Chapter 10
Teaching Chinese to L2 Preschoolers Through Children's Songs: The Cases of Mandarin and Cantonese

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Abstract As varieties of the Chinese language, Mandarin and Cantonese are both tonal in nature and involve pitch cues for distinguishing characters and words. Chinese as a second language (CSL) learners often find Chinese tones difficult to grasp, especially for those at the preschool stage. In Hong Kong, Cantonese is the dominant variety of Chinese for daily communication and serves as the medium of instruction in local kindergartens, whereas Mandarin is used in Chinese language teaching in international kindergartens. Children's songs are widely used to foster preschoolers' CSL learning in the aforementioned settings. With adequate phonological input in a pleasurable learning environment, such an approach helps facilitate tone perception, which is key to the development of prosodic competence for better facilitation of reading comprehension. However, the tone-melody mismatches in children's songs and their negative influence on CSL learners' tone learning have long been underestimated. This chapter looks into the problems concerning teaching CSL through children's songs from a comparative perspective. Based on a contrastive analysis of the Mandarin and Cantonese tone systems with reference to multimodal learning, the authors recommend that teachers and curriculum developers should be more sensitive to tone-melody relationships when selecting or creating children's songs for pedagogical purposes to better support CSL literacy development. It is also important to raise the preschoolers' tone awareness, particularly in Cantonese-medium CSL classrooms, given the distinct tonal features of the target variety.

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10.1 Introduction

Since the handover in 1997, the Hong Kong Special Administrative Region (SAR) Government has adopted the "biliteracy and trilingualism" language-in-education policy, which aims at developing the capability of next-generation to communicate in Cantonese the local vernacular, English the co-official and international language, and Mandarin[1] (better known in Hong Kong as *Putonghua*) the national language cum lingua franca of the People's Republic of China (PRC) (Adamson & Lai, 1997; Kan et al., 2011). This policy was designed to create balanced development of all three language(s)/dialect(s) among children in view of the empirically attested "golden window" of language acquisition (Leung & Li, 2020). Hong Kong children could, along this line, learn both Chinese and English from preschool onwards according to the "biliteracy and trilingualism" policy. As varieties of Chinese, both Mandarin and Cantonese are tonal in nature. Unlike English, they are marked by lexical tones that serve to distinguish meanings among Chinese characters. For example, in Mandarin, a character can be pronounced with four different tones, usually referring to different meanings respectively. This makes Chinese tone an important yet challenging element for Chinese as a second language (CSL) learners.

According to the *Kindergarten Education Curriculum Guide* of the Hong Kong SAR of the People's Republic of China (hereinafter referred to as Hong Kong), teachers should improve children's listening and speaking abilities in Cantonese and expose children to Mandarin to conform to the diversified language environment of Hong Kong (Curriculum Development Council, 2017a), which includes CSL students. Therefore, it is one of the key teaching objectives to help CSL learners to identify characters pronounced with different tones. In light of this, pedagogies involving the use of music are highly desirable to shape brainstem encoding of linguistic tone and pitch patterns (Wong et al., 2007), especially at the preschool level. However, frontline teachers still experience difficulties in teaching Cantonese and Mandarin to second language (L2) learners. To facilitate Cantonese and Mandarin learning, multiple studies suggest that interesting and diversified language activities should be provided for preschoolers, especially CSL learners (Loh et al., 2013).

As a result, teaching materials such as children's songs in both Cantonese and Mandarin are commonly used in Hong Kong preschool classrooms, as teaching through music is a popular pedagogical approach for early childhood language learning. Such a teaching method of singing not only presents children with the tone system of the Chinese language, but also fosters their prosodic competence that contributes to reading development (Wade-Woolley et al., 2022). However,

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[1] In this chapter, Mandarin is adopted as a term often used interchangeably with *Putonghua*. As the English name for the broadly-defined northern variety of Chinese, the standard variety is known as *Putonghua*, which is used as the official national language of mainland China. Although based on Mandarin, *Putonghua* is not entirely the same as Mandarin. The term "Mandarin", however, is frequently used in scholarly publications and public discourse as a convenient substitute for *Putonghua*. The term Mandarin has been used in the English language documents issued by the Center for Language Education and Cooperation (affiliated with the Ministry of Education and previously known as *Hanban*) as well (Zhu & Li, 2014).

teachers may not aware of the importance of tone features of the Mandarin and Cantonese when teaching CSL through children's songs. To be specific, as the meanings of Chinese characters are conveyed by lexical tones, the songs with tone-melody mismatches could lead to incorrect inputs of phonological information and misunderstanding of content, which would exert negative influences on CSL learners. If the CSL learners were constantly exposed to these kinds of children's songs, it could result in irreversible flaws in character pronunciation during their early development of Chinese language learning. In light of this, when teaching the target language through songs, CSL teachers must check whether the melody of selected children's songs match the tones of lyrics, so that the learners may receive correct phonological information for better construction of their tone awareness.

Some researchers pointed out the importance of selecting appropriate children's songs for language teaching according to theme, content, and length (e.g. Tekşan & Yılmaz-Alkan, 2020). However, the importance of tone-melody matching for songs in a tonal language, and tone-melody relationships in Cantonese and Mandarin children's songs have been under-researched. With regard to Cantonese and Mandarin learning in Hong Kong kindergartens, it is worthwhile to investigate how tone awareness could be influenced by the pitch of melody through the use of children's songs in the CSL preschool classroom, and to look into relevant issues in children's songs such as tone-melody mismatches.

