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Code-Mixing and Mixed Verbs in Cantonese-English Bilingual Children: Input and Innovation

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Abstract: In both child and adult Cantonese, code-mixing is used productively. We focus on the insertion of English verbs into Cantonese utterances. Data from nine simultaneous bilingual children in the Hong Kong Bilingual Child Language Corpus are analyzed. Case studies show that the children's rates of mixing closely match the rate of mixing in the parental input, and that different input conditions influence rates of mixing. The bilingual children, nevertheless, show creativity, notably in inserting phrasal verb-particle combinations into a Cantonese frame. We argue that this is an innovation not derived from adult input.

Keywords: code-mixing; mixed verbs; parental input; Cantonese; bilingual development

1. Introduction: Input and Code-Mixing in Bilingual Development

It has been argued that the input to which children are exposed plays a more decisive role in bilingual than monolingual development [1,2]. The input available to the bilingual child is divided among two or more languages, and is thus typically reduced in each language relative to monolingual environments [3]. The dual input is typically unevenly distributed, often leading to uneven development of the two languages [4]: most bilingual children show dominance in one language over the other, while balanced bilingual children are the exception rather than the rule.

Differential input effects are found across different domains in bilingual children [5]. In the case of code-mixing, there is ample evidence for effects of input. An experimental study which manipulated the rate of mixing in the input found a close relationship between rates of mixing produced by adults and children [6].

Code-mixing as understood here is the use of more than one language in a single utterance. Such mixed utterances often form part of the input to children developing bilingual competence [7]. Whether the input contains code-mixing depends on variables including differing input conditions and parental discourse strategies. In some cultures, code-mixing is resisted by parents [8], whereas among Hong Kong families it is widely practiced and in some cases well-accepted or even welcomed [9].

Effects of input may also be affected by the input conditions under which children are raised. Much of the available data comes from one parent-one language (1P1L) case studies, often conducted by parent-linguists as in the case of [10], in which the parents each address the child in their native language. The 1P1L pattern is not the typical case in Hong Kong, however. A more prevalent strategy is one parent-two languages (1P2L), a pattern which is increasingly seen in Hong Kong. In this study

we include two children from one parent-two languages families. The parents are native speakers of Cantonese who speak English as a second language, and the children are addressed in both languages with varying degrees of code-mixing. One research question raised by this situation is whether the parents and/or the children raised in 1P2L environments mix more, or in different ways, compared to 1P1L cases, and how this is reflected in the children's mixing.

This article addresses the following research questions:

1. Are there quantitative and qualitative differences in bilingual children's code-mixing between the Cantonese and English contexts?
2. What relationships hold between language dominance patterns and children's mixing?
3. How does parental input influence the frequencies and patterns of child code-mixing?
4. What are the properties of mixed verbs in children's Cantonese-English code-mixing? To what extent are they derived from the input?

Mixed verbs are discussed in Section 4.5. It will be argued that children's mixed verbs demonstrate creativity [11]. Mixed verb phrases with a light verb are found to be absent. Focusing on verb-particle constructions, it will be shown some mixed structures show creativity, going beyond the input (see Section 4.6).

2. Methodology

The data for this study come from the Hong Kong Bilingual Child Language Corpus, which at the time of writing contained longitudinal data for seven 1P1L and two 1P2L children. Table 1 provides details of the available corpora for each child. The entire corpus contains a total of 478 files in two languages coded in CHAT (Codes for the Human Analysis of Transcripts) format and tagged with a set of 33 word-class labels. The age range covered by the corpus starts at 1;03 (one year and 3 months) and ends at 4;06. The total number of child utterances is 57,831 and 46,382 in the Cantonese and English files respectively[1].

Table 1. Background of child participants (based on [10] (p. 67)).

Child	Native Language of Parents		Age Span of Corpus (Years; Months; Days)	Number of Files (Total Number of Utterances)
	Mother	Father		
1P1L				
Timmy	Cantonese	English	2;00;26–3;06;25	CC: 34 (10,631) EC: 38 (6,241)
Sophie	Cantonese	English	1;06;01–3;00;09	CC: 40 (12,574) EC: 40 (6,717)
Alicia	Cantonese	English	1;03;10–3;00;24	CC: 40 (6,217) EC: 40 (5,109)
Llywelyn	Cantonese	English	2;00;12–3;04;17	CC: 17 (3,831) EC: 17 (4,121)
Charlotte	Cantonese	English	1;08;28–3;00;03	CC: 19 (4,012) EC: 19 (4,621)
Kathryn	English	Cantonese	3;01;05–4;06;07	CC: 17 (4,281) EC: 14 (4,202)
Janet	Cantonese	English	2;10;16–3;11;11	CC: 22 (5,978) EC: 22 (4,343)
1P2L				
Kasen	Cantonese	Cantonese	2;04;07–4;00;09	CC: 20 (5,228) EC: 20 (5,723)
Darren	Cantonese	Cantonese	1;07;23–3;11;24	CC: 27 (5,079) EC: 28 (5,079)

