Code-Mixing of Cantonese-English Bilingual Children with Different Language Dominance Patterns

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Abstract

Code-mixing, which denotes switches between languages as well as a phenomenon reflecting grammars of both languages in interpersonal interactions simultaneously, is a universal language-contact phenomenon present in both individual bilingualism and societal bilingualism, and individual differences exist in both frequency and complexity of code-mixing out of multifarious factors. The present corpus-based longitudinal study investigates impacts of the variable of language dominance on Cantonese-English bilingual children's code-mixing. Spontaneous speech data with critical case sampling were collected from the Hong Kong Bilingual Child Language Corpus, where code-mixing identified in participants' utterances were analyzed both quantitatively and qualitatively. Bilingual children in the current study are discovered to code-mix more frequently and in a more complicated fashion in their weaker language with more intra-sentential switches in the dominant language involving incorporation of language structures of the dominant language with higher syntactic complexity as well as semantic value into utterances of the weaker language. In light of the correlation between language dominance and code-mixing, patterns of code-mixing can plausibly be capitalized upon to formatively assess kindergarten toddlers' bilingual development.

Keywords*: code-mixing, language dominance, bilingualism*

Introduction

It is a no-brainer that language contact, be it at an individual or societal level, paves way for bilingualism. On one hand, an individual's acquisition or learning of two or more languages unequivocally effectuates individual bilingualism, which once denoted native-like control of two or more languages yet is classified by five dimensions, videlicet age, ability, balance of two languages, development, and contexts of acquisition, into multifarious types under a taxonomy, such as simultaneous bilingualism, successive bilingualism, and heritage bilingualism (Benmamoun, Montrul, & Polinsky, 2013) at present (Beatens Beardsmore, 1982; Bloomfield, 1933; Valdes & Figueroa, 1994); whichever type of bilingual to which a person belongs, cross-linguistic influences such as syntactic transfer (Huang, 2009; Yip &

Matthews, 2000) and lexical transfer (Jiang, 2002) are construed as inevitable.

Attributed to such influences, a pejorative conceptualization of bilingualism as a deficiency detracting from one's intellectual and spiritual abilities had been prevalent until 1960s, yet scholars' collective and cumulative effort has corroborated that individual bilinguals enjoy bilingual advantages in multiple respects, ranging from language processing (Desmet & Duyck, 2007) and cognitive processing (Bialystok & Barac, 2013; Kroll & Bialystok, 2013) to metalinguistic ability (Clyne, 1997) and literacy development (Bialystok, 2013) out of an inextricable connection between language and thought as a matter of fact (Baker, 2001; Boroditsky, 2001; Li, 2000; Cohen, 1985); this entails that bilingual development assists humans in carrying out rational activity of the soul (Aristotle, 1955).

On the other hand, interactions between two or more languages in society certainly are the premise for societal bilingualism, plausible outcomes of which embody bilingual language planning (Yule, 2014) and evolution of novel varieties of language such as Hong Kong English (Hung, 2000) as well as lingua francas such as Chinese Pidgin English (Ansaldo, Matthews, & Smith, 2010; Matthews & Li, 2011) as contact languages (Sebba, 1997). In particular, embracing the notion of multiculturalism, bilingual education is a language policy capitalizing upon multiple languages for verbal interactions in the classroom and serves as a mode of special education catering for needs of ethnic minorities as an exceptionality group as well as an avenue for respecting cultural behaviours (Fox, 2004; Gay, 2004; Hallahan, Kauffman, & Pullen, 2014; Ormrod, 2014).

A concrete instance of bilingual education is implemented in Hong Kong, where Cantonese, English, and Putonghua are equally zeroed in on in basic education, for individual and societal good by virtue of the trend of globalization, Hong Kong's status as Asia's World City, which warrants English as a lingua franca for communication, and the city being a place where the East encounters the West, which pinpoints instruction on Chinese languages (Bauman, 1998; Haydon, 1996; Lee & Ng, 2007; Ng, 1984). Such bilingual policies are integral to preservation of endangered languages, vanishing voices, dying words, and most importantly, linguistic diversity (Evans, 2010; Hale et al., 1992; Nettle & Romaine, 2000).

It is no question that one similarity between individual bilingualism and societal bilingualism is presence of code-mixing. Referring to switches between languages as well as a phenomenon reflecting grammars of both languages working simultaneously, code-mixing, or code-switching, is a universal language-contact phenomenon exhibited at an individual level, as in conversations amongst bilingual interlocutors, as well as at societal level, as an attribute of a variety of language or contact language (Baker, 2001; Fromkin, Rodman, & Hyams, 2013). Approaching the issue of code-mixing from a perspective of bilingual acquisition, the present study aims at investigating code-mixing of Cantonese-English bilingual children with distinct language dominance patterns.

Literature Review

Code-mixing can predominantly be categorized into three types: tag-switching, where tags of one language as movable constituents are inserted into utterances of another language, intra-sentential code-switching, where segments of disparate languages are merged in the same sentence, and inter-sentential code-switching where sentences uttered in disparate languages co-exist in the same utterance (Poplack, 1980). Being a prominent area of research in bilingualism, code-mixing is largely studied from three distinct perspectives.

First and foremost, suffice it to say that sociolinguistic research considers code-mixing as an attribute of a variety of language or contact language that is pervasive in a multilingual society. Language being an identity marker, human beings exploit language to represent who they are in a bid to satisfy esteem needs and eventually achieve self-actualization (Jones, 2012; Liu, Holosko, & Lo, 2009; Maslow, 1954); in particular, ability to code-mix is regarded as one's embodied cultural capital for realization of his/her identity as a second language learner, transnational citizen, or simply a bilingual (Bourdieu, 1997; Mitchell, Myles, & Marsden, 2013). Exploring code-mixing of English in a collection of Cantopop songs as a one-of-a-kind poetic genre, which is a purposeful and socially constructed text with attendant register variables, Chan (2009) has discovered that not only does code-mixing in Cantopop songs symbolize western concepts and convey connotative meanings, it also facilitates expression of identities of local Hong Kongers (Nunan, 2008; Rose, 2012). In such a vein, code-mixing is definitely conceived as a phenomenon arising from societal bilingualism.

