

## **Bilingual Intonation in Cantonese-English Bilingual Children's Sentence-Final Particles\***

**Jonathan Him Nok Lee<sup>[1]</sup>, Regine Yee King Lai<sup>[1]</sup>, Stephen Matthews<sup>[2]</sup> and Virginia Yip<sup>[1]</sup>**  
*The Chinese University of Hong Kong<sup>[1]</sup> and The University of Hong Kong<sup>[2]</sup>*

### **Abstract**

This corpus-based study investigates the intonation of Cantonese-English bilingual children. Few studies have explored the prosodic aspect of simultaneous acquisition of a tonal and a non-tonal language. We examine the intonation patterns in eight simultaneous bilingual children acquiring a tonal (Cantonese) and an intonational language (English) from 2;0 to 3;0. We have observed two bilingual intonation patterns in the children studied: “high pitch followed by a fall” and “low pitch followed by a rise”. They illustrate cross-linguistic influence in prosody from English at early stages of the bilingual children’s phonological development. Both language dominance and the use of sentence-final particles (SFPs) are found to have significant effects on the production of bilingual intonation. The more dominant the bilingual child is in Cantonese, the less bilingual intonation is produced in Cantonese and code-mixed utterances. Also, bilingual intonation was attested significantly more frequently in utterances with SFPs than without SFPs.

### **Key words**

Bilingual intonation, sentence-final particles, cross-linguistic influence, bilingualism, language acquisition

---

\* We would like to thank the commentator of our paper Prof. Sue-mei Wu for her useful comments. The authors are particularly indebted to Prof. Jianjing Kuang, Prof. Bob Ladd, Prof. Charles Lam, Prof. Chaak Ming Lau, Prof. Tan Lee, Prof. Mark Liberman, Prof. Peggy Mok, Prof. Sze-wing Tang, and Ka Fai Yip for discussion and useful input. We would also like to thank Tsun Hei Choi, Cheuk Fung Lok, Herman Ng, Hailey Ngai, and Jason Tai for their help with the corpus data. Needless to say, all errors remain our own. This project has been funded by the Childhood Bilingualism Research Centre, The Chinese University of Hong Kong, to which we are grateful.

## 1. Introduction

This corpus-based study investigates the intonation patterns in Cantonese sentence-final particles (SFPs) produced by Cantonese-English bilingual children. In recent bilingual first language acquisition research, the interaction between two or more languages in children’s development (e.g., cross-linguistic influence) has been at the center of discussion. Previous studies in bilingual phonological acquisition have focused on segmental aspects of bilingual children’s production (e.g., Johnson and Wilson 2002, Kehoe 2002, Kehoe, Lleó and Rakow 2004). However, very few studies have explored the prosodic aspects, let alone the intonation of bilinguals. In recent years, more studies have investigated the intonation of bilinguals but mostly with stress/non-tonal language pairs, e.g., German-English (Gut 2000), Turkish-German (Queen 2001, 2012), English-Hindi (Puri 2013, 2016), Greek-English (Kontaxi and Chaida 2015). They all argued for cross-linguistic influence in intonation based on their data. As far as the bilingual phonological acquisition of a tonal and a non-tonal language is concerned, only three studies have been found: Mok and Lee (2018) studied the lexical tone development of Cantonese-English bilingual children, and L.-F. Lai (2018) and L.-F. Lai and Gooden (2018) examined the intonation of Yami-Mandarin bilinguals. Although the latter two studies examined the intonation of bilinguals, they combined different types of adult bilinguals (including early, late, and simultaneous bilinguals) in the same study and analyzed the data from a perspective of language contact instead of language acquisition. The present study, in contrast, focuses specifically on the bilingual interaction in intonation in simultaneous bilingual children acquiring a prosodically and typologically orthogonal language pair: Cantonese (a tonal language) and English (an intonational language). This can bridge an important gap in our understanding of cross-linguistic influence in prosody/intonation at early stages of bilingual development.