In each recording session, samples of English and Cantonese were elicited by having one of two researchers responsible for each language [10] (pp. 66–67). Although they were instructed to address the children in their assigned language, the researchers conducting the recording were also bilingual

[1] The total number includes all utterances produced by the child in each recording context as represented in the corpus at the time of writing. Due to ongoing expansion and maintenance of the corpus, some figures and the total number of files differ from those reported in [10].

speakers of Cantonese and English, and some children showed awareness of this, thus opening up the possibility of operating in a bilingual mode. One researcher interacted with the child for up to half an hour in English and a second researcher for half an hour in Cantonese. The same procedure was adopted for the 1P2L children, in order to record a sample of each language systematically. In the data discussed below, 'English context' means that the researcher was interacting with the child in English, which does not guarantee that the child would always respond in English. Similarly, the 'Cantonese context' could contain English utterances, although this pattern is less common since for the majority of children studied here, Cantonese is the dominant language.

A mixed utterance was defined as an utterance containing elements from both languages [12]. Examples were extracted from the corpus by using the Key Word and Line (KWAL) command of the Computerized Language Analysis (CLAN) program to search for items marked by the postcode '@s' in the CHAT transcripts. For example, in (1) the Cantonese verb-object compound 沖涼 *cung1-loeng4* inserted as the complement of *want* is marked by the postcode '@s':

1. I want 沖涼@s
   I want Shower
   'I want to take a shower.' (Alicia 2;06;13, English context (hereafter EC))

Mixing in the English context (indicated by EC in the examples) typically means that the child is inserting Cantonese elements into an English frame, as in (1); however, it could also be that the child is using Cantonese and inserting English elements into the Cantonese frame, in the sense of [13]. Although the notion of frame or matrix language may be descriptively useful, there are numerous cases where an utterance cannot be categorized as using an English or a Cantonese frame [7] (p. 135).

The rate of code-mixing was calculated for each language context by dividing the number of mixed utterances by the total number of utterances produced by the child. Utterances of the following types were excluded: (i) cases where it was difficult to tell whether the child knew the words belonged to different languages, e.g., tag switching, abbreviations and proper nouns; and (ii) utterances whose syntactic structure could not be analyzed, e.g., repeated and incomplete utterances.

3. Results

3.1. One Parent–One Language Children

Figures 1–7 show mixing rates for each language context over time for the respective children in the one parent–one language condition. The typical pattern, exemplified by Timmy, Charlotte, Kathryn and Llywelyn, shows consistently higher rates of mixing in the Cantonese context. For Sophie, Alicia and Janet the pattern is less clear, with the English context showing a higher rate of mixing at certain periods. This reflects the fact that in the English recording session, the child (despite being addressed in English) produced Cantonese utterances with English elements inserted.

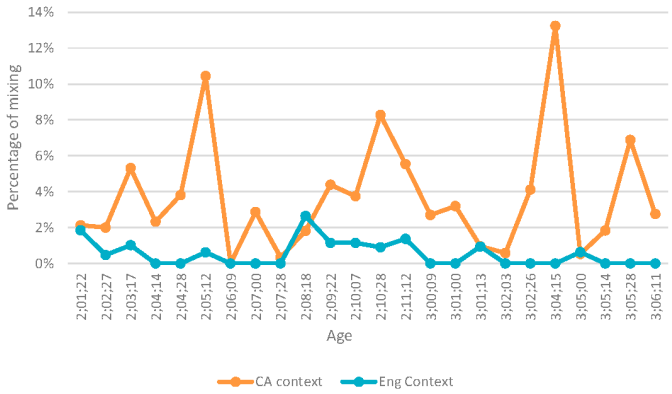

Figure 1. Mixed utterances produced by Timmy in English and Cantonese contexts.

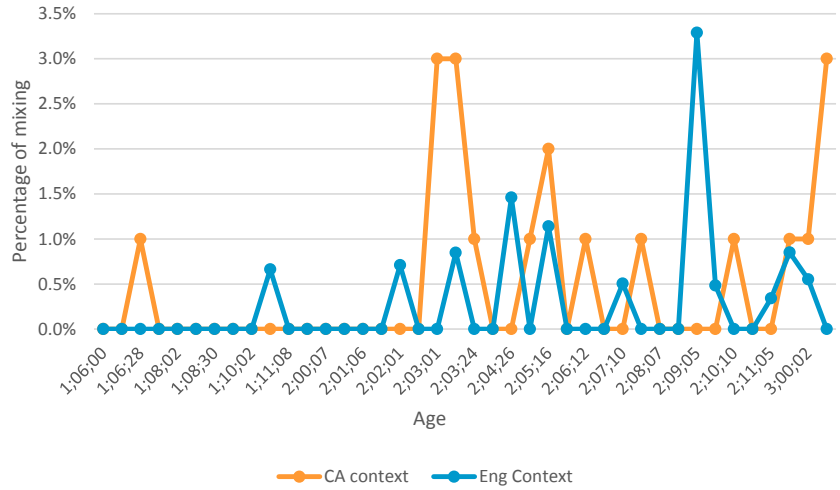

Figure 2. Mixed utterances produced by Sophie in English and Cantonese contexts.