Unlike sociolinguistic research, classroom-based research perceives code-mixing to be a pedagogical strategy or approach employed by teachers in the classroom. With the advent of communicative language teaching in second language instruction, second language teachers in Hong Kong are expected to act as facilitators of students' learning, structure lessons in the form of communicative activities, such as form-focused tasks (Nassaji & Fotos, 2011), metalinguistic awareness tasks heightening students' language awareness (Prtic Soons, 2008; Sze & Leung, 2014), and process drama activities (Chan & Lam, 2010), and conduct lessons merely "in the English medium" (Choudhury, 2011; Curriculum Development Council, 2017, p. 15; Ellis, 2006; Harmer, 2001); even assessments are presumed to be communicative in nature as in task-based assessments (Ke, 2006); there being an inextricable link between assessment and learning, English language teachers in Hong Kong possess low receptivity to pedagogical change and possess a tendency to remain utterly Anglophone and shun code-mixing in the classroom at pains (James, 2006; Lee, 2000). On the other hand, for all a Medium of Instruction (MOI) policy discouraging mixed code in secondary schools with English as MOI, also known as late English immersion, confronting with the actualities of immense examination pressure, complicated instructional content, and

students' variable levels of English proficiency, content-subject teachers have been found to conceive code-mixing as a valuable linguistic resource ameliorating pedagogical efficacy as well as an efficacious tool establishing communities of respect and tolerance (Cheng, 2009; Kottler & Kottler, 2007; Li, 2008; Lightbown & Spada, 2013). When compared to secondary schools, tertiary institutions in Hong Kong appear more flexible and open in that some have opened the floodgates for code-mixing in the classroom to facilitate teaching and learning (Li, 2012; The Chinese University of Hong Kong, 2007). On the whole, Cantonese-English code-mixing in Hong Kong classrooms undeniably remains highly contentious albeit research findings substantiating its pedagogical value.

It is beyond the doubt that the two aforementioned perspectives reckon that code-mixing is an attribute of societal bilingualism whilst bilingual acquisition research on code-mixing views the phenomenon as an indispensable attribute of individual bilingualism. Despite a widespread misconception that only do bilinguals code-mix when they fail to express themselves adequately in one language, antecedent research reveals that by no means does code-mixing signify bilinguals' deficit; on the contrary, it is a conclusive piece of evidence for their mastery of both languages in practice, for code-mixing involves skilled manipulation of overlapping sections of two grammars (Li, 2000). Motivations for bilinguals' code-mixing are threefold: need to present a discourse persona, incorporation of discourse markers signaling topic change, and absence of lexical items in any languages conveying intended semantic or pragmatic meanings (Myers-Scotton, 1998). Even though code-mixing is ubiquitous amongst bilinguals, individual differences surely exist in both quantitative and qualitative respects in that frequency and complexity of code-mixing are substantially influenced by myriads of factors, videlicet language history, language stability, functions of languages, language proficiency, language modes, and biographical data, so are other language contact phenomena (Grosjean, 1998). Quantity and quality of input being influential in bilingual development, code-mixing in bilinguals' language production has been discovered to be associated with code-mixing in input (Hoff, Welsh, Place, & Ribot, 2014). All the same, rarely have impacts of other variables on frequency and complexity of bilinguals' code-mixing been probed into in bilingual acquisition research to date.

Targeting at language dominance, the current study is intended to look into impacts of such a variable on Cantonese-English bilingual children's code-mixing. Needless to say, seldom do bilinguals possess equivalent mastery of two languages; on the contrary, it is likely for them to possess greater proficiency in one language than in another language (Li, 2000); the concept of language dominance captures disparities in rate and complexity of a bilingual's development of two languages in that the language developing faster and with greater complexity is usually denoted as one's dominant language whereas its counterpart is referred to as his/her weaker language (Yip, 2013). Correlated with degree of language use and found to be

influential in language choice, language dominance is unquestionably expected to be a variable exerting far-reaching impacts on both frequency and complexity of bilinguals' code-mixing (Genesee, Paradis, & Crago, 2004; Montrul, 2013). Bernardini and Schlyter (2004)'s Ivy Hypothesis contends that bilingual children resort to functional elements of the dominant language in utterances of the weaker language. Even though Yip and Matthews (2007) argue that code-mixing of bilingual children growing up in bilingual societies is chiefly influenced by rich code-mixed primary language input, hardly can the role of language dominance, which is also a significant factor, be kept out of consideration; impacts of such a variable on code-mixing constitute the crux of the study.

However vital impacts language dominance exerts on code-mixing, limited antecedent research on the interrelation between the two has been conducted to date; two prominent ones were carried out by Bentahila and Davies (1992), which was one of the pioneer studies on such a topic and identified disparities in directions of code-mixing of Moroccan bilinguals with distinct language dominance patterns, and Heredia and Altarriba (2001), which was an explanatory study on the motivation for code-mixing possessed by bilinguals with distinct language dominance patterns, respectively. Not only are those two studies rather dated, they also lack a systematic analysis of code-mixing with respect to language dominance using an integration of quantitative and qualitative data analysis methods. More importantly, Cantonese and English being genetically and typologically distinct languages, code-mixing of Cantonese and English in Hong Kong, where both languages are dictated as official languages, is undoubtedly worth examining albeit a lack of relevant studies focusing specifically on code-mixing and language dominance using such a language pair (Yip & Matthews, 2010). The aforementioned research gaps provide motivation for the present study.

More specifically, the study aims at addressing the following research questions:

1) What are attributes of code-mixing in Cantonese and English utterances of Cantonese-English bilingual children with Cantonese as a dominant language respectively?
2) What are attributes of code-mixing in Cantonese and English utterances of Cantonese-English bilingual children with English as a dominant language respectively?
3) What are attributes of code-mixing in Cantonese and English utterances of Cantonese-English bilingual children with balanced bilingual development respectively?

Barely is the study intended to verify Bernardini and Schlyter's (2004) Ivy Hypothesis, which has been studied at length in antecedent research; instead, it focuses on frequency as well as complexity of bilingual children's code-mixing. Possessing a disposition to adopt the dominant language in lieu

of the weaker language in daily language use, and displaying strong preference for their dominant language to their weaker language in conversations with bilingual or even monolingual interlocutors, bilingual children are presumed to be more likely to code mix utterances in their weaker language with segments of their dominant language, and embedded components in the dominant language are also presumed to be more complicated in syntactic structure when compared to their counterparts in the weaker language (Genesee et al., 2004; Montrul, 2013). In other words, Cantonese-English bilingual children with Cantonese and English as a dominant language are predicted to code-mix more frequently and in a more complicated fashion in English and Cantonese utterances respectively whilst those with balanced bilingual development are envisaged to code-mix equally frequently and in an equally complicated fashion in both Cantonese and English utterances. On the basis of the aforementioned predictions, it is further hypothesized that bilingual children code-mix more frequently and in a more complicated fashion in utterances of their weaker language. Such a hypothesis assuredly ought to be taken with an assumption that other variables, such as language history, language stability, functions of languages, language proficiency, language modes, and quantity as well as quality of input of both languages, remain relatively constant.

Methodology

Being a corpus-based longitudinal case study, the present investigation utilizes spontaneous speech data produced by Cantonese-English bilingual children in the Hong Kong Bilingual Child Language Corpus created by Yip and Matthews (2007) available through the Child Language Data Exchange System (CHILDES) database, which is a large-scale longitudinal corpus with spoken data of nine participants collected by means of recording of interactions between participants and adult interlocutors in naturalistic settings between 1994 and 2005. All participants were situated at their sensorimotor or preoperational stage of cognitive development and confronted with psychosocial tasks of autonomy and initiative in the course of data collection (Piaget, Green, Marguerite, & George, 1971; Rosenthal, Gurney, & Moore, 1981). Not only do spontaneous speech data preclude artificiality induced by experimental methods omnipresent in cross-sectional studies, they also enhance objectivity of the study by detracting from researchers' reliance on individual intuitions or personal reflections in the course of data analysis (Ming & Tao, 2008; Yip & Matthews, 2007).