### 1.1 The prosodic systems of Cantonese and English

Cantonese and English are two typologically and prosodically orthogonal languages. Cantonese has a complex tonal system. Every Cantonese syllable carries a tone (T) which is crucial for differentiating word meanings. There are six lexical tones (T1-T6) based on pitch contrast alone (Bauer and Benedict 1997, Fok-Chan 1974). Table 1 summarizes the information of the six tones. This paper adopts Chao’s 5-level system to annotate the relative pitch of tones. The numbers in the “relative pitch” column in Table 1 represent the relative starting and ending pitch height of each tone, with 1 being the lowest and 5 being the highest pitch height of a speaker’s normal pitch range (Chao 1930, 1947).

Table 1. The six contrastive Cantonese lexical tones based on pitch contrast alone

Tones	Descriptive pitch contours	Relative pitch
1	High level	55
2	High rising	25
3	Mid level	33
4	Low level	21
5	Low rising	23
6	Low level	22

In contrast, there are no lexical tones in English, but lexical stress (e.g., “stressed-unstressed” trochaic stress and “unstressed-stressed” iambic stress). In longer words, there are often three

levels of stress: primary stress, secondary stress, and unstressed.

As far as English intonation is concerned, sentence types are distinguished by the global falling and rising of pitch value over the whole utterance (Grice, German and Warren 2020, Silverman et al. 1992). On contrary, Cantonese relies on boundary tones at the final syllable to signal intonation (Wu 2013, Xu and Mok 2011, 2012, Zhang 2014). Additionally, Cantonese possesses a complex and abundant system of SFPs with diverse meanings and functions. It has been argued that certain tones on SFPs are intonation rather than lexical tones (e.g., Feng 2015, Sybesma and Li 2007, Tang 2019, 2020). Wakefield (2010, 2016, 2020) even argued that Cantonese SFPs are the equivalent of English intonation. Ladd (2008) proposed that intonation should be redefined to include segmental particles if particles and intonation have the same meanings/functions. However, English has very few particles and relies on suprasegmental intonation to encode similar semantic/pragmatic functions. This difference between English and Cantonese can potentially give rise to a transfer effect in the speech of Cantonese-English bilingual children.

The current study is pioneering in investigating the prosodic interaction between Cantonese SFPs and suprasegmental intonation in the phonological development of simultaneous bilingual children of a tonal language (Cantonese) and an intonational language (English). We will discuss how the use of pitch for intonation interacts with the pitch patterns of lexical tones and SFPs in their Cantonese and code-mixed utterances. We ask the following research questions: Given the previous reported cross-linguistic influence in intonation in the bilingual language acquisition of non-tonal language pairs, (i) would there also be cross-linguistic influence in prosody in the phonological development of Cantonese-English bilingual children (i.e., simultaneous acquisition of a tonal and a non-tonal language)? If so, (ii) would there be any bilingual intonation patterns which are exclusive to the bilingual children but not to the monolingual Cantonese-speaking children? If so, (iii) would the language dominance of the bilingual children and the use of SFPs affect the production of bilingual intonation?

## 2. Methods

Mok and Lee (2018) reported that while some simultaneous Cantonese-English bilingual children were on a par with their monolingual peers at 2;0, some had a delay until 2;6. The current study will examine the intonation produced by the bilingual children longitudinally from 2;0 to 3;0 so as to avoid the possibility of the bilingual children not having acquired the Cantonese tones.

### 2.1 Participants

The current study investigates the production of 8 simultaneous Cantonese-English bilingual children (4 female and 4 male) from ages 2;0 to 3;0 in the longitudinal Hong Kong Bilingual Child Language Corpus. 5 children were Cantonese-dominant, 1 child was English-dominant, 1 child had balanced development in both languages and 1 child (Kasen) was originally balanced but became English-dominant after 2;10. Their language dominance was determined by calculating MLU (mean length of utterance) differentials between the two languages, their language preferences and patterns of code-mixing (Yip and Matthews 2006, 2007). Detailed background of the participants are stated in Yip and Matthews (2007, Chapter 3).