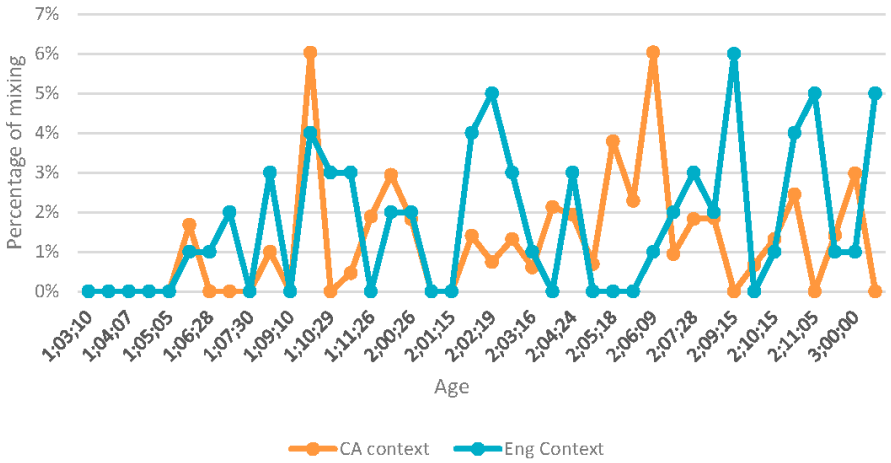

Figure 3. Mixed utterances produced by Alicia in English and Cantonese contexts.

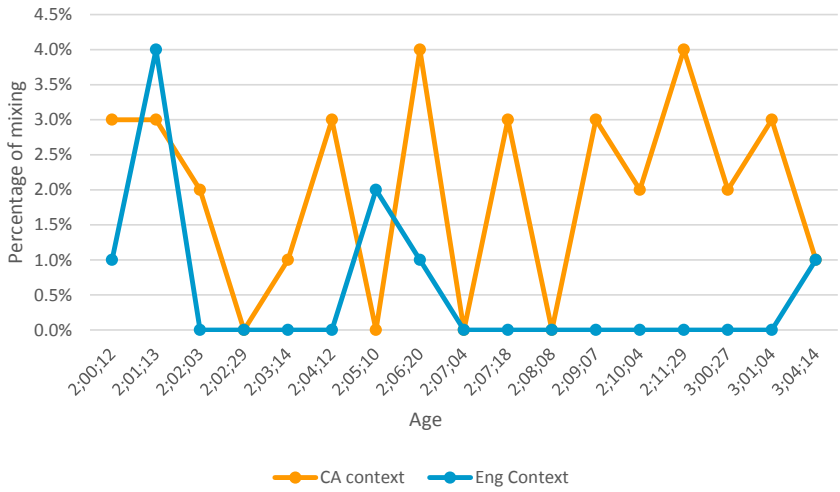

Figure 4. Mixed utterances produced by Llywelyn in English and Cantonese contexts.

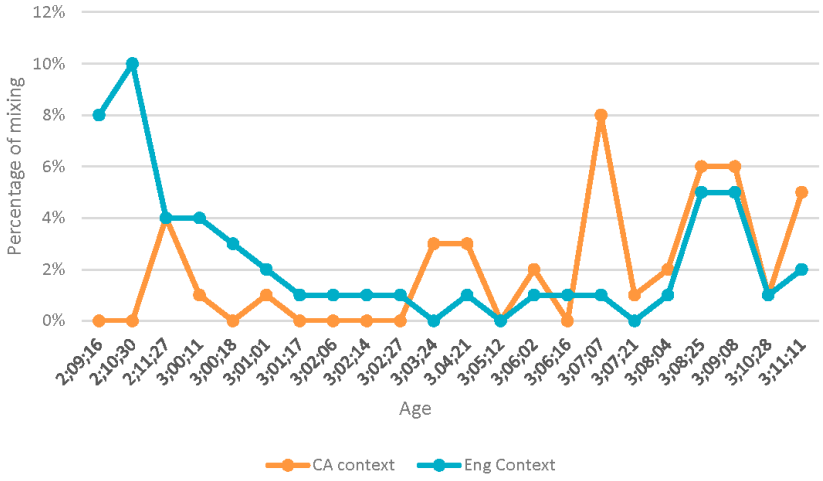

Figure 5. Mixed utterances produced by Janet in English and Cantonese contexts.