In this chapter, an overview of Mandarin and Cantonese tone systems is followed by the current literature on children's tone perception development in first languages (L1) and L2. Then, tone-melody relationships in language teaching through music will be reviewed. Based on the existing literature and first-hand field data, this chapter will further examine and identify common issues in Mandarin and Cantonese teaching for L2 learners, with a special reference to children's songs from the perspective of the tone-melody matching. Possible reasons causing tone-melody mismatches in children's songs are analysed and discussed in relation to recent studies in applied linguistics and speech sciences. By comparing Mandarin and Cantonese in terms of their phonological features and pedagogical conventions, practical solutions to tone-melody mismatches are proposed towards the end of the chapter.

10.2 Mandarin and Cantonese Tone Systems

Sharing the same writing system of Chinese characters, Cantonese has its own colloquial script based on the spoken vernacular. There are also phonological differences between Cantonese and Mandarin, and some of the major ones lie in the tones. Mandarin has four tones, whereas Cantonese has a more complex tone system of six tones. In this section, the tone systems of Mandarin and Cantonese are overviewed and discussed based on a comparison of their phonological and phonemic systems.

Mandarin is the most widely spoken tonal language around the world and also the majority Chinese language in Mainland China where 80% of the population speaks it (Ministry of Education of PRC, 2021). Mandarin is also widely spoken in

Table 10.1 Mandarin tone system

Tone	Description	Pitch	Example
1	Flat	5–5	肖 (xiāo) [resemble]
2	Rising	3–5	淆 (xiáo) [confuse]
3	Falling and rising	2–1–4	小 (xiǎo) [tiny]
4	Falling	5–1	笑 (xiào) [smile]

Taiwan as a *lingua franca*, despite minor phonological, syntactic, and morphological variations from its Mainland counterpart. In Mandarin, there are four lexical tones in total, in the sequence of Tones 1 to 4. They are named *yinping* (陰平), *yangping* (陽平), *shangsheng* (上聲), and *qusheng* (去聲) respectively (see Table 10.1). Based on the five-point-scale method for transcribing tones (locating the pitch point from the lowest to the highest as 1–5 with equal distribution), the tone values of the four basic and pitched Mandarin tones are 55, 35, 214, and 51 respectively (Chao, 1930). In transcription systems for language teaching, diacritics are commonly used to mark the tones.

Although Mainland China and Taiwan use different transcription systems to indicate the pronunciations of Chinese characters, both systems apply similar diacritics to represent tones. According to the *Hanyu Pinyin* (漢語拼音, also known as *Pinyin*) system, tones are marked with diacritics on the vowel nucleus of a syllable. These diacritics resemble the pitch shape of these four tones as *high-level*, *high-rising*, *falling-rising*, and *high-falling* respectively. With these diacritics, readers may "visualize" the pitch features of the target tone to make the correct pronunciation.

Widely regarded as a Chinese dialect, Cantonese is defined as the de facto official spoken form of the Chinese language in Hong Kong. In fact, nearly 90% of Hong Kong's population aged 5 spoke Cantonese at home according to the 2021 Population Census (Census & Statistics Department, 2022). As a tonal language and a variety of Chinese, Cantonese has a more complex tone system (see Table 10.2). In Cantonese, there are six lexical tones in total, in the sequence of Tones 1 to 6, including one falling tone (T4), two rising tones (T2 and T5), and three-level tones (T1, T3, and T6). They are traditionally named *yinping* (陰平), *yinshang* (陰上), *yinqu* (陰去), *yangping* (陽平), *yangshang* (陽上), *yangqu* (陽去) respectively. While some argue that Cantonese has nine tones, i.e. three additional checked tones (i.e. *yinru* 陰入, *yangru* 陽入, *zhongru* 中入), these tones actually have the same pitch as T1, T3, and T5, which should not be considered as different tones in theoretical terms. The tone values of these six Cantonese tones are namely 55, 25, 33, 21, 23, and 22, based on the five-point-scale method for transcribing tones.

In Hong Kong, there are no official Cantonese phonemic transcription systems. Several systems, such as Yale Romanisation of Cantonese (耶魯粵語拼音) (Huang & Kok, 1958), Hong Kong Government Cantonese Romanization (香港政府粵語拼音) (Kataoka & Lee, 2008), and Cantonese Pinyin (教育學院拼音方案) (Institute of Language in Education, 1992) were in use before the launch of the *Jyutping* Romanisation Scheme (香港語言學學會粵語拼音方案, widely known as *Jyutping* 粵拼). *Jyutping* gradually replaced the aforementioned systems in teaching. According to

Table 10.2 Cantonese tone system

Tone	Description	Pitch	Example
1	High flat	5–5	需 (seoi1) [need]
2	High rising	3–5	水 (seoi2) [water]
3	Mid flat	3–3	帥 (seoi3) [handsome]
4	Low falling	2–1	垂 (seoi4) [down]
5	Low rising	2–3	絮 (seoi5) [floc]
6	Low flat	2–2	睡 (seoi 6) [sleep]

Jyutping, tones are marked by numbers 1 to 6 next to the romanisation. The numbers code the six tones as high flat, high rising, mid flat, low falling, low rising, and low flat. To use *Jyutping*, the readers should possess prior knowledge of the six Cantonese tones and their pitch features, as no visual clues are available in the romanised forms.

Referring to Tables 10.1 and 10.2, it can be seen that different phonemic transcriptions rules are adopted for Mandarin and Cantonese respectively. For Mandarin, the *Hanyu Pinyin* system and *Bopomofo* (注音符號) system use diacritics to mark Mandarin tones which signify the tone features, despite the fact that the *Hanyu Pinyin* system marks diacritics above the syllables, while *Bopomofo* marks them next to the romanised form. For Cantonese, *Jyutping* presents the Cantonese tones in the form of numbers without providing visual clues.