The corpus data were analyzed by sampling children's speech at 3-month intervals at ages 2;0, 2;3, 2;6, 2;9 and 3;0. The children were recorded longitudinally in naturalistic situations with Cantonese and English contexts. Cantonese context refers to the situation that the child was

addressed in Cantonese in the recording. Similarly, the child was addressed in English in English context. Since our study is concerned with the usage of Cantonese SFPs, only recordings in the Cantonese contexts were considered. Despite this, intra- and inter-sentential code-mixing are so common among bilinguals that we can still observe English utterances even in Cantonese contexts. One recording in the Cantonese context was sampled for each participant at each time-point. If there were more than one recording available at the time-points, only the earliest recording would be analyzed. Table 2 summarizes the background information of the eight bilingual children.

Table 2. Background information of the eight bilingual children

Child	Sex	Dominant language	Age of data used	No. of utterances	No. of morphemes	MLU
Alicia	F	Cantonese	2;00.13	68	190	2.794
			2;03.02	148	395	2.669
			2;06.02	172	540	3.140
			2;09.15	187	462	2.471
			3;00.10	234	798	3.410
Charlotte	F	English	2;00.25	131	303	2.313
			2;03.17	152	380	2.500
			2;06.16	161	398	2.472
			2;09.04	35	68	1.943
			3;00.03	123	372	3.024
Darren	M	Balanced	2;00.10	152	327	2.151
			2;03.08	148	363	2.453
			2;06.11	107	215	2.009
			2;09.03	242	669	2.764
			3;00.07	210	463	2.205
Janet	F	Cantonese	2;10.16	142	545	3.838
			3;00.11	369	1433	3.883
Kasen	M	Balanced	2;06.16	256	752	2.938
			2;09.03	369	1221	3.309
		English	3;00.03	184	545	2.962
Llywelyn	M	Cantonese	2;00.12	149	215	1.443
			2;03.14	154	320	2.078
			2;06.20	300	980	3.267
			2;09.07	293	986	3.365
			3;00.27	292	865	2.962
Sophie	F	Cantonese	2;00.06	330	683	2.070
			2;03.01	237	675	2.848
			2;06.00	213	719	3.376
			2;09.06	361	1241	3.438
			3;00.03	226	682	3.018
Timmy	M	Cantonese	2;03.17	325	1116	3.434
			2;06.09	312	1110	3.558
			2;09.08	217	829	3.820
			3;00.09	413	1459	3.533

## 2.2 Procedure

The sampled data listed in Table 2 were divided into three datasets. Dataset 1 comprises all sampled recordings of Alicia and Janet. Dataset 2 comprises all sampled recordings of Charlotte and Darren, and the recordings of Llywelyn at 2;9 and 3;0. Dataset 3 comprises all sampled recordings of Kasen, Sophie, and Timmy, and the recordings of Llywelyn at 2;0, 2;3, and 2;6. A native adult speaker of Cantonese who spoke English as a second language listened to all 3 datasets, judging the intonation pattern of each utterance. Two bilingual intonation patterns were observed: “high pitch followed by a fall” and “low pitch followed by a rise”. Another 3 native adult speakers of Cantonese who also spoke English as a second language first listened to samples of these two bilingual intonation patterns. They then each listened to 1 dataset (i.e., each dataset was listened to by two raters in total) and judged every utterance as either “high pitch followed by a fall”, “low pitch followed by a rise”, or “other” (including target intonation, unknown intonation patterns, and unintelligible utterances) without referencing the judgements of the first rater. Inter-rater reliability test (Cohen’s kappa) was then carried out based on all data (no. of utterances = 7412).

## 3. Results

### 3.1 Inter-rater reliability

Table 3 shows the inter-rater reliability (Cohen’s kappa) of the three sets of data. According to Cohen (1960),<sup>1</sup> there is substantial to almost perfect agreement between the judgements of raters in the present study.