Critical case sampling was applied to select four participants out of nine Cantonese-English bilingual children in the corpus in accordance with their language dominance patterns for in-depth analysis. Three predominant indicators of language dominance prevalently accepted by scholars in the field of bilingual acquisition are Mean Length of Utterance (MLU) differential measured in words, language preferences, and silent periods. MLU opined to

be the most objective indicator of a child's linguistic development in a language, MLUw differential, which denotes difference between mean MLUw values of a child's two languages over a period of development, provides a measure of a child's language dominance in that the MLUw value of the dominant language is presumed to be higher than that of the weaker language (Yip & Matthews, 2007). Language preferences and silent periods, which are concerned about a child's willingness or reluctance to interact in a certain language and periods during which one language is comprehended but not produced by a child respectively, are also relevant to language dominance albeit their lower validity and reliability when compared to MLUw differential (Yip & Matthews, 2007); MLUw differential was thereby selected as a measure of language dominance in the current study, and four participants with distinct language dominance patterns were selected for the study. Mean MLUw differentials of the four selected participants are shown in Table 1.

Janet was exposed to both Cantonese and English from birth and grew up in a one parent-one language environment with her father and mother being native English and Cantonese speakers respectively (Yip & Matthews, 2007). She was a Cantonese-dominant child on account of imbalance of Cantonese and English language input.

Table 1
Mean MLU differentials of four Cantonese-English bilingual children

Participants	Janet	Charlotte	Llywelyn	Darren
Age range	2:10:16 – 03:11:11	01:08:28 – 03:00:03	02:00:12 – 03:04:17	01:07:23 – 03:11:24
Cantonese MLU	4.061	2.313	2.683	2.647
English MLU	2.587	2.808	2.672	2.689
MLU differential (Cantonese MLU – English MLU)	1.474	-0.495	0.011	-0.042
MLU differential (Cantonese MLU % as of English MLU)	156.98	82.37	100.41	98.44

Charlotte is the second of two children with an elder sister who is two years and nine months older (Yip & Matthews, 2007). Her father, who was a professor from the United Kingdom, was on sabbatical leave in New Zealand when she was born whereas her mother is a native Cantonese speaker. She was cared for by a Pilipino domestic helper throughout the period of data collection and was an English-dominant child.

Llywelyn grew up in a one parent-one language environment with his father and mother being native English and Cantonese speakers respectively (Yip & Matthews, 2007). His father was absent from home for work every now and then during his early years, and he was cared for by two Pilipino

domestic helpers throughout the period of data collection. He is the second of two children with an elder brother who is three years and eight months older. He possessed rather balanced bilingual development with slight dominance in Cantonese.

Darren was exposed to both Cantonese and English from birth and grew up in a one parent-two language environment with both his father and mother being native Cantonese speakers speaking English as a second language and interacting with him in both Cantonese and English (Yip & Matthews, 2007). He possessed rather balanced bilingual development with slight dominance in English.

Code-mixing identified in spontaneous speech data produced by the four participants was analyzed both quantitatively and qualitatively. The number of code-mixed utterances produced by a child was first compared with the total number of utterances in a certain language produced by the child to compute the percentage or relative frequency of a participant's code-mixed utterances. Code-mixed utterances were subsequently analyzed in greater depth through identification of the type of each instance of code-mixing as well as the language form of each embedded segment. Types of code-mixing entail intra-sentential and inter-sentential code-switching whilst language forms denote distinct levels of language structures in the grammatical hierarchy, videlicet words, phrases, and clauses (Nelson, 1998). Being an ambiguous notion in grammar or syntax, clauses are defined in the present study as components comprising a subject and a predicative element (Biber, Leech, & Conrad, 2002). Moreover, generative syntax makes a clear distinction between determiner phrases (DP) and noun phrases (NP), yet the current study conceives all nominal expressions as NP for simplification (Sportiche, Koopman, & Stabler, 2014). Descriptive statistics was yielded to provide a general picture of relatively complexity of a participant's code-mixing.

Results

Descriptive statistics of frequencies of code-mixing in Cantonese and English utterances of the four participants were computed and presented in Tables 2 and 3 respectively.

Table 2
Frequencies of code-mixing in Cantonese utterances of four Cantonese-English bilingual children

Participants	Janet	Charlotte	Llywelyn	Darren
Total number of Cantonese utterances	5956	3261	4088	5079
Number of code-mixed utterances	681	1737	437	798
Percentage of code-mixed utterances	11.43%	53.27%	10.69%	15.71%

Code-mixing was discovered in over half of Cantonese utterances of Charlotte, who was English-dominant, yet in solely slightly more than 10% of Cantonese utterances of Janet and Llywelyn, who were Cantonese-dominant and balanced with slight Cantonese dominance respectively. Darren, who was a roughly balanced bilingual with slight English dominance, code-mixed slightly more frequently in Cantonese utterances than his Cantonese-dominant counterparts did.

Table 3
Frequencies of code-mixing in English utterances of four Cantonese-English bilingual children

| Participants	Janet	Charlotte	Llywelyn	Darren
Total number of English utterances	3455	3860	3862	5082
Number of code-mixed utterances	1018	146	257	326
Percentage of code-mixed utterances	29.46%	3.79%	6.65%	6.41%

Findings of frequencies of code-mixing in English utterances of the four participants are construed as opposite to those of frequencies of code-mixing in Cantonese utterances. Charlotte, who code-mixed most frequently in Cantonese utterances, possessed the lowest proportion of code-mixed English utterances. In contrast, Janet, who possessed about one-tenth of code-mixed Cantonese utterances, code-mixed in over one-fourth of her English utterances. Concerning Llywelyn and Darren, both of whom possessed

balanced bilingual development, code-mixing was present in almost 6% of their English utterances. The aforementioned findings doubtlessly demonstrate a strong correlation between language dominance and frequency of code-mixing in that code-mixing is more frequent in utterances of the weaker language, as in Charlotte's Cantonese utterances and Janet's English utterances.

The analysis of frequencies of the four participants' code-mixing is that of complexity of their code-mixing, which will be presented separately.

Figures 1a and 1b manifest that inter-sentential switching dominated code-mixing of Janet, who was Cantonese-dominant, in both Cantonese and English utterances albeit a much larger proportion of intra-sentential switching in her Cantonese utterances; this suggests that she possessed a higher propensity to be contingent upon Cantonese language structures when incorporating English language structures into her Cantonese utterances, yielding more intra-sentential switching with elements of both languages in the same sentence.