Such a difference between Mandarin and Cantonese phonemic transcription systems could attribute to the Cantonese tones with the same contour but at a different pitch. For example, T1, T3, and T6 are all flat tones but at different pitch levels. Thus, it would be necessary to use other methods other than diacritics in describing Cantonese tones. In return, *Jyutping* can be more difficult for the beginners to learn than *Hanyu Pinyin*, as the learners have to memorise the whole tone system in advance. Nevertheless, phonemic transcription systems of Mandarin and Cantonese have an increasingly important role in not only sound annotation but also language learning.

Recently, growing evidence has proved the effective role of the phonetic system including *Hanyu Pinyin* and *Bopomofo* in Chinese language learning for the phonological awareness of both first and second-language learners (e.g. Li et al., 2016). For example, McBride-Chang et al. (2004) found that the experience of learning *Hanyu Pinyin* enhanced students' phonological awareness in tone awareness. Ding et al. (2015) also directly examined the relations between *Hanyu Pinyin* skills with Chinese character recognition and Chinese phonological awareness in 54 Mandarin-speaking elementary students. The results showed a strong connection between *pinyin*-invented spelling and Chinese character recognition, suggesting the important role of *pinyin* in Chinese reading performance.

Based on similar findings, some researchers further proposed that learning the *Pinyin* system should be considered an essential step before learning to recognise Chinese character in the Mandarin classroom (Xiao et al., 2020). In practice, students in Mainland China and Taiwan generally learn *Hanyu Pinyin* and *Bopomofo* before

starting to recognise Chinese characters in preschool. They learn the vowels, consonants, and tones step-by-step, all of which serves as a foundation for learning the Chinese language. However, there are objections to an overemphasis on learning the phonemic transcription systems. Lee and Kalyuga (2011) argued that using *Pinyin* would impose high levels of cognitive load and hinder Chinese character learning due to its horizontal layout format. More importantly, learners are expected to develop good decoding ability, instead of relying on *Pinyin* which is considered as insufficient for the advancement of their Chinese language proficiency. Thus, it has been suggested that phonemic transcription systems should only be used as an auxiliary system in early childhood education, while placing the main focus on developing the very young learners' orthographic knowledge.

Compared with the heated discussions and real-life applications of *Pinyin* and *Bopomofo* in Mandarin-medium Chinese language teaching, phonological coding systems such as *Jyutping* are much less involved in the Cantonese-medium Chinese language curriculum in Hong Kong. According to the *Chinese Language Curriculum Guide* (Curriculum Development Council, 2017b), learning Chinese with romanisation is not a recognised teaching approach in Hong Kong first language (L1) classrooms. In other words, students tend to learn the Chinese characters directly, implying that they barely receive any phonological training in transcription system(s), but develop their phonological awareness (including tone awareness) naturally. In this sense, the phonemic transcription systems for Mandarin and Cantonese play significantly different roles in learning Chinese linguistic features, including the tone systems for native speakers.

For the teaching and learning of CSL, phonemic transcription systems are considered an important medium in Mandarin learning, as non-native speakers could access more Chinese vocabulary in reading via *Pinyin* or *Bopomofo* (Liang & Sun, 2019). It is, however, a make-or-break factor for very young learners. In the majority of the CSL textbooks, learners are first introduced to *Pinyin*, based on which they could pronounce new characters without teacher's assistance, which in turn enhances their self-learning. For a group of Grade 3 learners with a non-tonal language background, a phonemic transcription system could help them to build the concept of tone (Ju et al., 2021), as the visual clues of tones in the *Pinyin* system may assist the CSL learners to produce correct pronunciations.

Nevertheless, it poses another challenge for preschool L2 learners who are yet to master the spoken form of their target language—and not to mention the corresponding phonemic transcription systems. One should also be cautious about the possibility of over-relying on the phonemic transcription system for script-to-sound correspondences (Tse, 2000). Zhou et al. (2020) found that frequent usage of *Pinyin* typing had led to a weaker dynamic connection among reading regions in L1 children aged 9–11 with intermediate Chinese proficiency. They suggested that the *pinyin* input method might be related to Chinese children's poor reading development. To prevent such a negative influence on Chinese character learning, restricted use of *Pinyin* input and promotion of orthography-based input methods were recommended (Zhou et al., 2020).

In contrast, learners tend to develop tone awareness through direct exposure to characters and words in the Hong Kong CSL classroom. While the *Supplementary Guide to the Chinese Language Curriculum for Non-Chinese Speaking Students* (Curriculum Development Council, 2008) suggests that teachers guide the CSL learners to construct the concepts of Chinese phonology at the primary and secondary levels, there is yet any official guide for L2 preschoolers' Chinese learning. Moreover, using phonemic transcription systems in the classroom has not been a popular option, although there have been studies arguing for the effectiveness of using Cantonese romanisation for early childhood Chinese teaching (e.g. Wong & Leung, 2018).

In conclusion, tone learning in Mandarin and Cantonese differs not only in the role of the phonological transcription system, but also in terms of learning approach. Mandarin learners tend to directly access and learn the tone system through phonetic transcription systems, whereas Cantonese learners tend to develop their tone awareness when learning Chinese characters without deliberate input on the more complex tone system of the target variety. This may also suggest a difference in tone perception development between the two groups.

