Lily stayed home with her English-speaking mother during the first year of her life and entered a German kindergarten at the age of 18 months for most of the day. Lily's data cover a span of 19 months (2;3 – 3;10), and consist of spontaneous interactions made during play situations, meals, or bedtime, mostly with both parents present. The parents recorded Lily at rather infrequent intervals, on average 1 hour per week, leading to large differences in the amount of data for each month with 23,667 utterances entering the analyses.

Fion is the second child of a middle-class family. The mother is a native speaker of German and the father of English. Both parents spoke the non-native language quite well and they were very inconsistent in their use of the mother tongue. They produced code-mixed utterances and sometimes repeated the mixed utterances of their children (Fion and his brother). Fion started attending a German-speaking daycare at the age of 18 months for 4 hours a day. From 24 months onwards he went to a German-speaking kindergarten for 6–8 hours per day. Data consisted

of audiotape recordings of spontaneous speech in the home environment, during playtime or meals. Most of the time both parents were present which results in a German – English context. Often the brother was present; as he code-mixed sometimes he was another source of bilingual speech. The recordings cover a span from 2;3–3;11. Recordings were made on average two hours per week, adding up to a total of 205 hours for the whole period; 47,928 utterances entered the analysis.

Thus, all three children were raised in families that subscribed to the idea of OPOL but they differed in the degree to which they adhered to this principle. They would often hear the parents use their other language or siblings mixing the languages. Fion especially had a lot of code-mixing in his input, including the parental input

All recordings were transcribed and coded in SONIC CHAT format (MacWhinney, 2000) by a bilingual research assistant.

2.2 Analysis

All utterances were coded for language: "English monolingual", "German monolingual", and "code-mixed". Unintelligible or incomplete utterances were coded as "ambiguous" and excluded from the analyses. We took the following measures: First, we calculated the language proportions for each recording month separately for each child. Second, MLU was calculated in words for each month, for all utterances, and separately for the English and German monolingual utterances as well as for the mixed utterances (n = 109815). Third, in order to get a developmental picture due to the amount of the data, we coded for syntactic completeness and construction types for one week in each of the three months (n = 5,863).

Syntactic completeness

For the data from three months of each child (2;3, 3;0, and 3;11) we analyzed one week for syntactic completeness and complexity of the utterances. We therefore grouped the German, English and code-mixed utterances into three categories: phrase level, sentence level and fragments (see Table 1). Utterances on the "phrase level" contained noun phrases (NP), adjective phrases (AP), prepositional phrases (PP), and verb phrases (VP). For example, *a sheep* was coded as English monolingual NP belonging to the phrase category with a MLU of two.

Utterances belonging to the "sentence level" were intransitives (SV), transitives (SVO), ditransitives (SVOO), complex sentences (Complex S), and imperatives (Imp). Questions were assigned to either phrase or sentence level based on their argument structure. Therefore, the code-mixed utterance *this is kein taxi* 'this is no cab' had a MLU score of four and was coded as a SVO utterance belonging to the sentence level category.

All utterances which fit none of these categories were assigned to the "fragment" (frag) category, for example *and da* 'and there' was a code-mixed fragment with a MLU of two words.

Table 1. Complexity and construction types

Level	Code	Construction	Examples
Phrase level	**NP**	noun phrase	*a sheep*
	AP	adjective phrase	*big feuer* 'big fire'
	PP	prepositional phrase	*in a riesenrad* 'in a ferries wheel'
	VP	utterances with a verb	*and music hören* 'and listening to music' *Bin salty* 'am salty'
Sentence level	**SV**	Simple sentence with main verb	*Everything broke*
	SVO		*I carry it.*
	SVOO		*I want not Apfelschorle* 'I want no apple soda' *Ich bringe sie dir* 'I bring it to you'
	Complex S	Complex Sentence, sentences containing two verbs; basically subordinated or conjoined clauses	*That is all what I need.* *Look at the Ampel, it is kaputt* 'Look at the traffic light, it is broken' *Ein Feuer gibt es und einen Räuber gibt es* 'There is a fire and there is a thief'
	Imp	Imperatives	*Help me!* *Nein ask mommy!* 'No ask mommy!' *Guck mal!* 'Look!'
Phrase or sentence level	**Quest**	Question	*Mama is this jetzt kalt?* 'Mommy is this now cold?' *Ist das ein Tier* 'Is this an animal?' *Mann and Frau?* 'man and woman?'
Fragment	**Frag**	all utterances which do not fit into any other category	*nein* 'no' *please.* *and da* 'and there' *nein* 'no' *bye bye.* *ja really* 'yes really'

3. Results

Language proportion for each child

We first analyzed the language proportions for each child. Utterances were coded for German monolingual, English monolingual and mixed. Ambiguous utterances were excluded. As can be seen from Figure 1, children showed different patterns of language preferences. Whereas Silvie's preferred language is German 75% (n = 28,487), Lily seemed to be balanced as the language proportions for German, 47% (n = 11,046) and English, 44% (n = 10,560) were similar to each other. Fion's proportions were higher for German, 73% (n = 34,812) compared to English 20% (n = 9,458). All children showed only a small proportion of mixed utterances, Silvie 10% (n = 4,321), Lily 9% (n = 2,061), and Fion 7% (n = 3,658).