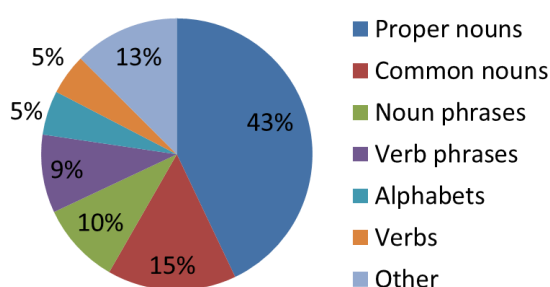**Types of Code-Mixing in Janet's Cantonese Utterances**

- ■ Intra-sentential switching
- ■ Inter-sentential switching

36%

64%
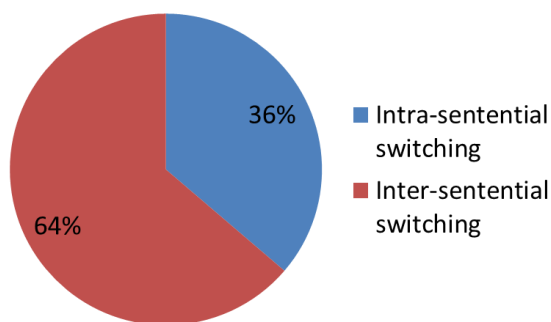
Types of Code-Mixing in Janet's English Utterances

- ■ Intra-sentential switching
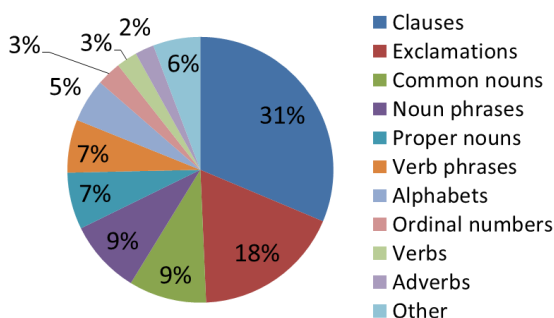- ■ Inter-sentential switching

15%

85%
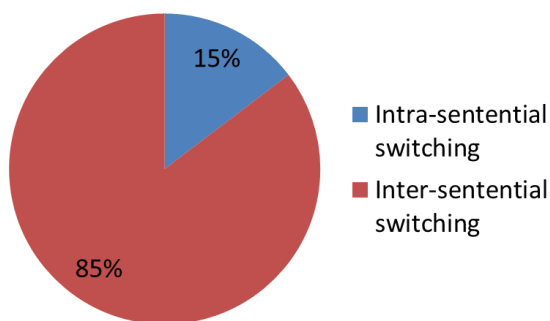
Figures 1a and 1b. Types of code-mixing in Janet's Cantonese (left) and English (right) utterances.

Figures 2 and 3 present types of code-mixed language forms in Janet's Cantonese and English utterances respectively. She mostly embedded clauses of the other language into utterances of the matrix language in inter-sentential switching as in (3), where an English clause was embedded into a context where the adult interlocutor intended to elicit Cantonese utterances. In intra-sentential switching, she embedded more English proper nouns (as in (4)) and Cantonese clauses (as in (5)) into her Cantonese and English utterances respectively. Comprising combinations of subjects and predicates, clauses are absolutely more complicated than proper nouns, which are names of entities, in a syntactic respect.

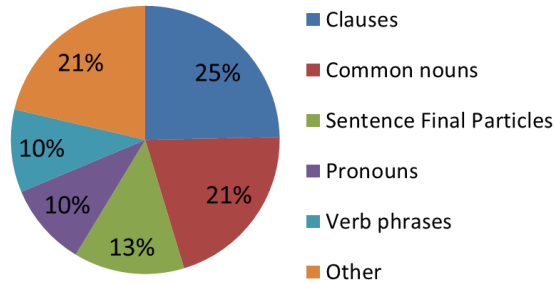**Types of Intra-Sententially Code-Mixed Language Forms in Janet's Cantonese Utterances**

Proper nouns 43%
Common nouns 15%
Noun phrases 10%
Verb phrases 9%
Alphabets 5%
Verbs 5%
Other 13%

Types of Inter-Sententially Code-Mixed Language Forms in Janet's Cantonese Utterances

Clauses 31%
Exclamations 18%
Common nouns 9%
Noun phrases 9%
Proper nouns 7%
Verb phrases 7%
Alphabets 5%
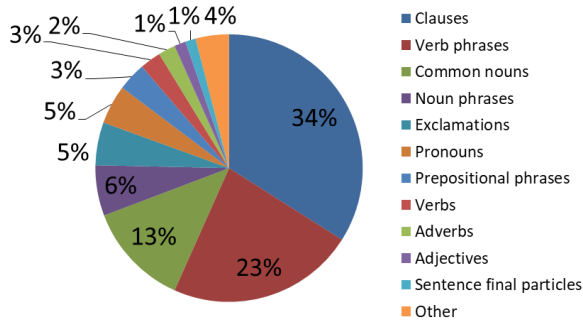Ordinal numbers 3%
Verbs 3%
Adverbs 2%
Other 6%

Figures 2a and 2b. Types of intra-sententially (left) and inter-sententially (right) code-mixed language forms in Janet's Cantonese utterances.

Types of Intra-Sententially Code-Mixed Language Forms in Janet's English Utterances

- Clauses — 25%
- Common nouns — 21%
- Sentence Final Particles — 13%
- Pronouns — 10%
- Verb phrases — 10%
- Other — 21%

Types of Inter-Sententially Code-Mixed Language Forms in Janet's English Utterances

- Clauses — 34%
- Verb phrases — 23%
- Common nouns — 13%
- Noun phrases — 6%
- Exclamations — 5%
- Pronouns — 5%
- Prepositional phrases — 3%
- Verbs — 3%
- Adverbs — 2%
- Adjectives — 1%
- Sentence final particles — 1%
- Other — 4%

Figures 3a and 3b. Types of Intra-Sententially (Left) and Inter-Sententially (Right) Code-Mixed Language Forms in Janet's English Utterances.

(1) Adult: Gam2mai6 hai6 lo1   gam2mai6 tung4 nei5 jat1cai4
    (咁　咪　係　囉　咁　咪　同　你　一　齊
    then yes　SFP　then   with　you　together
    waan2 lo1   hai6mai6 aa3
    玩　　囉　係　咪　呀)
    play　SFP　right SFP
  "Then he will play with you together, right?"
  Child: Hai6 aa3
    (係　呀
    yes　SFP
    "Yes."
  Adult: Hai6 lo1
    (係　囉
    yes　SFP
    "Yes."
  Child: I'm… I'm… I'm… I show xxx photos.
  (Janet 3;03;24)

(2) Child: Ho2ji5 jung6 Clariol gaa3
      (可 以用　 Clariol 㗎)
       can　　use　Clariol SFP
      "You can use Clariol."
    (Janet 2;10;30)

(3) Child: Ngo5 jiu3　wee wee
      (我　 要　 wee wee)
      I　　 need　wee
      "I need to wee."
    (Janet 2;10;16)

     Figures 4a and 4b indicate that code-mixing patterns of Charlotte, who was English-dominant, were opposite to those of Janet in that more intra-sentential switching was found in her English in lieu of Cantonese utterances; this means that English language structures were hinged upon more frequently when Cantonese language structures were embedded into her English utterances. On the basis of disparate code-mixing patterns between Janet and Charlotte, it appears that intra-sentential switching is more pervasive when language structures of the weaker language are embedded into utterances of the dominant language.

