Tonal aspects of code-switching

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This paper examines the tonal aspects on code-switching among Chinese-Australian bilingual children. Fifteen boys and fifteen girls aged from six to ten were chosen from three different primary schools in Victoria.

Chinese is a tone language with a very highly constrained syllable structure. Mandarin Chinese has four basic tones with an additional neutral tone. The Chinese fourth falling tone corresponds to English intonation. A Chinese third curve tone, when immediately followed by a first, second, or fourth tone or most neutral tones, usually becomes a half third tone, that is, the tone that only falls but does not rise. In addition, both the neutral tone words and the words with a weak stress are pronounced in a falling tone, the same as English. When the switches to English occur, they are usually following the Chinese fourth, half third and neutral falling tones or weak stress of word. These falling tones may also facilitate transitions between Chinese and English.

1. Introduction

It has been suggested in the literature that code-switching is constrained by a variety of factors such as social functions [setting, topic, degree of competence in both languages, etc. (cf. Grosjean 1982; Romaine 1995)] and grammatical factors [constraints have been proposed such as structural integrity, free morpheme, government and semantics (cf. Clyne 1987)]. However, this paper will show that certain tones in Chinese may facilitate code-switching in and out of English among Chinese-Australian bilingual children. Although there are different kinds acting as a transition where any code-switching occurs, tone is the important one in Chinese-English code-switching. The hypothesis is that the percentages of falling tones, and high pitch or rising tones before English nouns and noun phrases in the Chinese-Australian children's mixed speech would match the percentages of falling tones, and high pitch or rising tones before Chinese nouns and noun phrases in monolingual Chinese speech.

To understand Chinese-Australian children's use of code-switching at different ages, four interviews of approximately thirty minutes were conducted amongst thirty native speakers of Mandarin Chinese aged from six to ten years at three different primary schools in Victoria over a four-month period in 1992.

The total of thirty subjects were divided into groups by sex and age: 9–10 year olds, 7–8 year olds and 5–6 year olds. There were five subjects in each of the six groups.

The children came from three different government primary schools in Victoria, Australia. These schools were chosen because the subjects met the study needs and because School A teaches Chinese, and School B teaches Spanish whereas School C does not. The schools were chosen from the different socio-economic areas in Victoria so as to study the role of the family background played in the language maintenance. All the subjects were from a Mandarin Chinese native-speaking family background.

2. The Chinese Language

While English is the most widely used language in the world, Chinese is spoken by more than 1,000,000,000 people, approximately one-quarter of the earth's population, a greater number of people than any other language. Genetically, Chinese is an independent branch of the Sino-Tibetan family of languages. Within the Chinese branch,

there are mainly five groups of 'Fangyan' (local language): Mandarin, Wu, Min, Yue and Hakka.

Mandarin Chinese, the standard variety (Putonghua 'common speech'), is the major language group in China, both in terms of political importance and in terms of number of speakers. It is estimated that about 70 per cent of the total Chinese population are native speakers of this language group. The term 'Mandarin' is an English translation of the old Beijing expression Guan-hua 'official language', which was accepted as a standard for the official language in the early part of this century. Since the 1950s, the official language of P.R.China has been called Putonghua 'common speech' and the official language of Taiwan, called Guoyu 'national language' as a result of political and geographical division. However, both of them are based on the Beijing speech sounds with slight differences in both vocabulary and grammar. One of the four official languages of Singapore, Huayu 'Chinese language', is also based on the Beijing speech sounds. It is also somewhat different from both Putonghua and Guoyu. Putonghua is employed in the project rather than Mandarin Chinese or the other terms, and Standard Chinese (Mandarin) is referred to as Putonghua only.

3. Tone in Chinese

Putonghua is a tone language with a very highly constrained syllable structure. The tones are capable of differentiating meanings. A syllable, when pronounced in a different tone, has a different meaning: for instance, bā 'eight', bá 'to pull out', bǎ 'target', bà 'father'.