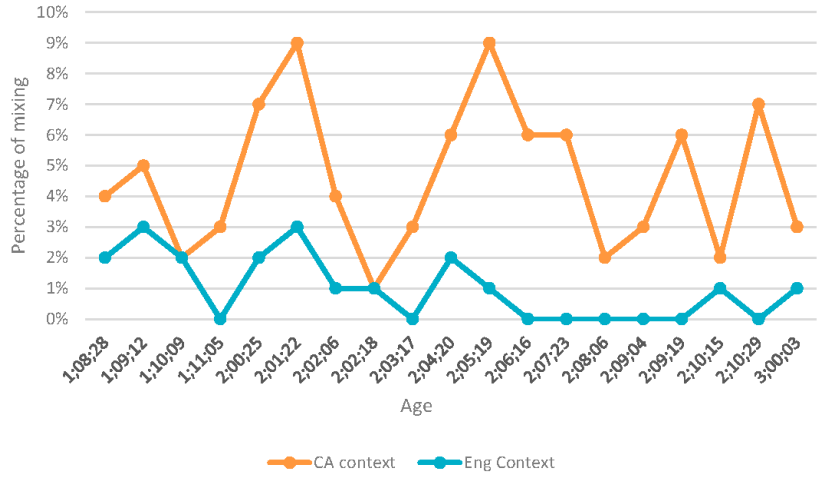

Figure 6. Mixed utterances produced by Charlotte in English and Cantonese contexts.

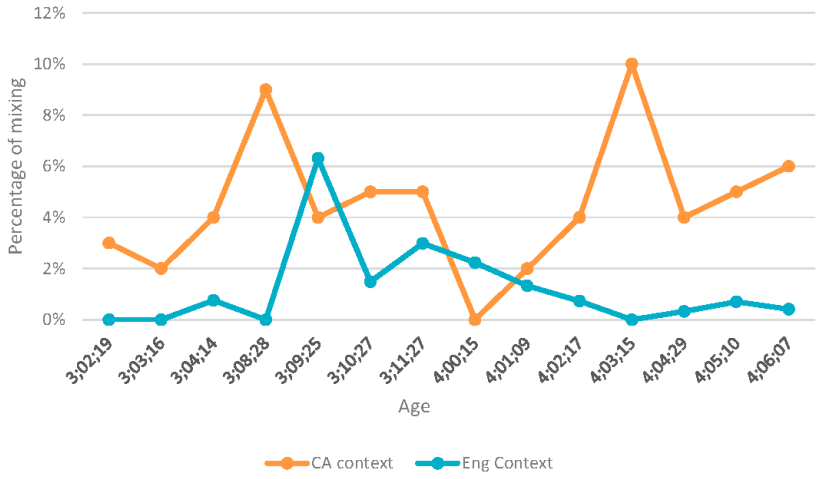

Figure 7. Mixed utterances produced by Kathryn in English and Cantonese contexts.

3.2. One Parent–Two Language Children

The mixing patterns for the two 1P2L children are shown in Figures 8 and 9 below. The overall pattern is clear, again showing consistently higher rates of code-mixing in the Cantonese context. The two children's profiles differ quantitatively, however. Kasen's rate of mixing is as high as 16%, higher than any of the 1P1L children, and at many data points, over 10% of utterances in the Cantonese context are mixed. Darren shows a lower rate of mixing overall, but again the mixing rate is consistently higher in the Cantonese context. The difference between the children may be explained in terms of the parental input they receive, as shown in Section 4.3 below.

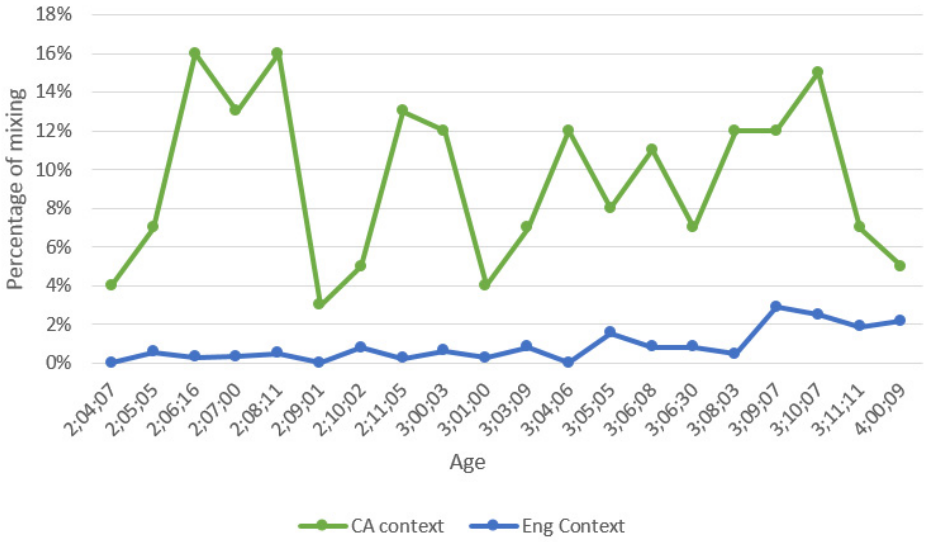

Figure 8. Mixed utterances produced by Kasen in English and Cantonese contexts.