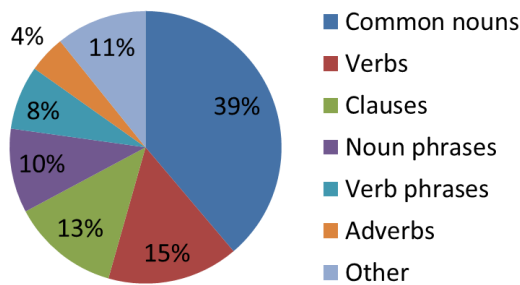**Types of Code-Mixing in Charlotte's Cantonese Utterances**

14%
86%
■ Intra-sentential switching
■ Inter-sentential switching
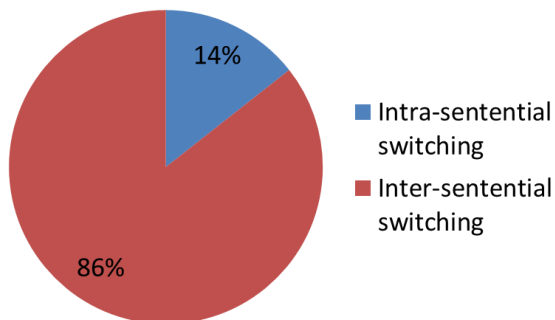
Types of Code-Mixing in Charlotte's English Utterances
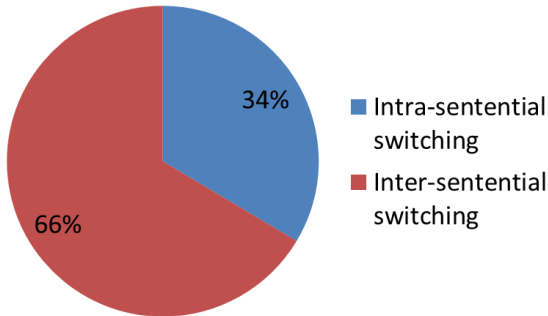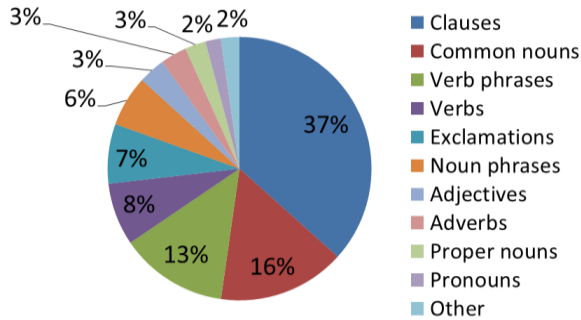

Figures 4a and 4b. Types of code-mixing in Charlotte's Cantonese (left) and English (right) utterances.

Figures 5 and 6 present types of code-mixed language forms in Charlotte's Cantonese and English utterances respectively. Lexical elements as well as syntactically more complex ones, such as common nouns (as in (6)) and clauses, of English are more frequently embedded into her Cantonese utterances whereas functional elements, such as sentence final particles (as in (7)) and exclamations (as in (8)), of Cantonese are more ubiquitous in her code-mixed English utterances. Such findings irrefutably imply that English language structures embedded into Cantonese utterances possess much higher semantic value than Cantonese language structures embedded into English utterances do.

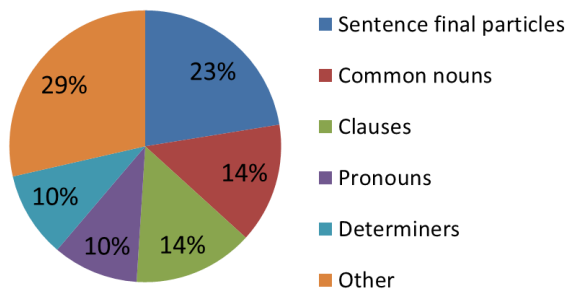**Types of Intra-Sententially Code-Mixed Language Forms in Charlotte's Cantonese Utterances**

Types of Inter-Sententially Code-Mixed Language Forms in Charlotte's Cantonese Utterances

Legend:
- Clauses
- Common nouns
- Verb phrases
- Verbs
- Exclamations
- Noun phrases
- Adjectives
- Adverbs
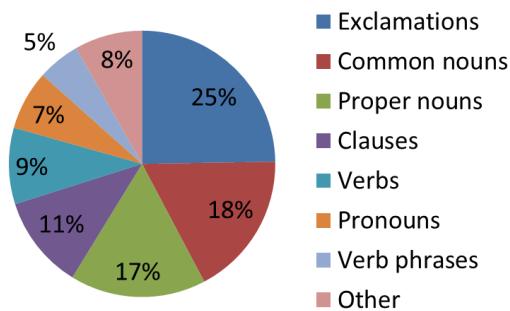- Proper nouns
- Pronouns
- Other

Figures 5a and 5b. Types of intra-sententially (left) and inter-sententially (right) code-mixed language forms in Charlotte's Cantonese utterances.

Types of Intra-Sententially Code-Mixed Language Forms in Charlotte's English Utterances

Legend:
- Sentence final particles
- Common nouns
- Clauses
- Pronouns
- Determiners
- Other

Types of Inter-Sententially Code-Mixed Language Forms in Charlotte's English Utterances

Legend:
- Exclamations
- Common nouns
- Proper nouns
- Clauses
- Verbs
- Pronouns
- Verb phrases
- Other

Figures 6a and 6b. Types of intra-sententially (left) and inter-sententially (right) code-mixed language forms in Charlotte's English utterances.
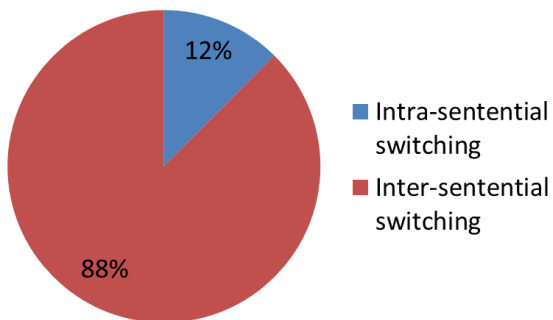
(4)   Child: Ne1go3 aa3 Gaa3gaa3 money
          (呢 個 呀 家 家 money)
           this   SFP Ka Ka   money
          "This is Ka Ka's money."
      (Charlotte 1;08;28)

(5)   Child: Pretty aa4
           Pretty SFP
           "Is it pretty?"
      (Charlotte 1;10;09)

(6)   Adult: Excuse me, you say excuse me.
      Child: Aai1jaa3 aai1
          (哎 吔 哎
           Ah   ah
          "Ah!"
      (Charlotte 1;08;28)

Regarding the two balanced bilinguals, videlicet Llywelyn and Darren, scarcely were disparities in proportions of intra-sentential and inter-sentential switching between their Cantonese and English utterances as significant as those in Janet and Charlotte, both of whom obviously possessed clear patterns of language dominance, as shown in Figures 7 and 8; this could plausibly be explicated by their relatively balanced bilingual development. That said, in spite of their lack of clear patterns of language dominance, intra-sentential switching was observed to take up a larger proportion of the total number of code-mixing in utterances of their slightly dominant language, videlicet Cantonese for Llywelyn and English for Darren, than in utterances of their slightly weaker language. All the same, the two participants' language dominance being frightfully insignificant, hardly is it plausible to tell whether the aforementioned disparities identified in their patterns of code-mixing are genuinely attributable to their language dominance.