Table 3. Inter-rater reliability

Dataset	Agreement (no. of utterances)	$\kappa$ value	Standard error of $\kappa$	95% Confidence intervals
1	99.98% (N = 1320)	.67	.069	.54-.81
2	99.98% (N = 2046)	.85	.021	.81-.89
3	95.59% (N = 4046)	.65	.024	.60-.70

### 3.2 Bilingual intonation

We have observed two bilingual intonation patterns in all the children studied: (1) “high pitch followed by a fall” and (2) “low pitch followed by a rise”, regardless of the sentence types. For instance, the intonation pattern (1) in example (1) can be attributed to the superimposition of an English intonation with high pitch followed by a low boundary tone at the utterance-final position (predominantly SFPs). The intonation pattern (2) in example (2) can be attributed to the superimposition of an English intonation with low pitch followed by a high boundary tone at the utterance-final position (predominantly SFPs). Figure 1 shows the fundamental frequency (F0) of the intonation patterns of the two examples. In (1) the initial high pitch overrides the low falling tone of *m4* “not”, while in (2) the final high pitch overrides the low level tone of *liu6* “pee”.

<sup>1</sup> Cohen (1960) suggested that the Kappa ( $\kappa$ ) value be interpreted as follows: values  $\leq 0$  as indicating no agreement and .01-.20 as none to slight, .21-.40 as fair, .41-.60 as moderate, .61-.80 as substantial, and .81-1.00 as almost perfect agreement.

- (1) M4 hai6 aa3. (Kasen 2;09.01, CC)  
Not be SFP  
“No.”
- (2) Ngo5 jiu3 o1liu6 laa3. (Llywelyn 2;03.14, CC)  
1sg have to pee SFP.  
“I have to pee.”

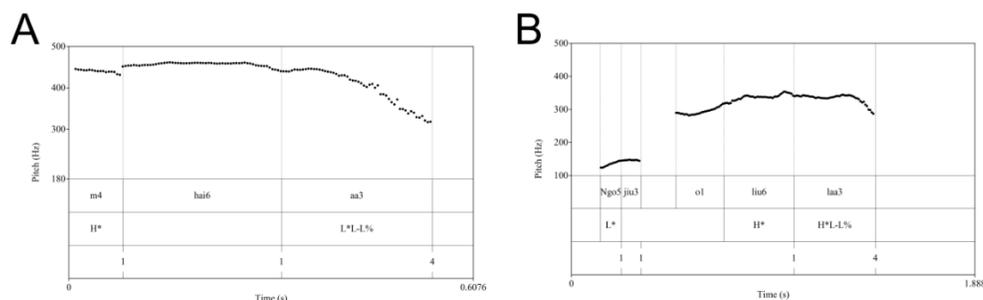


Figure 1: The F0 of examples (1) and (2). (A) The F0 of example (1). (B) The F0 of example (2).

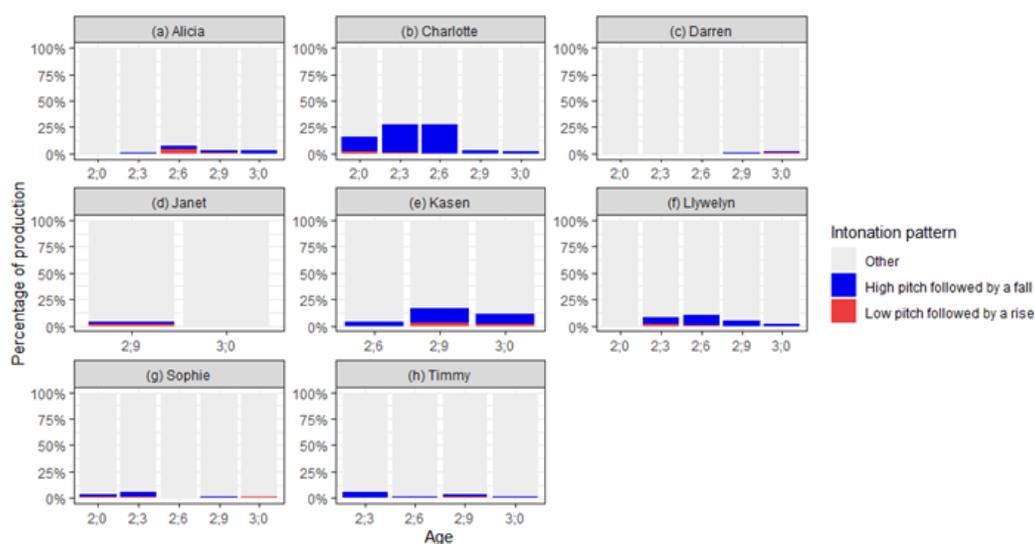


Figure 2: The production of intonation patterns by the eight Cantonese-English bilingual children (at five time-points) in eight panels: (a) Alicia (five time-points); (b) Charlotte (five time-points); (c) Darren (five time-points); (d) Janet (two time-points); (e) Kasen (three time-points); (f) Llywelyn (five time-points); (g) Sophie (five time-points); and (h) Timmy (four time-points).