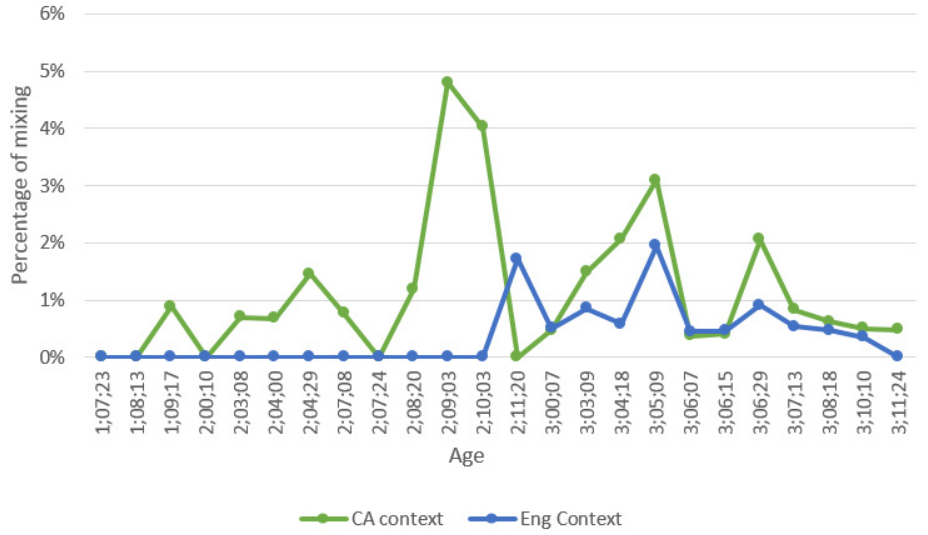

Figure 9. Mixed utterances produced by Darren in English and Cantonese contexts.

Taken together, the mixing rates for both 1P1L and 1P2L case studies show a higher rate of mixing in the Cantonese context. To quantify this effect, Table 2 shows the rates of mixing in each context and, in the last column, the ratio of mixing in Cantonese to English contexts.

Table 2. Rates of code-mixing in Cantonese and English contexts (based on [14]).

	Cantonese Context		English Context		Ratio of Mixing in Cantonese Context to English Context
Utterance Type	**Monolingual**	**Mixed**	**Monolingual**	**Mixed**	
1P1L					
Timmy	96.8%	3.2%	99.4%	0.6%	5.3 *:1
Sophie	99.4%	0.6%	99.7%	0.3%	2 *:1
Alicia	98.5%	1.5%	98.1%	1.9%	0.8:1
Llywelyn	98.0%	2.0%	99.6%	0.4%	5 *:1
Janet	98.0%	2.0%	98.0%	2.0%	1:1
Charlotte	95.5%	4.5%	99.2%	0.8%	5.6 *:1
Kathryn	96.0%	4.0%	99%	1.0%	4 *:1
1P2L					
Kasen	90.6%	9.4%	99.1%	0.9%	10.4 *:1
Darren	98.9%	1.1%	99.5%	0.5%	2.2 *:1

* indicates significant differences in the mean mixing rate between the English and Cantonese contexts ($p < 0.05$).

The generalization is clear: the children mix more in the Cantonese context than the English context. This difference is significant based on t-tests for most children, although the ratio of mixing in Cantonese to mixing in English varies greatly, from around 1:1 in Charlotte's data to 10:1 for Kasen. These broad figures are potentially ambiguous, however; mixing in the English context merely means that in the relevant recording session the adult researcher is addressing the child in English, aiming to elicit English from the child. It does not necessarily entail mixing of Cantonese into an English utterance. Instead some children, when addressed in English, produce a Cantonese utterance with an English item inserted. This explains why Alicia, in particular, appears to mix more often in the English context (1.9%) than in the Cantonese context (1.5%).

4. Discussion

As shown in Figures 1–9 and Table 2, the bilingual children's code-mixing is asymmetrical: they mix more when interacting in Cantonese than in English. In principle this asymmetry could be related to language dominance: it has been proposed that children are more likely to code-mix when using their weaker language [15]. Alternatively, the asymmetry could be derived from the input, as discussed in Section 4.2 below.

4.1. Comparison of Children with Different Language Dominance Patterns

There is evidence that the overall preference for mixing in the Cantonese context is modulated by language dominance. Language dominance is based on MLU for the two languages, following [10]. The 1P1L children have Cantonese as dominant language, except for Charlotte who was assessed as English-dominant and Kathryn whose MLU data do not show a dominant language [10] (pp. 73–81).

Among the 1P1L children, while both Cantonese-dominant and English-dominant children mix more elements from English into Cantonese, the English-dominant child Charlotte mixes more than Cantonese-dominant children in Cantonese contexts. Table 3 shows the ratio of mixing in the Cantonese context to that in the English context.

The mean ratio is around 2:1 in Cantonese-dominant children, but over 5:1 in the English-dominant child, Charlotte. All the children are influenced by the distribution of code-mixing in the input (code-mixing being prevalent in the Cantonese input across the board). In addition to the input factor, Charlotte has further motivations for mixing when speaking Cantonese: she knows words in English that she does not know in Cantonese, and/or she can access the English term faster or more easily than the Cantonese one.

Table 3. Mixing rate of children with different language dominance patterns from one parent-one language families.