10.3   Tone Perception Development of Preschoolers

As mentioned in the previous section, in the cases of Mandarin and Cantonese, pedagogical variations contribute to differences in the development of phonological awareness, including tone awareness, which is essential in both varieties of Chinese. Increasing findings assumed that tone perception provides a foundation for future word learning (e.g. Singh et al., 2017). As the Chinese language system contains a considerable number of homophones, Mandarin and Cantonese tones play an important role in distinguishing the lexical meanings. Thus, the development of lexical tone perception is crucial for Mandarin and Cantonese learners, especially beginning Chinese learners at the preschool level.

Moreover, since the tone reflects the rise and fall of pitch in spoken language that distinguishes homophones, the development of tone perception also implies a certain degree of prosodic competence for better facilitation of their Chinese reading comprehension. Besides tone, prosody is concerned with linguistic functions including intonation and rhythm at the word, phrase, and discourse levels (Wade-Woolley et al., 2022). The relationship between prosodic competence and reading has been evidenced in non-alphabetic languages such as Chinese (Tong & McBride-Chang, 2010), suggesting the essential role of prosody in Chinese reading development. It is, therefore, necessary to look into the development trend of tone perception.

In terms of tone perception development, previous research suggests that the perceptual reorganisation for lexical tones could begin as early as 4 months of age for native learners of tonal language (Yeung et al., 2013). Researchers also concluded that this period is a crucial stage for infants to develop lexical tone awareness. However, while many studies assumed that CSL learners, especially those from non-tonal language backgrounds, should first build up the concept of tone categories and

comprehensive connections between tone categories and lexical items (e.g. Francis et al., 2008), few focused on the teaching and learning of Mandarin and Cantonese among preschoolers. This section revisits preschoolers' tone perception development in the cases of Mandarin and Cantonese respectively.

For Mandarin tone learning, studies have shown that Chinese native-speaking children tended to make few errors in producing Mandarin tones by around the age of 3 (Hua & Dodd, 2000; Li & Thompson, 1977). Children speaking Mandarin as their L1 showed progress in their sensitivity to native tonal contrasts, with relatively high perceptual accuracy (around 90%) in perceiving all four Mandarin tones (Wong et al., 2005). In other words, children at 3 years could produce all four tones approaching adult-level. Nevertheless, the four Mandarin tones differ in terms of the acquisition rate, i.e. the production of T1 and T4 was mastered earlier than T2 and T3. It relates to the pitch features of rising tones that require more and better pronunciation skills. Such a rapid development in tone awareness may relate to the phonological training through their experience learning *Pinyin* or *Bopofomo*, as well as the capability of using those phonemic transcription systems.

Compared with the gradual progress in tone awareness among native speakers of Mandarin, the non-tonal language learning children's sensitivity to tonal contrasts demonstrates a U-shaped development curve, i.e. a perceptual decline followed by a rebound at 2 years (Liu & Kager, 2014; Mattock & Burnham, 2006). After their second year of life, CSL learners' ability to discriminate more fine-grained tonal differences in between-category pairs was enhanced gradually with age due to perceptual accumulation (Lee-Kim, 2021). This is possibly related to their L2 phonological construction for tonal language, which differs from their L1 learning experience. Nevertheless, both L1 and L2 learners of Mandarin could successfully develop their sensitivity to tonal contrasts for distinguishing the four tones of Mandarin between the ages of 3 and 4.

For Cantonese tone learning development, native-speaking children generally require a longer learning period to achieve mature tone perception than their Mandarin counterparts. Wong et al. (2017) compared the perception and production of monosyllabic Cantonese tones in 3-year-old children. The results showed that 3-year-old Cantonese-speaking children are in the developing stage of tone perceptual skills, and cannot identify any of the six tones with adult-like accuracy. They suggested that children's tone production accuracy was affected by word familiarity, while most of the less familiar words tested were also found in young children's vocabulary bank. Studies further pointed out that children make better progress in tone perception than in production, while they can produce adult-like tones by 5 and 6 years of age. Compared with children native in Mandarin who can produce accurate tones at 3 years old, it is obvious that Cantonese preschoolers need more time to learn how to identify and produce Cantonese tones with high accuracy. These findings echoed the complexity of the Cantonese tone system, with six lexical tones contrasting in both pitch height and pitch contour increasing the difficulties of tone learning for preschoolers (Gandour, 1981).

For non-native learners of Cantonese, tone development is also sluggish compared with those learning Mandarin. Yao et al. (2020) examined the production of

Cantonese tones by preschool Urdu-Cantonese children living in Hong Kong. Twenty-one L1-Urdu L2-Cantonese children (ages 4–6) and 20 age-matched L1-Cantonese children participated in the picture-naming experiment with 86 words. The results showed that the tone accuracy of L1-Urdu participants was significantly lower than that of their L1-Cantonese counterparts. L1-Urdu participants had more difficulty with T3 and T4, while also having higher error rates and more diverse errors than their L1-Cantonese counterparts. These L1-Urdu children's acquisition of Cantonese tones could be modulated by Urdu prosody, ongoing T2–T5 merger tone changes in Cantonese, as well as general phonetic properties. The L1-Cantonese children's acquisition, on the contrary, was affected by tone mergers and reduced perceptual distinction with fewer errors. Such a development trend could also relate to the lack of support from teachers and parents in Chinese phonology enhancement.

Given that learners of Cantonese as L1 and L2 generally have very limited access to systematic training in Cantonese phonology, tone perception poses a potential challenge considering the complexity of the Cantonese tone system. Fortunately though, pedagogical tools for the development of phonological awareness, such as children's songs, nursery rhymes, and educational cartoons, are widely adopted to help foster tone awareness at the preschool level. The next section will focus on the mechanism behind tone-melody matched songs in terms of their contribution to phonological awareness in young children.