Figure 2 shows the production of intonation patterns by the eight Cantonese-English bilingual children at five time-points. Since there are disagreements between the raters on some utterances, this paper adopts a more stringent criterion of the production of bilingual intonation patterns. We only consider an utterance as belonging to either of the two bilingual intonation patterns (i.e., “high pitch followed by a fall” or “low pitch followed by a rise”) when both raters perceived it as the same intonation pattern. If only one rater perceived it as a production of

bilingual intonation while the other rater does not agree, that utterance is considered as “other” intonation patterns.

The bilingual intonation was attested most predominantly in the speech of the English-dominant child Charlotte. For instance, the two bilingual intonation patterns constituted more than 25% of her speech in the sampled recording at 2;6. In contrast, bilingual intonation was attested in the speech of the Cantonese-dominant children (Alicia, Janet, Llywelyn, Sophie, and Timmy) at much lower frequencies (generally < 10% of total utterances). They usually produced target-like lexical tones and intonation in their Cantonese and code-mixed utterances.

There were two balanced bilingual children in the study: Kasen and Darren. Bilingual intonation was attested frequently in Kasen’s speech (e.g., constituting ~15% of his speech in a sampled recording at 2;9). In contrast, bilingual intonation was attested extremely rarely at all five time-points for Darren. This can be attributed to the fact that Darren was an idiosyncratic participant in the corpus with an extremely rare production of Cantonese SFPs. He produced zero SFP in the sample recordings at ages 2;0 and 2;6 and merely a few tokens at the other three time-points. We argue it might be the case that Darren’s personality was blunter and he did not observe the social expectation of using SFPs.

### 3.3 Mixed effects logistic regression

We argue that the bilingual prosody is a manifestation of cross-linguistic influence from English intonation. We hypothesize the following relationship between language dominance and the production of bilingual intonation: if the Cantonese-English bilingual child is more Cantonese-dominant, we predict less cross-linguistic influence from English, and thus the less frequent production of bilingual intonation. Besides, we have observed that bilingual intonation is predominantly attested in utterances with SFPs. Given the intonational nature of SFPs, we hypothesize the use of SFPs is correlated with the production of bilingual intonation. Furthermore, linguistic productivity (measured by mean MLU of Cantonese and English contexts) and the gender of the children may play a role in the course of acquisition and the transfer of prosody.

We analyze the data using mixed effects logistic regression. The present model includes fixed effects of language dominance, the use of SFPs, linguistic productivity, and the gender of the children. It also includes random intercepts for the variability of utterances and participants.

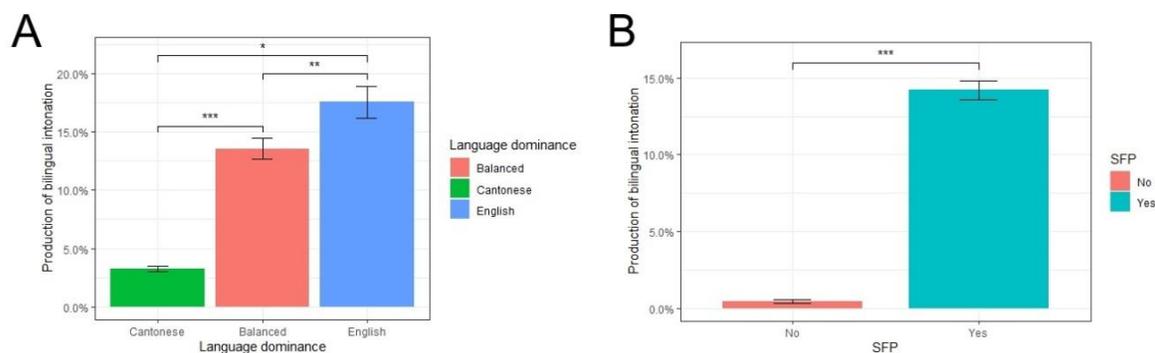


Figure 3: The results of mixed effects logistic regression modelling. (A) The production of bilingual intonation by three different groups of language dominance (Cantonese-dominant, balanced, and English-dominant). (B) The production of bilingual intonation in utterances with SFPs (Yes) and without SFPs (No).