	Cantonese Context	English Context	Ratio
Cantonese-dominant * (N = 5)	1.9%	1%	1.9:1
English-dominant (N = 1)	4.5%	0.8%	5.6:1

* Kathryn is not included in the table as she is the most balanced among the bilingual children and cannot be categorized as Cantonese-dominant or English-dominant based on MLU.

4.2. Comparison of Children Growing up with Different Language Strategies

The general pattern whereby children mix more in the Cantonese context (regardless of language dominance) can be attributed to the input. This pattern is modulated by the input conditions, however. Table 4 compares mixing rates in children from one parent-one language and one parent-two language families.

Table 4. Mean mixing rates by language context and input conditions.

	Cantonese Context	English Context	Ratio
One parent-one language (N = 7)	2.5%	1.0%	2.5:1
One parent-two language (N = 2)	4.9%	0.7%	7:1

It can again be seen that all children mix more in the Cantonese context than in the English context. However, the two children from one parent-two language families mix twice as often as the 1P1L group (4.9% *versus* 2.5%) in the Cantonese context. They also show a ratio of 7:1 between the Cantonese and English contexts, *versus* 2.5:1 in the 1P1L group.

4.3. The Role of Input

To recapitulate the main finding so far: the children mix more frequently in the Cantonese context than the English context. This generalization is in accord with the input, as suggested in a case study by [16]: the parents are observed to code-mix commonly when addressing the children in Cantonese, and more rarely when speaking English. It is not always possible to quantify this difference in the input: for the majority of the corpus data, parental input is not systematically available since the Cantonese recording was conducted by research assistants rather than the parents. In the corpora for Kasen and Darren, however, substantial samples of incidental child-directed speech were recorded and transcribed, allowing comparisons to be made between mixing rates in the parental input and in child production. The results are shown in Table 5.

Table 5. Mixing rates of parents and child by language context.

Context	Kasen			Darren		
	Mother	Father	Child	Mother	Father	Child
Cantonese	1.4%	13.2%	9.4%	0.76%	1.5%	1.1%
English	0.7%	0%	0.9%	0.25%	0%	0.5%

In the Cantonese context, Kasen's father's speech production shows a high mixing rate of 13.2%, reflecting his use of both languages on a daily basis. His rate of code-mixing closely matches Kasen's strikingly high mixing rate of 9.4% in the Cantonese context. The mixing rate for Kasen's father (13.2%) is nine times that of Kasen's mother (1.4%). This contrast reflects the fact that the mother's assigned role in the recording context was to elicit Cantonese; thus her mixing rate in the recordings may not be representative of her use of mixing in everyday speech and in child-directed speech outside the

recording context. In the English context, both parents of Kasen show lower rates of mixing (0.7% and 0%) which match Kasen's low mixing rate of 0.9%.

Darren's much lower rate of mixing (1.1% in the Cantonese context) is consistent with those of his mother and father (0.76% and 1.5%, respectively). The comparison of Kasen and Darren suggests that parental language strategies exert a strong influence on children's code-mixing rates. While code-mixing is widespread in the community overall, there is also considerable variation within and between families, which is reflected in the children's mixing behavior.

Qualitatively, most morpho-syntactic patterns of child mixing are also demonstrated in the parents' data. In (2), the child uses the English verb *claim* with the Cantonese particle *faan1* 'back' and the father repeats this mixed combination in his response:

2. CHI: claim faan1
   claim back
   'Claim back.'
   FAT: hai6 laa3, claim faan1 di1 cin2
   Yes, claim back CL money
   'Yes, claim the money back.' (Darren 3;05;09, Cantonese context (CC))

This example is also revealing in terms of parental discourse strategies. The father's adoption of the mixed form *claim faan1* 'claim back' with an English verb and a Cantonese particle produced by the child indicates acceptance of code-mixing. This goes beyond the 'Move on' strategy whereby the parent does not react to the child's use of code-mixing [8]. In effect, the father in (2) encourages code-mixing by adopting exactly the mixed expression introduced into the discourse by the child.

4.4. Syntactic Categories in Code-Mixing

We now turn to the syntactic categories involved in code-mixing, and the properties of mixed verbs in particular. Table 6 shows the breakdown of the main syntactic categories inserted in code-mixed utterances. Noun-mixing and verb-mixing types are two primary categories involved in mixing, especially in the Cantonese context. In the English context, sentence-final particles (SFP) such as *aa3* and *laa1* are the most frequently inserted Cantonese items, followed by nouns and verbs.

Table 6. Distribution of syntactic categories in the mixed utterances of eight children.

Syntactic Category	Cantonese Context	English Context
Noun	64%	27%
Verb	17%	16%
Adjective	6%	4%
Others	13%	53% (SFP: 16%)

This pattern matches the general trend observed in language contact situations, where a 'hierarchy of borrowability' has been established: nouns > verbs > adjectives [17] (p. 189). That is, nouns are most readily borrowed, even with superficial contact, whereas borrowing of verbs entails more intensive contact. Several explanations have been offered for this pattern. Semantically, nouns provide reference to new referents, which rarely arises with verbs. Structurally, verbs are more likely to require morphology that may lead to phonological difficulties. Typical cases of noun mixing include the following:

3. jau5 go3 horse gaa3.
   have CL horse SFP
   'There is a horse.' (Timmy 2;03;17, CC)
4. sik6 di1 apple
   eat CL apple
   'Eat some apples.' (Alicia 2;00;26, CC)

Note that nouns are inserted in their bare forms: even when the sense is plural as in (4), the bare form *apple* is used.