10.4   A Closer Look at Tone-Melody Relationships

In language learning, a growing body of research suggests an interrelationship between musical experience and language learning (e.g. Moreno et al., 2009; Schön et al., 2008; Wong et al., 2007). Remarkably, the advantage of singing was found in L2 teaching and learning for children. For example, Good et al. (2015) investigated the English learning outcomes of Spanish-speaking children through singing, and the results showed that improvement in English vocabulary and pronunciation was significantly more successful in singing conditions than in speech-based methods. Well before that, Delogu et al. (2006) examined the effect of melodic ability in L2 learning, and confirmed a music-to-language transfer effect in non-tonal language speakers learning a tonal language.

There are a few mechanisms behind such an advantage for L2 learning, especially learning a tonal language as L2. First, teaching through singing is generally enjoyable for learners, especially preschoolers. According to the affective filter hypothesis, the lack of motivation of learners could form a "mental block" preventing successful L2 learning development (Krashen, 1988). Interesting contexts and relaxing tunes of children's songs, in particular, may attract the attention of preschoolers and increase their motivation to sing and to read the lyrics, while enhancing positive affection (Kreutz et al., 2004). More importantly, motivation is one of the key factors in L2 learning to overcome regressions and achieve learning goals. As musical tones are usually easier to master than linguistic ones, music helps CSL learners to build up

the concept of tone categories and to discern lexical tones in the lyrics. In other words, musical activities including singing could serve as a first step for learning and teaching lexical tones in Mandarin and Cantonese.

On the contrary, tone-melody mismatched songs may have negatively impact on the phonological development of CSL preschoolers. For CSL learners of Mandarin, although some claimed that Mandarin listeners are not in the habit of using melody contours and pitch registers of the melody when interpreting the lyrics (Vondenhoff, 2009), tone-melody mismatched songs could adversely affect learners' lexical decisions when listening, as a great amount of guesswork would be involved. For Cantonese learners, cross-cultural research by Chen-Hafteck (1999b) has demonstrated the influence of language on singing, as well as the positive effects of a close text-melody relationship. The research findings proved that tone-melody matched songs lead to better language performance than tone-melody mismatched ones. This requires a higher degree of integration between text and melody in cognitive strategies.

The results also suggested that Cantonese-speaking children might have developed a closer relationship between music and language than their English-speaking counterparts, given the similar requirements on pitch identification and production in spoken Cantonese. Chen-Hafteck (1999a, 1999b) recruited 194 children speaking Cantonese as L1 to investigate how they sang Cantonese songs with different pitch relationships between text and melody, as well as whether Cantonese texts could be matched to Western diatonic melodies. The researcher found that compared to English texts that place more demand on children's ability to discriminate among different syllables, recalling Cantonese words would involve more interference since many Cantonese words share the same syllable. The ability of pitch discrimination was affected due to the fixed pitch movement of songs in case of tone-melody mismatch. Therefore, it is essential to seek solutions to tone-mismatched children's songs, so as to help CSL preschoolers to develop their L2 phonological awareness in a pleasurable manner.

10.5 Issues Concerning Tone-Melody Matching in Children's Songs in the CSL Context

10.5.1 Teaching Mandarin Through Children's Songs

For Mandarin children's songs, tone-melody matching is not a must in language teaching especially to native speakers—as its tonal system is simpler compared with the Cantonese language system (Wong & Ng, 2018). In most cases, the melody generally corresponds with the tonal pattern of the lyrics. The mismatches are mostly found in "rough" Mandarin translations of English nursery rhymes. For example, the children's song "Where Are My Friends" (我的朋友在哪裏) was adopted from an American children's song by Lin Fu-Yu (1931–2004). The lyrics of the original song

Fig. 10.1 Sheet music of *Where Is My Friend* (folk adaptation, with English translation)

were replaced with new ones in Chinese. In the first line, the tone of character 笑 [lit. smile] is T4 (falling tone) while the melody is rising, resulting in an obvious tone-melody mismatch. Besides, when the falling tone is produced in line with the rising melody, the tone value would be adjusted and become T3 in Mandarin. This example demonstrates how a tone-melody mismatch leads to a misunderstanding of 笑 [lit. smile, laugh], such as mistaking it for homophones with T3 like 小 [lit. small], which might confuse L2 audience (Fig. 10.1).

Since Mandarin has only four basic pitched tones and a fifth neutral tone, it is hard to perfectly match the musical pitch with the respective tone. Thus, many children's songs contain tolerable tone-melody mismatching that would hardly affect one's understanding of lyrics (Cheng, 2004; Chen-Hafteck, 1999a, 1999b). Another reason behind such low level of awareness is that the audience is supposed to understand the whole song through contexts. However, it poses a key problem that could affect the learning progress of children, especially CSL preschoolers. Children might not be able to fully understand the lyrics based on context alone, given their limited vocabulary and comprehension skills. The equally limited correspondence between the tones of lyrics and melody, which forms an enormous pitch gap, could result in incorrect phonological information inputs for the young listeners. Such a mismatch between tone and melody would immerse L2 learners in fallacious phonological information, and hinder their understanding of the relevant lexical items. Constant inputs of tone-melody matched songs could benefit literacy development in terms of listening and speaking, making them a plus for language learning.