A significant effect of language dominance is found,  $\chi^2(2, N = 7412) = 18.07, p < .001$ . Post hoc analyses using estimated marginal means (EMMs) (Figure 3(A)) show that Cantonese-dominant bilingual children produced significantly less bilingual intonation than both balanced children ( $p = .001$ ) and English-dominant ( $p = .0479$ ). Bilingual intonation was attested only in 3.25% of total utterances produced by Cantonese-dominant children, but in 13.55% and 17.56% of total utterances produced by balanced and English-dominant children respectively. Balanced children also produced significantly less bilingual intonation than English-dominant children ( $p = .009$ ). The results support our hypothesis that the more dominant the Cantonese-English bilingual child is in Cantonese, the less bilingual intonation is produced in Cantonese and code-mixed utterances. Moreover, bilingual intonation was attested in 14.20% of utterances with SFPs, which is significantly more frequently than that without SFPs (.48%),  $\chi^2(1, N = 7412) = 253.66, p < .001$  (Figure 3(B)). Linguistic productivity is also found a significant effect on the production of bilingual prosody,  $\chi^2(1, N = 7412) = 16.42, p < .001$ . However, there is no significant difference between the two genders of the bilingual children,  $\chi^2(1, N = 7412) = .204, p = .652$ .

#### 4. Discussion

This study is the first to investigate the development of intonation in simultaneous Cantonese-English bilingual children. Our data illustrate some instances of their intonation of Cantonese and code-mixed utterances is influenced by English. We have observed two bilingual intonation patterns in all children studied: “high pitch followed by a fall” and “low pitch followed by a rise”.

R. Y. K. Lai (2006) reported a frequent non-target usage of the SFP *aa4* (low falling tone) for the target form *aa3* (mid level tone) by the bilingual child Charlotte. She argued it can be attributed to the fact that Charlotte often showed a falling intonation, which was possibly affected by English prosody, towards the end of Cantonese and code-mixed utterances. Excluding SFPs from their analysis, Mok and Lee (2018) studied five bilingual children in the same corpus and argued that T1 (high level tone) is the “default tone” in errors in the speech of Charlotte and Llywelyn. We argue that their observations converge on the prominent bilingual intonation pattern reported in the current study: “high pitch followed by a fall”. The superimposition of intonation with high pitch at the utterance body resembles T1 in Cantonese, echoing the argument of Mok and Lee (2018), while the low boundary tone (the fall) at the utterance-final position (predominant SFPs) may have led to the non-target usage of SFPs with T4 as observed by R. Y. K. Lai (2006).

We have found a significant effect of language dominance on the production of bilingual intonation (Figure 3(A)). Cantonese-dominant bilingual children produced significantly less bilingual intonation than both balanced and English-dominant children. Balanced children also produced significantly less bilingual intonation than English-dominant children. The results support our hypothesis that the more dominant the Cantonese-English bilingual child is in Cantonese, the less cross-linguistics influence from English occurs, and hence the less bilingual intonation is produced in Cantonese and code-mixed utterances.