When producing English, the most common form of code-mixing is addition of a Cantonese sentence-final particle, as in (5):

5. You tidy up laa1
   you tidy up SFP
   'You tidy up.' (Kasen 3;06;08, EC)

The borrowing of Chinese sentence particles in English is also attested in language contact varieties, such as Singapore English [18].

4.5. Mixed Verbs and the Absence of Light Verb Constructions[2]

Like nouns, English verbs inserted into a Cantonese frame may be in their bare forms as in (6). However, inflected forms are also used, notably by the English-dominant child Charlotte, as in (7)[3]:

6. Put nei1 go3
   Put DET CL
   'Put this one.' (Charlotte 2;03;17, CC)
7. de1di4 sleeping aa3
   Daddy sleeping SFP
   'Daddy is sleeping.' (Charlotte 2;10;29, CC)

Cantonese aspect markers may be attached to English verbs, a common pattern in adult code-mixing [19]. Thus, when inserting an English verb into a Cantonese utterance, children use Cantonese aspect markers, as (8) and (9) where the perfective marker *zo2* is attached to the verbs *turn* and *plant*:

8. dim2gaai2 turn zo2?
   why Turn ASP
   'Why did it turn?' (Darren 3;04;18, CC)
9. Hai6 aa3 keoi5dei6 plant-zo2 go2 di1 gaa3 laa3
   Yes SFP they plant-PFV that CL SFP SFP
   'Yes, they have planted those.' (Kathryn 3;06;18, CC)

An inflected English verb may be modified by a Cantonese aspect marker, resulting in double morphological marking:

10. Broken zo2 laa3
    Broken ASP SFP
    'It was broken.' (Kasen 3;09;07, CC)

In the English context, a bare Cantonese verb may be inserted into an English utterance:

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[2] The term 'mixed verbs' here refers to the insertion of an English verb into a Cantonese utterance or vice versa. As will be shown, verbs are inserted without light verbs or other nativizing elements, so that mixed verbal compounds do not arise. The number at the end of each Cantonese syllable in the linguistic examples indicates the lexical tone, and also serves to mark the language switch from English to Cantonese (or vice-versa) in the examples of mixed utterances.

[3] The utterance in (7) is considered to involve a Cantonese frame since (a) the loan word *de1di4* 'Daddy' shows assimilated Cantonese pronunciation, including lexical tones; and (b) the utterance ends with a Cantonese final particle, implying a Cantonese functional category CP headed by the particle.

11. I teoi1 him
I push him
'I push him.' (Timmy 2;04;07, EC)
12. Can't hoi1 the boat
can't open the boat
'I can't open the boat.' (Charlotte 2;01;22, CC)

Cantonese verbs with English tense-aspect morphology are rare, but attested occasionally as in *kat-ing* 'coughing', pronounced similarly to English *cutting*.

Note that in (11) and (12), the children insert the Cantonese verb directly into an English frame, without requiring a light verb such as *do* or *make*. Similarly, in (6)–(10) the English verb is inserted directly into a Cantonese frame, with aspect marking optional (just as it is in adult Cantonese). This contrasts with many language pairs in which a light verb is introduced to carry inflectional information [19] (p. 74), [20,21]. Such light verb constructions are not attested in the child data, nor have they been described in studies of adult Cantonese-English code-mixing [19]. The absence of light verb constructions in both child and adult code-mixing appears to reflect typological properties of Cantonese. First, verbs may remain uninflected: bare verb forms are freely allowed in adult Cantonese and occur regularly (regardless of code-mixing) in the children's developmental English, so that no light verb is required to carry the verbal inflection. In the case of adult mixing, Cantonese serves as the matrix language [19], so that mixed verbs follow the Cantonese property of allowing uninflected verbs rather than the inflectional requirements of English.

A second typological factor involves the extensive congruence in word order between English and Cantonese. Mixed compound verbs using a light verb typically occur when a verb from a VO language is inserted/incorporated into an OV language [19] (p. 75). The resulting verbal complex can then assign case to an object on its left, as in the matrix language. Since Cantonese and English are both VO languages, this motivation for mixed light verb constructions is absent[4].