One major solution to the tone-melody mismatches in Mandarin children's songs would be word replacement according to the interval. Before teaching the children's songs, teachers should check for gaps between tone and melody. As there are only four strictly-defined tones in Mandarin, the music interval could be accepted as long as the tone pitch of lyric would not be interfered with by the melody. Besides, tone and melody are supposed to follow a similar trend. For example, with T2 as a rising tone and T4 as a falling one, the melody trend of children's songs should be rising and falling respectively. This is because any obvious mismatch could lead to mispronunciation of Chinese characters. Thus, teachers may replace those characters that fail to match the melody according to both the music interval and the melody contour. These adjustments would clarify the meaning of the lyrics and enable the children to better understand the songs when singing. Once the tones of the lyrics

commensurate with the melody of the song, it would form positive phonological reinforcement, particularly tone awareness, for children. This could also help children to master the melodies of the targeted songs while being able to repeatedly practise tone production. In short, tone-melody matched songs help one to make sense of the phonological information with the lexical meaning of the words in the context of a song for preschoolers.

10.5.2   Teaching Cantonese Through Children's Songs

In comparison with Mandarin children's songs, tone-melody matching is much more important in the case of Cantonese. This is because Mandarin lexical tones are more easily identified in both speech and singing than Cantonese ones (Zhang, 2016). Learners of Cantonese may experience learning difficulties due to misuse of melody in tone learning (Lau, 2010). Such misuse would lead to pitch gaps between melody and tone which are commonly found in Cantonese children's songs. Using such songs in early childhood education could adversely affect not only one's tone perception, but also their development of CSL phonological awareness.

There are mainly two reasons behind tone-melody mismatches. The foremost and most common reason would be related to unprofessional or inexperienced songwriters. Lacking sensitivity to pitch differences between tones and melody, these songwriters may fail to write lyrics on the basis of tone-melody matching. A typical scenario is that they tend to roughly translate or adapt children's songs in another language to Cantonese without considering the tone-melody relationship. For example, "A Sparrow Fell into the Water" (有隻雀仔跌落水) is adapted from the British children's song "London Bridge is Falling Down". The context of the original song that describes what happened to the London Bridge was replaced with the story of a bird that fell into the water. In other words, while the theme has been replaced with a topic that children in Hong Kong are more familiar with, this song might not be ideal for CSL learning through the Cantonese medium given the tone-melody mismatches.

In fact, most of the lyrics fail to match the melody. Besides, the song presents a mix of the Mandarin-based written language and the local vernacular. Unlike Mandarin, words or sentences of Cantonese in spoken and written language could be significantly different. While the song describes the bird being washed away by the flowing water, the character "被" [lit. be (passive)] is used to express the meaning of suffering. However, "被" normally appears in the written language, whereas "俾" [lit. be forced] is more commonly used in colloquial Cantonese. Adopting the aforementioned word used primarily in writing may confuse CSL beginners in Chinese character learning due to tone-melody mismatch and discrepancy in word choice. More importantly, since children are supposed to immerse themselves in the daily language for L2 learning, such use of "被" in the folk song (see Fig. 10.2) featuring the use of Mandarin-based written form might confuse the very young L2 learners.

Fig. 10.2 Sheet music of *A Bird Fell Into the Water* (folk adaptation, with English translation)

The second scenario refers to the performers' bad pronunciation or mispronunciation, which could also lead to tone-melody mismatches. In many cases, the performers of the children's songs, mostly the teachers themselves, may fail to pronounce the characters or sing the melody correctly due to a lack of training (Zhang & Cross, 2021). As mentioned in the previous section, the majority of Cantonese speakers were not required to systematically study Cantonese phonology in formal education settings. In some situations, even native speakers of Cantonese are not aware of their mistakes or omission of initials or finals. Some scholars advocate a prescriptive approach to Cantonese pronunciation in line with historical linguistics (Ho, 1995). Although tone mispronunciation is less serious compared to other problems such as onset and rime production, some speakers would fail to achieve the pitch of tone that enable accurate production of sounds (Jiang, 2010). Overall speaking, it could hamper one's development of Cantonese tone awareness. These problems relating to pronunciation are at times concluded as relaxed pronunciations (Fung, 2008). These relaxed pronunciations that are common in tone production, are featured by the speakers' failure to distinguish T2–T5, T3–T6, and T3–T5. It is, therefore, worth paying attention to tone production before delivering the children's songs to preschoolers in class.

Compared with the limited number of tones in the Mandarin phonological system, Cantonese has complex high-low-rise and low-pitched tones, making it difficult to match the tonal pattern of Cantonese lyrics with the melody. One of the most direct approaches to resolving the issue is to adjust the music interval. The music interval refers to the pitch distance between the sounds, which is determined by the degree of loudness and intensity of sounds (Lindley et al., 2001). The listener's acceptance of tone-melody correspondence is directly determined by the music interval. When the tones of lyrics and the melody cannot match completely, appropriate music intervals can prevent mispronunciation by inhibiting the listeners from importing inaccurate phonological information and misinterpreting the lyrics. Adjustment of music intervals requires sufficient knowledge of phonology and music theory. As mentioned,

tone choices for lyric writing are relatively limited compared with songwriting. Thus, songwriters should focus on the tune to coordinate the melody in their work and adjust (such as adding or subtracting semitones) according to the tone pattern of lyrics, based on the basic whole tone of the melody. In other words, using words that are closer to the tune based on the interval might serve as a maxim for creating children's songs achieving acceptable harmony. For frontline teachers, one practical solution for "fixing" tone-melody mismatches would be content restriction, with special reference to fine-tune the notes in the melody and replacing "outlier" characters with matching tones. An alternative would be to rewrite the songs according to the tone-melody matching principle, yet it requires sufficient time and musical knowledge.