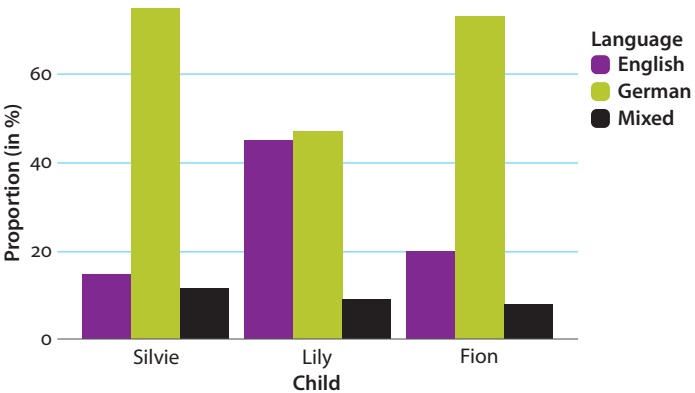

Figure 1. Language Distributions for all children

MLUs for Silvie, Lily and Fion

First we report the mean MLUs across all months. The first child, Silvie, had a higher mean in the German monolingual utterances (3.54) than in the English monolingual utterances (1.95), which matches her language proportions. Interestingly, it is the MLU of the mixed utterances that has the highest mean (5.2). The second child, Lily, was more balanced in her language proportions and we also see this in her MLU values, with German and English MLUs very close to each other (3.23 vs. 3.63). However, like we saw for Silvie, the MLU of mixed utterances has a higher mean (5.32). Finally, Fion has a slightly higher MLU in German (2.82) compared to English (2.26). Again, the MLU of mixed utterances is the highest, namely 4.35.

Since the children were recorded longitudinally, the MLU development across times is more revealing, and indeed it showed some interesting developments.

Figure (2) shows the fitted MLU values for each child across time. Mixed MLUs in all children always exceeded the monolingual MLUs and also gradually increased with age.

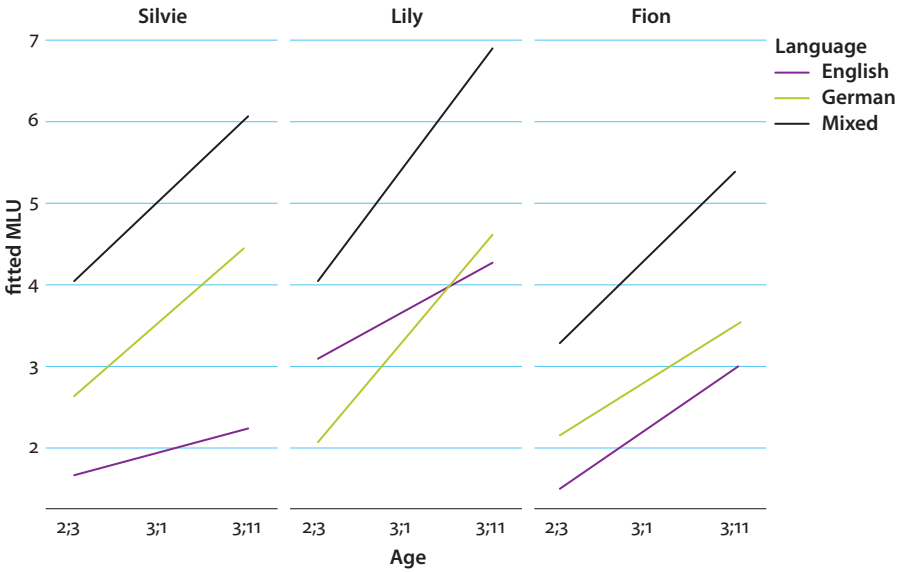

Figure 2. Fitted MLU for all children

A linear model was fitted with MLU as the dependent variable and age and child as the independent variables (R function `lm()` in R base installation). Overall, the model was significant ($F = 122.3$, $df_1 = 17$, $df_2 = 156$, $p < 0.001$) showing that mixed MLUs were significantly longer than monolingual German or English MLU for all children (5.2 for Silvie. 5.32 for Lily, and 4.35 for Fion).

If we now look at each child individually we can see for Silvie that her MLU gradually increases with age, with German developing at a higher level than English. Lily's MLU also gradually increases in both languages. Initially, she had a somewhat higher MLU in English than in German, however, throughout the developmental period observed German became stronger in faster manner and eventually exceeded English. Fion's MLU gradually increased in both languages, with German at a higher level than English. For all children we can see that mixed utterances are longer from the beginning and this holds throughout development. The MLU gradually increases with age.