The differences between the prosodic systems of English (an intonational language) and Cantonese (a tonal language) potentially give rise to such a cross-linguistic influence in prosody in the speech of Cantonese-English bilingual children at early stages (2;0-3;0). Our results have shown that Cantonese SFPs are very pertinent to the transfer of bilingual prosody. First, bilingual intonation was attested significantly more frequently (~30 times more) in utterances with SFPs (14.20%) than without SFPs (.48%) (Figure 3(B)). Such statistically asymmetrical distribution of

bilingual intonation between utterances with and without SFPs indicates that bilingual intonation is transferred predominantly under the presence of SFPs. This may echo with Ladd (2008)'s proposal that SFPs could be a segmental realization of intonation which may interact actively with suprasegmental intonation/prosody (e.g., enhancing the likelihood of the production of bilingual intonation). Second, the low boundary tone (i.e., the fall in the pattern “high pitch followed by a fall”) and high boundary tone (i.e., the rise in the pattern “low pitch followed by a rise”) in the two bilingual intonation patterns are strictly licensed at the utterance-final position (predominantly SFPs). The fact that SFPs are used as the domain for intonation realization by the bilingual children is consistent with the location of boundary tones for signaling Cantonese intonation. These facts reflect a crucial role played by SFPs in producing bilingual intonation by the bilingual children.

## 5. Conclusions

This corpus-based study has investigated the intonation patterns of the production of Cantonese SFPs by Cantonese-English bilingual children at 3-month intervals from 2;0 to 3;0. The current study is the first study examining the bilingual interaction in intonation in simultaneous bilingual children with a tonal (Cantonese) and a non-tonal/intonational language (English). We have observed two bilingual intonation patterns in all the children studied: “high pitch followed by a fall” and “low pitch followed by a rise”. We argue that they are a manifestation of cross-linguistic influence from English which also illustrates how cross-linguistic influence in prosody happens at early stages of the phonological development of Cantonese-English bilingual children. Both language dominance of the bilingual children and the use of SFPs are found to have significant effects on the production of bilingual intonation. The more dominant the Cantonese-English bilingual child is in Cantonese, the less bilingual intonation is produced in Cantonese and code-mixed utterances. Also, bilingual intonation was attested significantly more frequently in utterances with SFPs than without SFPs.

## References

- Bauer, Robert S. and Paul K. Benedict. (1997) *Modern Cantonese phonology*. New York: Mouton de Gruyter.
- Chao, Yuen Ren. (1930) A system of tone-letters. *Le Maître Phonétique* 45, 24-27.
- Chao, Yuen Ren. (1947) *Cantonese primer*. New York: Greenwood Press.
- Cohen, Jacob. (1960) A coefficient of agreement for nominal scales. *Educational and Psychological Measurement* 20.1, 37-46.
- Feng, Shengli (馮勝利). (2015) Shengdiao, Yudiao yu Hanyu de Jumoyuqi (聲調、語調與漢語的句末語氣) [Tone, Intonation and Sentence Final Particles in Chinese]. Yuyanxue Luncong (語言學論叢) [Essays on Linguistics]. Vol. 51, 52-79. Beijing: The Commercial Press.
- Fok-Chan, Yuen-Yuen. (1974) *A perceptual study of tones in Cantonese*. Hong Kong: Hong Kong University Press.
- Grice, Martine, James Sneed German, and Paul Warren. (2020) Intonation systems across varieties of English. In Carlos Gussenhoven and Aoju Chen (eds.), *The Oxford Handbook of Language Prosody*. 285-302. Oxford: Oxford University Press.