4.6. Verb-Particle Constructions and Innovation

While the main patterns discussed so far are in accordance with those in the adult input, children's mixing also goes beyond the input. An example involves the insertion of English verb-particle constructions in Cantonese sentences. In the simplest case, a verb-particle combination may be inserted just like a single verb:

13. Hai6 mai6 soeng2 jiu3 lie down aa3?
be NEG.be want need lie down SFP
'Do you want to lie down?' (Charlotte 2;05;19, CC)

In (13), the child inserts the English verb-particle combination *lie down*. This corresponds to the Cantonese equivalent *fan3 dai1* 'lie down' in which the verb and particle are also contiguous, forming a verb-particle construction resembling that of English (14):

14. Ngo5 soeng2 fan3 dai1 aa3
I want lie down SFP
'I want to lie down.'

The Cantonese structure (14) and its English counterpart (as seen in the translation of (14)) are closely congruent (see [22] (p. 243) for discussion). This favours the insertion of the adjacent verb-particle combination into Cantonese, assuming that congruence is a factor in code-mixing [13,19] (p. 153).

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[4] A small number of OV constructions do exist in Cantonese, such as focusing and pretransitive constructions [22], but these are rarely produced by children within the age range studied here, and are not attested among children's mixed verb constructions.

In a range of more complex cases, code-mixing interacts with the bilingual children's developmental grammar. In (15) the transitive verb-particle combination *turn off* is inserted into a Cantonese frame with a null object understood from the context, consistent with the child's developmental grammar as well as the target grammar of Cantonese [10] (p. 146).

15. Ngo5 soeng2 turn off aa3
I want turn off SFP
'I want to turn it off.' (Charlotte, 2;04;20, CC)

Since the object is null, there is no distinction between the 'split' order *turn it off* and the 'non-split' order *turn off it* (which, although ungrammatical in adult English, does occur in Charlotte's English data).

Some children, however, use the 'split' order in code-mixing, inserting the verb and particle on either side of the Cantonese object:

16. Dim2 gaai2 lei5 throw ni1 go3 away ge3?
how come you throw this CL away SFP
'Why are you throwing this away?' (Kathryn 3;06, CC)

In the following case Timmy uses the verb-particle combination *slide down* in a complex Cantonese construction encoding inability. He adds the Cantonese complement *m4 dou2* 'not succeed' to the English verb *slide*, then completes the construction by adding the particle *down*:

17. Ji1 zek3 slide m4 dou2 down
this CL slide not succeeddown
'(With) these (shoes on) you can't slide down.' (Timmy 2;06, CC)

In (16) and (17) the children insert the verb-particle using the 'split' order which is the preferred order in English, but not in Cantonese [23]. This pattern as in (16) and (17) is not attested in the parental input, and has not been described in studies of adult code-mixing [9,19]. Instead, it appears to be an innovation created by the bilingual children.

Given the congruence between the adjacent (non-split) verb-particle constructions one would expect children's mixed structures to insert English verb-particle combinations in the non-split order. The 'split' constructions in (16) and (17) therefore pose a puzzle. A possible explanation involves cross-linguistic influence, which takes place between the developing grammars, independent of code-mixing. Although the code-mixed construction in (16) and (17) does not match the adult Cantonese order, the bilingual children do occasionally use 'split' verb-particle constructions in their Cantonese, as in (18) and (19):

18. M4 hou2 baai2 keoi5 dai1 laa1
not good put her down SFP
'Don't put her down!' (referring to a child being carried) (Timmy 3;09;09, CC)

19. Lau4 lei5 dai1 hai2 ji1 dou6 hou2-m4-hou2 aa3?
leave you down at this place good-not-good SFP
'Is it okay if we leave you behind here?' (Alicia 3;02;25, CC)

The verb and particle are separated in *baai2* ... *dai1* 'put ... down' in (18) and *lau4* ... *dai1* 'leave ... behind' in (19). This non-target 'split' verb-particle construction is not attested in adult Cantonese, which does not allow the pronoun *keoi5* 'her/him' in between *baai2* 'put' and *dai1* 'down' but requires it to be placed after the particle as in *baai2 dai1 keoi5* (literally 'put down her'). We have argued that the 'split' construction in (18) and (19) is influenced by the preferred order of the English counterpart [10] (p. 216). The code-mixed cases (16) and (17) are thus congruent with the children's developmental grammar for Cantonese, if not with the target grammar of Cantonese. An implication is that the mixing seen in (16) and (17) is a developmental phenomenon, going beyond the input the children receive.

5. Conclusions

This study has analysed bilingual children's code-mixing in relation to the input they receive. It has shown that code-mixing rates are asymmetrical, depending on language context: mixing is more prevalent in the Cantonese than the English recording context. Directionality of code-mixing is determined largely by the frequency of code-mixing in the input, rather than by language dominance. However, there is some evidence that the child is more likely to switch when speaking her weaker language.

We have presented evidence that input conditions affect rates of mixing: children in the one parent-two language environment code-mix twice as often as those in one parent-one language environments. Input thus exerts crucial influence on the rates and directionality of code-mixing in Cantonese-English bilingual children in Hong Kong.

Qualitatively, we have established some properties of children's mixed verbs. Verbs are mixed without the need for light verbs, reflecting the typological properties of Cantonese and extensive congruence with English. Some forms of mixing go beyond the input, however. While the use of Cantonese aspect markers with English verbs is prevalent in the input, children's use of 'split' verb-particle constructions goes beyond the input and demonstrates creative construction on the part of the bilingual child.

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