Syntactic complexity and construction types

There are various reasons why the MLU of mixed utterances could be longer than those of monolingual utterances. In order to further investigate the nature of these MLU differences, we analyzed 5863 utterances for syntactic complexity, by coding the construction types they embodied. We therefore coded utterances as phrases, sentences or fragments (Silvie: $n = 2081$, Lily: $n = 1626$, Fion: $n = 2156$).

A multinomial regression model, `multinom()`, was fitted for each child subset with three levels of complexity (sentence, phrase, fragment) as the dependent variable and language and age as the predictors (R package `nnet`, version 7.3–9, Venables & Ripley, 2002). The results of this complex model can be summarized in the following findings: First, monolingual utterances were less complex in that they contained more fragments. Second, this finding was the same for all three children ($p < 0.001$). Third, code-mixed utterances contained more phrases and sentences, are thus more complex, and presumably therefore, they are longer (Figure 3).

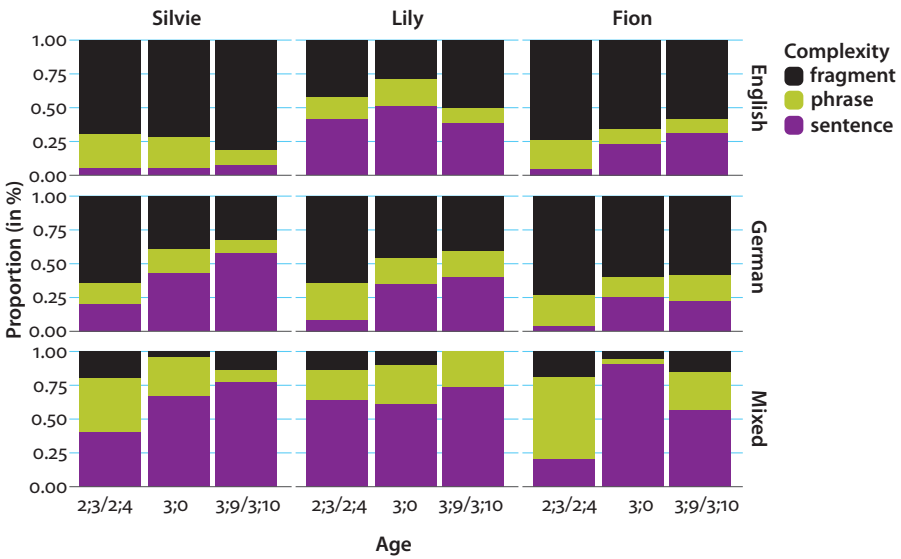

Figure 3. Syntactic completeness for each child, language and month

To summarize our finding, we found that language choice patterns, as reflected in the measure 'language proportions' is reflected in utterance lengths and utterance complexity: the higher the proportion of the data in a language, the longer and more complex the utterances in that language. However, code-mixed utterances were invariably the longest and most complex across all ages and children.

4. Discussion

In this study we analyzed the language development of three German-English bilingual children. First, in order to investigate language dominance, we calculated language proportions and compared them to MLU scores of each child. Unlike previous studies we calculated MLU separately for the monolingual and the code-mixed utterances. The results showed that language proportion was reflected in MLU: children who used one language more than the other also exhibited a higher MLU in that language. One child, Lily, did not show a difference in the proportion with which each language was used; accordingly, her MLUs were very similar in both languages. While this result points to an expected link between the amount of use of a language and proficiency in it, the results for the MLUs of mixed utterances were surprising. All three children had higher MLUs for the mixed utterances. To investigate further, we analyzed the data from three months for each child in terms of syntactic completeness, or 'complexity', i.e. whether the utterances were isolated phrases, complete sentences or aborted or incomplete fragments. Results showed that code-mixed utterances had greater syntactic complexity, involving more complete sentences and phrases and fewer fragments. Monolingual German and English utterances on the other hand more often were fragments and in fewer cases full sentences or phrases. This raises the question why code-mixed utterances exhibit higher syntactic complexity than the monolingual utterances in either language, even the dominant one.