- Gut, Ulrike. (2000) *Bilingual Acquisition of Intonation: A Study of Children Speaking German and English*. Tübingen: Niemeyer.
- Johnson, Carolyn E. and Ian L. Wilson. (2002) Phonetic evidence for early language differentiation: research issues and some preliminary data. *International Journal of Bilingualism* 6, 271-289.
- Kehoe, Margaret M. (2002) Developing vowel systems as a window to bilingual phonology. *International Journal of Bilingualism* 6, 315-334.
- Kehoe, Margaret M., Conxita Lleó, and Martin Rakow. (2004) Voice onset time in bilingual German-Spanish children. *Bilingualism: Language and Cognition* 7, 71-88.
- Kontaxi, Mary and Anthi Chaida. (2015) Question intonation of Greek-American simultaneous bilinguals. *Proceedings of the 6th ISEL Conference ExLing 2015*. 33-36. Athens, Greece.
- Ladd, Robert D. (2008) *Intonational Phonology*. Cambridge: Cambridge University Press.
- Lai, Li-Fang. (2018) *Intonation in contact: Prosodic transfer and innovation among Yami-Mandarin bilinguals*. Doctoral dissertation, University of Pittsburgh.
- Lai, Li-Fang and Shelome Gooden. (2018) Intonation in contact: Mandarin influence in Yami. *9th Proceedings of the International Conference on Speech Prosody 2018*. 952-956.
- Lai, Regine Yee King. (2006) *Language mixing in an English-Cantonese bilingual child with uneven development*. MPhil thesis, The University of Hong Kong.
- Mok, Peggy Pik Ki and Albert Lee. (2018) The acquisition of lexical tones by Cantonese-English bilingual children. *Journal of Child Language* 45.6, 1357-1376.
- Puri, Vandana. (2013) *Intonation in Indian English and Hindi late and simultaneous bilinguals*. Doctoral dissertation, University of Illinois at Urbana-Champaign.
- Puri, Vandana. (2016) Focus in Indian English and Hindi late and simultaneous bilinguals. *Linguistic Approaches to Bilingualism* 8.3, 343-371.
- Queen, Robin. (2001) Bilingual intonation patterns: Evidence of language change from Turkish-German bilingual children. *Language in Society* 30.1, 55-80.
- Queen, Robin. (2012) Turkish-German bilinguals and their intonation: Triangulating evidence about contact-induced language change. *Language* 88.4, 791-816.
- Silverman, Kim, Mary Beckman, John Pitrelli, Mori Ostendorf, Wightman Colin, Patti Price, Janet Pierrehumbert, and Julia Hirschberg. (1992) TOBI: A standard for labeling English prosody. *2nd International Conference on Spoken Language Processing (ICSLP 92)*. 867-870. Banff, Alberta, Canada.
- Sybesma, Rint and Boya Li. (2007) The dissection and structural mapping of Cantonese sentence final particles. *Lingua* 117.10, 1739-1783.
- Tang, Sze-wing. (2019) Jumozhuci de Lengreleixíng (句末助詞的冷熱類型) [Hot-cool typology of the sentence-final particles]. *Waiyu Jiaoxue yu Yanjiu (外語教學與研究) [Foreign Language Teaching and Research]* 51.5, 643-653.
- Tang, Sze-wing. (2020) Cartographic syntax of performative projections: evidence from Cantonese. *Journal of East Asian Linguistics* 29.1, 1-30.

- Wakefield, John C. (2010) *The English Equivalents of Cantonese Sentence-final Particles: A Contrastive Analysis*. Doctoral dissertation, The Hong Kong Polytechnic University.
- Wakefield, John C. (2016) Sentence-final Particles and Intonation: Two Forms of the Same Thing. *8th Proceedings of the International Conference on Speech Prosody 2016*. Boston University.
- Wakefield, John C. (2020) *Intonational Morphology*. Singapore: Springer.
- Wu, Wing Li. (2013) *Cantonese prosody: Sentence-final particles and prosodic focus*. Doctoral dissertation, University College London.
- Xu, Bo Robert and Peggy Mok. (2011) Final rising and global raising in Cantonese intonation. *Proceedings of 17th International Congress of Phonetic Sciences*, 2173-2176. Hong Kong.
- Xu, Bo Robert and Peggy Mok. (2012). Intonation Perception of Low-pass Filtered Speech in Mandarin and Cantonese. *International Symposium on Tonal Aspects of Languages (TAL 2012)*. Nanjing, China.
- Yip, Virginia and Stephen Matthews. (2006) Assessing Language Dominance in Bilingual Acquisition: A Case for Mean Length Utterance Differentials. *Language Assessment Quarterly* 3.2, 97-116.
- Yip, Virginia and Stephen Matthews. (2007) *The Bilingual Child: Early Development and Language Contact*. Cambridge: Cambridge University Press.
- Zhang, Ling. (2014) Segmentless sentence-final particles in cantonese: An experimental study. *Studies in Chinese Linguistics* 35.2, 47-60.

E-mail addresses: jonjonleehn@link.cuhk.edu.hk

ryklai@cuhk.edu.hk

matthews@hku.hk

vcymatthews@cuhk.edu