**Types of Code-Mixing in Llywelyn's
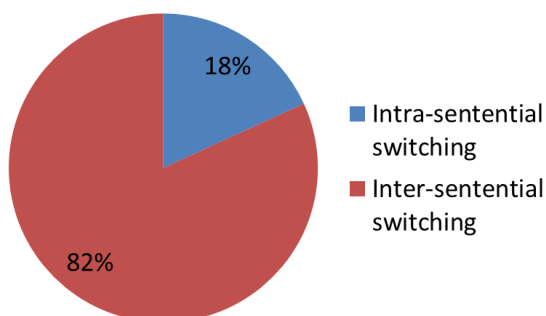Cantonese Utterances**

22%

■ Intra-sentential
switching

■ Inter-sentential
switching

78%
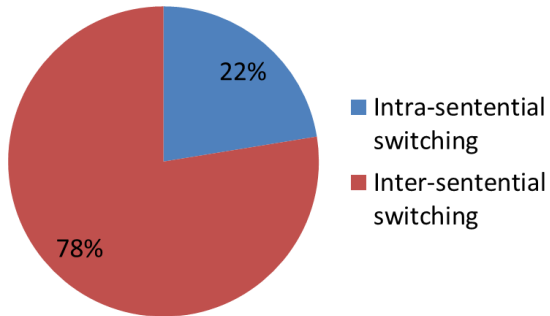
**Types of Code-Mixing in Llywelyn's
English Utterances**

12%

■ Intra-sentential
switching

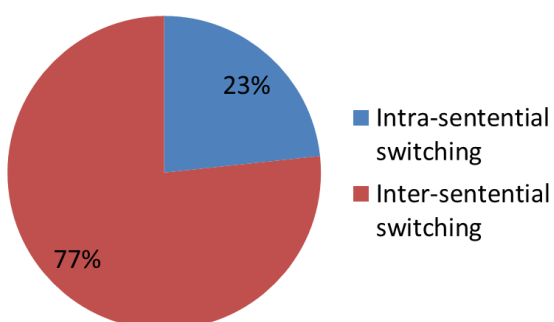■ Inter-sentential
switching

88%

Figures 7a and 7b. Types of code-mixing in Llywelyn's Cantonese (left) and English (right) utterances.

**Types of Code-Mixing in Darren's
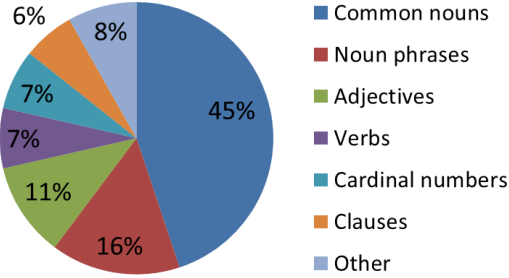Cantonese Utterances**

18%

■ Intra-sentential
switching

■ Inter-sentential
switching

82%

**Types of Code-Mixing in Darren's
English Utterances**

23%

■ Intra-sentential
switching

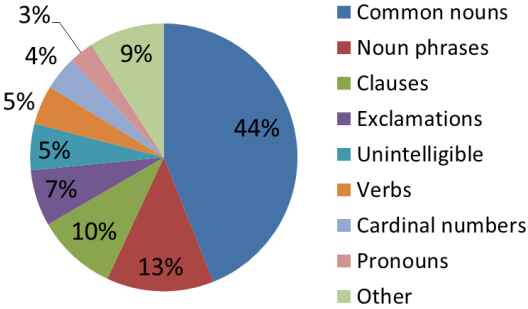■ Inter-sentential
switching

77%

Figures 8a and 8b. Types of code-mixing in Darren's Cantonese (left) and English (right) utterances.

A close scrutiny of types of code-mixed language forms in utterances produced by Llywelyn and Darren from Figure 9 to Figure 12 suggests that Llywelyn's pattern of code-mixing was akin to that of Janet, yet Darren's pattern of code-mixing deviated from that of Charlotte. Similar to Janet, Llywelyn also embedded syntactically complex structures, videlicet clauses, more frequently into his English utterances than his Cantonese utterances. In contrast, no particular pattern of complexity was observed in Darren's code-mixing in that simpler word-level structures and more complex clausal structures were roughly proportionally between code-mixing in both directions. Complexity of code-mixing of balanced bilingual children is thereby said to be more variable and less predictable than that of dominant bilingual children.

Types of Intra-Sententially Code-Mixed Language Forms in Llywelyn's Cantonese Utterances
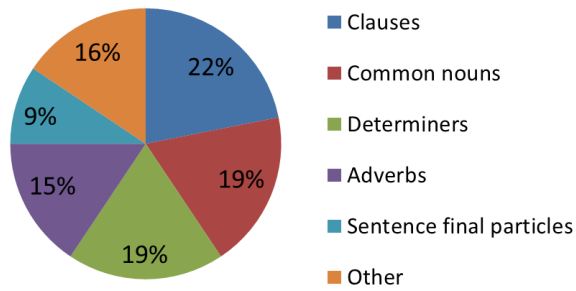

- Common nouns — 45%
- Noun phrases — 16%
- Adjectives — 11%
- Verbs — 7%
- Cardinal numbers — 7%
- Clauses — 6%
- Other — 8%

Types of Inter-Sententially Code-Mixed Language Forms in Llywelyn's Cantonese Utterances

- Common nouns — 44%
- Noun phrases — 13%
- Clauses — 10%
- Exclamations — 7%
- Unintelligible — 5%
- Verbs — 5%
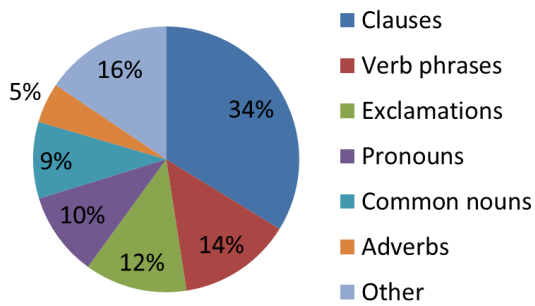- Cardinal numbers — 4%
- Pronouns — 3%
- Other — 9%

Figures 9a and 9b. Types of intra-sententially (left) and inter-sententially (right) code-mixed language forms in Llywelyn's Cantonese utterances.