The second solution would be correcting performers' pronunciation. Many preschool teachers use child-directed speech (CDS) in the classroom (Rowe, 2012). CDS refers to the language produced by an adult with rich intonation, slow speech, and exaggerated facial expressions to emphasise phonological features (e.g. tones). It is generally believed that CDS can enhance young children's language learning, since the adults can help the children to notice the phonological clues during speaking and listening. However, some studies have revealed that acoustic contrasts between phonetically similar and confusing tones are not enhanced in CDS, and adults tend to make significantly more perception errors in Cantonese CDS tones than adult-directed speech (ADS). It means that acoustic modification (e.g. hyper-articulation) of Cantonese tones in CDS might not serve didactic purposes. Instead, the findings point to the prosodic hypothesis which suggests that adults modify acoustic signals in CDS for pragmatic purposes (e.g. expressing affective emotions and regulating children's attention). Thus, instead of producing a tone with blind confidence, teachers need to check the pronunciations of all characters in the children's songs and avoid relying on hyper-articulation in CDS for teaching phonetic (especially tone) contrasts (Wong & Ng, 2018). The teachers may check their own pronunciation against the standard in singing. This is particularly true for Cantonese, as previous research suggests that children in all age groups (spanning over the range from 2;1 to 6;0) has production accuracy significantly higher than chance level, and they can produce major acoustic contrasts between specific tone pairs similarly as reference speakers (Mok et al., 2020). Thus, based on the tone-melody matching principle, it is suggested that the relationship between tone and melody may affect the children's phonological development.

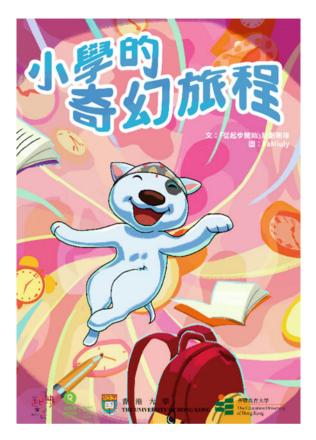## 10.6 Applying the Tone-Melody Matching Principle to CSL Curriculum Development

As mentioned in the previous section, the tone-melody relationship plays a key role in children's songs that serve as pedagogical tools for teaching both Mandarin and Cantonese. To a certain extent, the teaching effectiveness of Mandarin children's songs is less influenced by tone-melody mismatches compared with those

in Cantonese, thanks to the simpler 4-tone system of Mandarin. Besides a few old songs that are roughly translated from foreign languages, most Mandarin children's songs could meet the basic principle of the tone-melody matching and might not lead to misunderstanding of content for children (Cheng, 2004). However, for children's songs in Cantonese, the tone-melody relationship is critical but often overlooked by teachers and songwriters as samples abound, as in the example of Cantonese tone-melody matching children's songs given below (see Fig. 10.3).

In terms of Chinese phonology, the tones theoretically match the pitch variations of the melody, eliminating the possibility of producing incorrect phonological information input and causing misunderstanding of the content. It serves to support the very young CSL learners to continuously develop their tone awareness and achieve high accuracy in tone production. Moreover, the content was specially tailored to the preschoolers' learning progress and social experience, and in this case it introduces to the preschoolers new campus life in primary school to prepare them for the transition after graduation, including larger classrooms and the ringing school bell. This song meant to attract the children not only with unprecedented experience, but also to offer knowledge input related to their mental age and real-life experience.

Fig. 10.3 Sheet music of *A Magical Journey in Primary School* (original children's song, with English translation)

Fig. 10.4 Front cover of *A Magical Journey in Primary School* (an original picture book for preschoolers)

The project team received generally positive feedback from teachers and parents. The teachers reported that the CSL preschoolers were excited about singing this song and willing to repeatedly practise it. Along with tone-melody matching, the children were mostly able to produce the tones, which had in turn reinforced their tone awareness development. Besides, in their self-reports, the parents also mentioned their children singing the song frequently at home. Some children even tried to teach their parents the song while imagining their future campus life. Such learning activities provided constant support for phonological awareness development among the preschoolers. The positive feedback has provided further evidence on the effectiveness of tone-melody matching Cantonese children's songs for preschool CSL teaching (Fig. 10.5).

Fig. 10.5 A Screenshot of Music Video *A Magical Journey in Primary School* (original MV featuring the children's song mentioned in Fig. 10.4, with English translation)

10.7 Discussion

In view of the features of Mandarin and Cantonese, this chapter systematically examines the tone systems of the aforementioned varieties of Chinese in relation to the tone learning through children's songs among CSL preschoolers in Hong Kong. Relevant studies point out the relations between musical pitch and linguistic tones, including pitch register and pitch configuration, providing a theoretical foundation for the use of children's songs in preschool language learning. Children's songs with tone-melody mismatches can hamper CSL preschoolers' tone learning. Based on the case of using children's songs as pedagogical tools for tone learning, our analysis highlights the key issues with special reference to the CSL classroom. Comparing the linguistic features of Mandarin and Cantonese, this chapter also suggests practical solutions to the problems arising from tone-melody mismatches in Mandarin and Cantonese children's songs, and aims to offer a more comprehensive understanding of tone teaching and learning through music in the two featured Chinese varieties. Samples of tone-melody matching songs presented demonstrate the importance of tone-melody relationships for facilitating effective tone acquisition among L2 learners.