Code-mixing in bilingual children is often suggested to relate to asymmetric bilingualism, and serves as a way to fill lexical gaps in the knowledge of especially the weaker of the two languages. However, if code-mixing was merely used to fill gaps in vocabulary knowledge, one would not expect higher MLUs in code-mixed utterances. If a child has the choice between equivalent grammatical structures in either language, the MLU of code-mixed utterances should be the same as that of monolingual utterances, assuming that the length of equivalent structures in both languages does not dramatically differ. We think this is not an unreasonable assumption for typologically similar languages like English and German. Our suggestion is that the higher MLU of mixed utterances has to do with asymmetrical syntactic knowledge in the two languages. If a child has low entrenchment for a particular structure in Language A, the result will often be a 'fragment' in monolingual utterances, since the knowledge of how to finish the utterance is not entrenched well enough to ensure smooth production. Cumulatively, such fragments contribute to a lower MLU for monolingual utterances, more so for the weaker than for the stronger language. However, if this same child has higher entrenchment for the equivalent structure in Language B, and uses it instead, the result will be a mixed utterance that is likely to be a full sentence (according to our coding

scheme) and thus contribute to a higher MLU for the category of mixed utterances. In addition, if the child is not able to fill a lexical gap, whether because of non-availability or low entrenchment, the utterance will often be aborted and stay monolingual, again lowering MLU compared to when the gap is filled by the translation equivalent from the other language and ends up as a non-aborted mixed utterance. Pragmatically speaking, one could say that when children engage in code-mixing they are exploiting all their resources instead of just a subset, and consequently are more communicative. However, we think it is important to emphasize that focusing on vocabulary gaps only would fail to account for the code-mixing data. The children also code-mix when they demonstrably have access to both translation equivalents. Code-mixing, we submit, is often the result of the faster activation of the other-language element, be it a word or a partially schematic construction, itself presumably the result of a higher degree of entrenchment for that element.

We suggest that a usage-based approach might further contribute to an explanation of these findings, and additionally help account for the specific patterns of code-mixing that occurred. Children's early language in general is characterized by a large store of lexically-fixed and semi-formulaic structures, also known as slot-and-frame patterns or partially schematic units (e.g. Lieven et al., 2009). Slot-and-frame patterns form a starting point for establishing more abstract schemas and for identifying categories, i.e. they help build abstract grammar (Tomasello, 2003). For example, having the utterances *this is a dog* and *this is yours* entrenched in your competence can give rise to the partially schematic unit *this is x*. In a next step, together with similar partially schematic structures such as *Where is X* and *What is X* etc., these structures in turn may give rise to a more abstract copular structure. The emergence and entrenchment of units has been shown to be affected by frequency. The more often a unit is heard or used, the more entrenched it will be, and the faster it is accessed in the planning stages of running speech. Studies of monolingual development have shown that children construct their early language around lexically-fixed units (e.g. Lieven, Pine, & Baldwin, 1997; Lieven, et al., 2009), and further that the lexically-fixed units individual children employ match frequently found sequences in their input. In a study conducted by Bannard and Matthews (2008), the authors found that children were better able to repeat frequent four-word sequences such as *a cup of tea* than less frequently occurring sequences such as *a cup of milk*. High frequency units are argued to be better entrenched and therefore easier to activate in the child's system compared to low frequency units.

Consequently, if code-mixing is the result of activating highly entrenched units from either language with slots into which words or phrases from either language can be inserted, code-mixed utterances can be expected to be longer, i.e.

more complex and more often complete, than utterances in which code-mixing is, for whichever reasons, avoided or preempted (Quick, Lieven, Carpenter, & Tomasello, first view; Backus, 2015; Wasserscheidt, 2016). For example, let's assume a German-English bilingual child wants to say '*this is not a cab*' or '*this is yours*', but temporarily has trouble accessing the construction '*not a N*' or the word '*yours*'. If he feels free to code-mix to his more dominant German, he might come up with our attested examples *this is kein taxi* 'this in no cab' and *this is deins* 'this is yours' (Fion, 3,0), exploiting the productivity afforded by the partially schematic pattern '*this is x*'. If code-mixing is discouraged, he might simply abort the utterance, contributing to a lower MLU for monolingual utterances. It is interesting that the children we studied all produce code-mixing despite being raised mainly with the One Parent One Language strategy. The families differed in how strictly they enforced this policy, but in all cases the children obviously felt unconstrained enough to combine their languages a fair amount of the time. Given that the parents rarely modeled code-mixing in their input, it stands to reason to suggest that code-mixing is the natural result of growing up with two languages. What our data suggest is that activation of other-language material is a constant possibility while the child is speaking, and leads to overt code-mixing when either the entrenchment of the material needed to finish the current utterance in the same language as it was started is low or non-existent, or the entrenchment of the equivalent material in the other language is high. Often, both conditions may apply, and make code-mixing at least as natural a way of finishing the utterance as aborting it.

5. Conclusion

At this point, this account is merely a suggested explanation for the robust finding that MLU of mixed utterances was considerably higher than MLU of monolingual utterances, including that of the child's dominant language. Our next step is to test the hypothesis that code-mixing often involves filling in slots in partially schematic units with words and other partially schematic units for which we have good reason to assume higher degrees of entrenchment. This entails relating the units in the child's code-mixing to his/her own usage and input.

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