Types of Intra-Sententially Code-Mixed Language Forms in Llywelyn's English Utterances
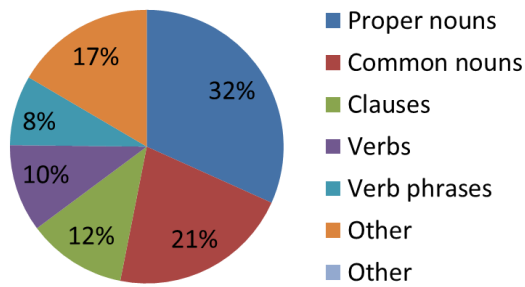

- Clauses
- Common nouns
- Determiners
- Adverbs
- Sentence final particles
- Other

Types of Inter-Sententially Code-Mixed Language Forms in Llywelyn's English Utterances

- Clauses
- Verb phrases
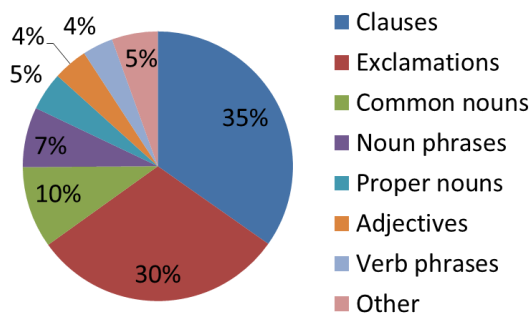- Exclamations
- Pronouns
- Common nouns
- Adverbs
- Other

Figures 10a and 10b. Types of intra-sententially (left) and inter-sententially (right) code-mixed language forms in Llywelyn's English utterances.

Types of Intra-Sententially Code-Mixed Language Forms in Darren's Cantonese Utterances

- Proper nouns
- Common nouns
- Clauses
- Verbs
- Verb phrases
- Other
- Other

Types of Inter-Sententially Code-Mixed Language Forms in Darren's Cantonese Utterances

- Clauses
- Exclamations
- Common nouns
- Noun phrases
- Proper nouns
- Adjectives
- Verb phrases
- Other

Figures 11a and 11b. Types of intra-sententially (left) and inter-sententially (right) code-mixed language forms in Darren's Cantonese utterances.

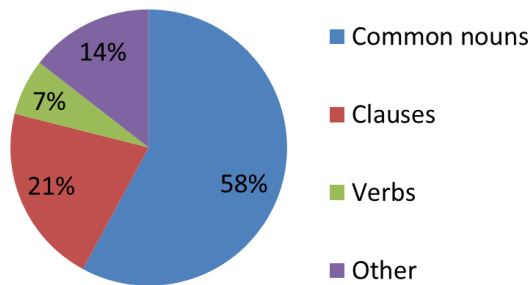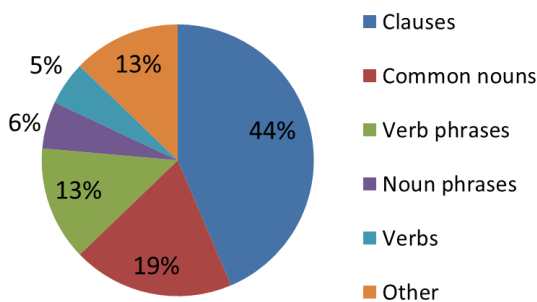**Types of Intra-Sentential Code-Mixed Language Forms in Darren's English Utterances**

- Common nouns
- Clauses
- Verbs
- Other

14% · 7% · 21% · 58%

Types of Inter-Sentential Code-Mixed Language Forms in Darren's English Utterances

- Clauses
- Common nouns
- Verb phrases
- Noun phrases
- Verbs
- Other

5% · 13% · 6% · 13% · 19% · 44%

Figures 12a and 12b. Types of intra-sententially (left) and inter-sententially (right) code-mixed language forms in Darren's English utterances.

Discussion

On the basis of antecedent studies, it was postulated that bilingual children code-mix more frequently and in a more complicated fashion in utterances of their weaker language. Findings delineated in the antecedent section generally confirm research predictions and hypothesis formulated, yet such a hypothesis indisputably ought to be interpreted with respect to the present research context.

To begin with, Cantonese-English bilingual children appear to code-mix more frequently in utterances of their weaker language. Such a hypothesis is apparently supported by a higher proportion or percentage of occurrence of code-mixing in English and Cantonese utterances produced by Charlotte, who was English-dominant, and Janet, who was Cantonese-dominant, respectively; such findings concur with antecedent research findings on language embedding, which suggest that bilingual children who have reached a higher level of syntactic complexity in one language than another language are apt to incorporate elements of a dominant language into utterances of a weaker

language (Yip & Matthews, 2000). Notwithstanding its inherent difference from syntactic transfer or lexical borrowing, code-mixing is still deemed to be an avenue for embedding of language structures of the dominant language into the weaker language as a matrix language of utterances. Another plausible explication is bilingual children's language preference. Preferring to interact with other interlocutors in their dominant language, bilingual children are less likely to code-mix their utterances with their weaker language when their dominant language is the matrix language yet are likely to capitalize upon linguistic elements of the dominant language even when the matrix language is the weaker language (Genesee et al., 2004; Montrul, 2013). Should the same hypothesis be applicable to balanced bilinguals, an equal frequency of code-mixing ought to be expected to be identified in utterances of both languages produced by balanced bilinguals; findings of the present study however fail to comply with such a prediction. Both Llywelyn and Darren code-mixed more frequently in their Cantonese utterances than in their English utterances; the input factor is plausibly in place in that Cantonese utterances embedded with English language structures are omnipresent in discourse amongst local Hong Kong citizens and so readily available to bilingual children as primary language input (Yip & Matthews, 2007). Having received such input, those children may plausibly learn from, if not imitate, those patterns of code-mixing and produce utterances with Cantonese as a matrix language and embedded English language structures.

As for types of code-mixing, inter-sentential code-mixing is predominant in utterances of both languages produced by all four participants albeit a higher proportion of intra-sentential code-mixing in utterances of the dominant language. Involving skilled manipulation of overlapping sections of two grammars, intra-sentential switching, where language structures of both languages are present in the same sentence, is incontestably considered much more challenging and complicated than inter-sentential mixing in that syntactic functions performed by distinct elements in both languages have to be contemplated to formulate a well-formed intra-sententially code-mixed utterance (Li, 2000). In intra-sentential code-mixing, seldom are two languages combined in an arbitrary fashion; instead, one language typically provides the grammatical framework for language items of the other language to fit in (Li, 2000). Being more proficient in the dominant language, bilingual children may find it easier to exploit the dominant language as the matrix language setting the grammatical framework in intra-sentential code-mixing; for such a reason, it is reasonable that intra-sentential code-mixing is more frequent in utterances of the dominant language. For instance, possessing a more advanced level of mastery of Cantonese and English respectively, Janet and Charlotte probably found formulation of Cantonese and English sentences easier respectively, so they were more likely to employ their dominant language to set a grammatical framework for intra-sentential code-mixing. Possessing roughly equivalent mastery of two languages, balanced bilingual children probably find formulation of Cantonese and English sentences

equally easy or difficult, so a significantly high proportion of intra-sentential code-mixing is absent in any of the two languages.