Moreover, this chapter also presents both theoretical and practical implications from the perspective of early childhood language education. As for theoretical implications, this chapter emphasises the role of tone-melody matching in Chinese language learning through children's songs, suggesting the importance of providing accurate phonological input for Chinese language acquisition for L2 learners. Since Chinese is a tonal language, it is necessary to help L2 learners to construct their

understanding and awareness of the tone system through accessible approaches. Such process of tone awareness development could be greatly influenced by the quality of linguistic inputs received by the L2 learners. In the case of early childhood education, the phonological inputs during teaching are critical for L2 learners to further develop other literacy skills, which include speaking and reading. Mismatches between tone and melody would hinder the acquisition of Chinese characters, given the inaccurate tone inputs and hence the influence on one's pronunciation of the lyrics. Thus, the importance of tone-melody matching in early childhood L2 classrooms would theoretically contribute to the understanding of phonological development in Chinese language acquisition for L2 learners.

In pedagogical terms, this chapter presents an example of good practice for tone learning through children's songs, highlighting the importance of tone-melody matching in early childhood language education. Learning the Chinese tones is a major challenge for L2 learners, especially the very young beginners. While tone awareness is likely fostered by instructional teaching, children's songs in the preschool CSL classroom are recommendable as regular sources of pleasurable phonological inputs. Teaching tone through children's songs could attract children with music, lyrics, and stories. In addition to enhancing children's interest, the singing activities also create joyful learning experiences for preschoolers, while supporting the tone learning process. Besides, since singing is also regarded as a play activity, children can enjoy singing tone-melody matching songs not only during the lessons, but also during transition time and after class with their parents and friends. Such constant phonological reinforcements greatly support their tone awareness development and lay a solid foundation for future language learning. Thus, teaching Chinese sounds through tone-melody matching songs is an effective approach for frontline educators to raise the preschoolers', particularly the CSL learners', tone awareness in both Mandarin and Cantonese.

Nevertheless, there are a number of limitations in the current research. One of the main limitations is that this study focuses on the use of original children's songs for CSL preschoolers in Cantonese. While Mandarin learners usually learn phonemic transcription systems that help to build tone awareness, certain recent studies have indicated that such systems could decelerate character recognition development. Thus, further research is needed to investigate whether teaching tone-melody matching children's songs for phonological development reduces the overuse of phonemic transcription systems and improves the learning performance of Mandarin learners.

Besides, while practical solutions to ameliorate tone-melody mismatches in children's songs are provided from the pedagogical perspective, the present study offers a limited review of the obstacles to L2 teaching through songs in the preschool classroom. As preschoolers may get overexcited in singing activities, organising such activities for young children require adequate classroom management skills and musical knowledge. Thus, further research is also required to investigate frontline educators' attitudes and experiences in teaching CSL through children's songs, such as longitudinal research using interviews and case studies.

Third, the learning outcomes of children's songs observed in the current study were all from preschoolers in Hong Kong. Given that both Cantonese and Mandarin are taught as varieties of Chinese in the highly diverse global CSL context, how tone-melody matching can help to foster CSL development in different settings and curricula is worth of further research. These should address the contribution of children's songs to the L2 learning performance of different groups, with reference to variables like ethnicity, socioeconomic status, and years spent learning CSL.

10.8 Conclusion

Based on the above contrastive review of Mandarin and Cantonese tone systems, tone perception development of L1 and L2 learners at the preschool level, and the effect of CSL teaching through songs in language education, this chapter identified and examined the problems concerning teaching Mandarin and Cantonese through children's songs in terms of tone-melody matching. The proposed solutions, both of which point to customising children's songs in Mandarin and Cantonese for academically and culturally diverse L2 preschoolers, aim to create age- and level-appropriate L2 input that motivates learning. These solutions could also support teachers through creative and multimodal language teaching approaches and materials, such as the use of music videos for effective enhancement of multiple intelligences (e.g. visual-spatial, verbal-linguistic, and musical-rhythmic). Samples of tone-melody matching children's songs have been given as a reference for preschool second language teaching. One may conclude that teaching Mandarin and Cantonese as a L2 through children's songs improves preschoolers' phonological awareness through customisable language and creative input. The singing activities in the language classroom are one of the most effective approaches for children to acquire Chinese language knowledge related to sound and meaning.

As the melody easily attracts attention, children are more likely to learn and receive phonological information through singing activities. If the tone-melody relationship was not emphasised, there is a risk for children to construct their tone awareness based on the incorrect corpus of children's songs. To avoid potential tone-melody mismatches which could hamper language development, teachers and curriculum developers using children's songs for CSL teaching should pay special attention to the music interval between the tone of Chinese character and the pitch of melody. At the same time, based on our initial attempts at using tone-melody matching songs in the learning and teaching of CSL, we observed significant learning interest among CSL students and received positive responses from the frontline teachers. Apart from Mandarin and Cantonese, frontline teachers in Taiwan focusing on other varieties of Chinese also composed and applied children's songs in classroom. Some of these songs, such as "Sticky Asphalt" (點仔膠) by Shih Fu-Jen (1935–), align with tone-melody matching principles which should help foster children's awareness of the Hokkien tone system (Shih, 2006). The use of tone-melody matching children's songs reveals potential benefits as an effective media for CSL teaching in

the preschool classroom. These initial findings suggest that tone-melody matching should be further explored in language teaching through singing activities, as it provides an alternative approach other than learning phonemic transcription systems to boost the development of tone awareness for CSL preschoolers. In the future, we expect to report longitudinal research findings on Chinese phonological development including tone awareness of CSL learners through original children's songs to further examine the contribution of tone-melody matching. After all, it is equally important to raise preschool educators' awareness of tone-melody matching in children's songs, particularly in Cantonese-medium language classrooms given the distinct tonal features of the target variety.

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