Besides code-mixing more frequently, Cantonese-English bilingual children also appear to code-mix in a more complicated fashion in their weaker language; this entails that language structures of the dominant language with higher syntactic complexity and semantic value are embedded into utterances of the weaker language. Possessing higher syntactic complexity and semantic value respectively, clauses, which comprise subjects and predicative elements, and common nouns, which denote classes of entities, of the dominant language are more prevalently embedded into Charlotte's Cantonese utterances and Janet's English utterances to convey meanings and propositional content (Biber et al., 2002). In contrast, possessing lower syntactic complexity as well as semantic value, proper nouns, which denote individuals, sentence final particles, and exclamations of the weaker language are pervasively embedded into the dominant language for the purpose of naming or conveyance of meanings without genuine prepositional content (Biber et al., 2002). Such findings provide counter evidence for Bernardini and Schlyter (2004)'s Ivy Hypothesis in that Cantonese-English bilingual children are likely to resort to lexical in lieu of functional elements of the dominant language, such as clauses and common nouns, and incorporate them into utterances of the weaker language. That said, the current study not possessing a goal of assembling evidence for or against that hypothesis, more evidence manifestly ought to be procured for the sake of putting forward a more tenable argument in support of or opposition to Ivy's Hypothesis. Variability of the code-mixing pattern of balanced Cantonese-English bilingual children could be accounted for by their lack of clear language dominance pattern and more significant impacts from primary language input received as well as their personal preferences for code-mixing, which ought to be studied in greater depth.

After elucidation of the overriding findings of the study, one additional issue worthy of deliberation is the interconnection between language dominance and language input. Input being influential in bilingual development, by no means can any attributes of bilinguals' language production be dissociated from input (Hoff et al., 2014); Yip and Matthews (2007) also noted that it is frightfully difficult to segregate bilingual children's acquisition of adult-like code-mixing behaivour from code-mixing as instantiation of their own bilingual development against a backdrop of a multilingual society, where code-mixing is ubiquitous amongst adults. The present study comparing frequency and complexity of code-mixing of Cantonese-English bilingual children with distinct language dominance patterns is argued to be valid in that it possesses no intention to rule out impacts effectuated by adult input or study the mere effect of language dominance on patterns of code-mixing; instead, only does it attempt to compare patterns of code-mixing amongst bilingual children with distinct language dominance patterns given an assumption that other variables,

embodying adult input, remain relatively constant. Being a naturalistic study, hardly can the study strictly control all variables of participants by reason of its impracticality; this incontrovertibly constitutes one limitation of the study and ought to be overcome by ameliorated research design in the future.

Apart from that, the study plainly possesses some other limitations in a methodological respect. First of all, one plausible pitfall as regards longitudinal corpus data is the low frequency of sampling. Attributed to limited duration of each recording session as well as frequency of recording, only was approximately 1% of a child's language production estimated to be capable of being captured and documented in the corpus, so the representativeness of the sample is in doubt (Yip & Matthews, 2007); for such a reason, reliability of the quantitative aspect of the study, especially the percentage of code-mixed utterances amongst the total number of utterances, might have been undermined. Another potential caveat in regard to spontaneous speech data on the whole is existence of a considerable amount of individual variation. Should a distinction between linguistic competence and linguistic performance be given credence to, rarely does a child's language production comprehensively represent his/her underlying linguistic competence (Yip & Matthews, 2007). In particular, there being no obligatory context for code-mixing, personal preferences constitute the determinant of bilingual children's production of code-mixed utterances; such a small sample size with solely two dominant bilinguals and two balanced bilinguals is thereby insufficient to conclusively verify any research hypotheses, but a larger sample size is warranted. Added to the aforementioned limitations pertaining to the source of data, only has the study taken the formal aspect of code-mixing into account, but it has kept its functional aspect out of consideration. More specifically, never have semantic and pragmatic meanings conveyed by code-mixed utterances been touched upon. Leech (1974) has constructed a taxonomy of seven types of meaning whilst Cruse (2011) has also identified several types of non-descriptive meaning irrespective of propositions conveyed by utterances; such frameworks can be adopted to study distinct types of meaning conveyed in code-mixed utterances produced by bilingual children with disparate language dominance patterns.

Conclusion

As an attempt to expand the body of bilingual acquisition research on Cantonese-English bilingual children's code-mixing, the current study targets an independent variable of language dominance and aims at investigating code-mixing of Cantonese-English bilingual children with distinct language dominance patterns via a corpus-based longitudinal approach. Bilingual children with asymmetrical bilingual development are discovered to code-mix more frequently and in a more complicated fashion in utterances of their weaker language with more intra-sentential switching in the dominant language and incorporation of language structures of the dominant language

with higher syntactic complexity as well as semantic value into utterances of the weaker language. On the other hand, code-mixing of bilingual children with balanced bilingual development are found to be influenced less by language dominance patterns yet more by the input factor.

Having elucidated and explicated impacts of language dominance on Cantonese-English bilingual children's code-mixing in naturalistic settings at length, not only does the study add to the existing body of literature on bilingual acquisition of Cantonese-English bilingual children, who possess an informative language pair as a result of marked genetic and typological disparities between Cantonese and English, it also uncovers code-mixing as a language contact phenomenon on a more comprehensive basis and enables scholars in the field of bilingualism to decipher code-mixing from more alternative perspectives. It is hoped that future studies associating code-mixing with language dominance in more diverse language pairs can develop pattern of code-mixing into a valid and reliable measure of language dominance; this is infallibly regarded as a methodological advancement in the field of bilingual acquisition research. Not only does such a measure possess theoretical usage, it may also possess practical applications in educational settings. When well-established, pattern of code-mixing can be applied by kindergarten teachers as an alternative and easily accessible language assessment tool to formatively assess children's bilingual development. The study is thereby said to possess both theoretical and practical significance.

For all its theoretical and practical significance, possessing certain limitations, the study decidedly ought to be ameliorated in terms of research design to yield more conclusive findings. More specifically, being rather limited, longitudinal corpus data are suggested to be supplemented by diary data, which manage to yield extended developmental trajectories of bilingual children's linguistic development to compensate for the weakness of low frequency of sampling whereas the sample size is also recommended to be enlarged to detract from impacts of individual variation in language production on quantitative analysis (Yip & Matthews, 2007). In addition, it is proposed that both formal and functional respects of code-mixed utterances be studied in future research with the hope of understanding not only bilingual children's contexts of code-mixing but also their reasons for code-mixing. Last but surely not the least, it is worth comparing code-mixing patterns of bilingual children with bilingual adults with similar language dominance patterns as an annex of the study for identification of any similarities or disparities in patterns of code-mixing between bilinguals at distinct stages of development or levels of proficiency. Not only are these directions for future research meant to expand the body of literature in the field, they are also expected to possess practical applications and inform pedagogical practice.

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