Putonghua has four basic tones. This is one of the simplest tone systems of a Chinese 'Fangyan'. The first tone is a high-pitch sound, the second one is a rising sound from middle-pitch up to high pitch, the third is the curve one from middle-low-pitch down to low-pitch and up to middle-high-pitch, and the fourth is the falling one from high-pitch down to low-pitch. The Romanisation system officially adopted by the government in Beijing, is called Pinyin. The Pinyin system is also accepted by the Singapore government. The four tones of Putonghua are represented by means of diacritic marks above the nuclear vowel of the word as the following tone-graphs: `-' (the first tone), `/' (the second tone), `v' (the third tone) and `\' (the fourth tone).

In Putonghua there are a number of syllables which are unstressed and take a weak tone as well. This is known as the neutral tone which is shown by the absence of a tone-graph, as in 'Ni ne (how about yourself)?' and 'Hao ma (Are you well)?'. Moreover, when the first high pitch tone word yī 'one' is followed by a syllable in the first, second or the third tone, it is pronounced in the fourth falling tone, for example: yì běn shū 'one book'.

A Chinese third tone, when immediately followed by a first, second, or fourth tone or most neutral tones, usually becomes a half third tone, that is, the tone that only falls but does not rise. The third tone is seldom used in full unless it occurs as an independent tone or when followed by a long pause. In most cases it is changed into a half third tone, but with its tone-graph 'v' remaining unchanged (Liu 1988l, p.14). Since the English intonation is similar to Chinese falling tone, so that switching from Chinese utterances to English at a Chinese half third falling tone word may be facilitated by this.

The neutral falling tone words are diverse. Generally speaking, particles in Chinese are neutral tone words, and some suffixes words are also neutral tone words such as '-(e)r', etc. Incidentally, some syllables are pronounced with a weak stress even though it is normally not the neutral tone (with a tone-graph over it).

4. Single code-switching within one sentence facilitated by the Chinese falling tones

The switch by Chinese-Australian children from Chinese to English usually occurs following the Chinese fourth, half third and neutral falling tones or following the weak stress. This is because the Chinese falling tones correspond to English intonation. In my corpus, the data analysis indicates 491 instances of single switching to English within one sentence out of the total 1,033 cases of various kinds of switching. These single English switches make up 47.53% of the total switches. The tonally facilitated switches take place immediately before English nouns or noun phrases, verbs or verb phrases and adjectives or adjectival phrases,

etc. These tonal aspects will be discussed separately in the following sections.

4.1 The fourth falling tone aspects

The Chinese fourth falling tone plays a very important role in the children's code-switching to English. It corresponds to 'normal intonation' in English, for example, the pronunciation of Chinese word 'AI, love' is roughly the same value as the English 'I'. So the fourth falling tone aspects assist the children switch from a Chinese word to English nouns, noun phrases (NPs), verbs, verb phrases (VPs), adjectives, numerals or a sentence. Here are some instances:

1. zǎoshang dào xuéxiào yǐhòu, wǒmen zuò *'language skill'*.
   morning arrive school after, we do language skill
   After arriving at school in the morning, we do language skill.
   (2-5, SD2)

This sentence contains a switch from Chinese to an English NP *'language skill'* facilitated by the Chinese fourth falling tone verb zuo 'do'. The switched noun phrase marks an instance of a direct quotation so as to signify the switching itself (Romaine 1995).

2. Question in Chn. (Lin): Ni wanshang dou zuo shenme?
   [What do you do in the evening?]
   kàn diànshì, *go to bed*
   watch TV, go to bed
   (I) watch TV and then go to bed.
   (6-1, SD3)

In this case, the switch to an English VP *'go to bed'* is facilitated by the Chinese fourth falling tone NP *'dianshi, TV'*. This code-switched verb phrase is motivated by the topic of the child's routine life in Australia (Gumperz 1976, p.55; Romaine 1989, p.115; Myers-Scotton 1993, p.84).

3. qiér -de yánsè shì *grey*.
   penguin -noms colour be grey
   The colour of penguin is grey.
   (6-1, SC2)

In this example, there is a switch to an English adjective *'grey'* helped by the Chinese fourth falling tone word *'shi, is'*. The function of the switching is to distinguish the notion topic of *'qier, penguin'* and the comment of *'grey'* colour (Gumperz 1982, p.75-84). The use the English words and expressions of colours occurs frequently in my corpus.

4. dào le xuéxiào shì *eight fifty*.
   arrive -crs school be eight fifty
   When I arrived at school, it was 8:50.
   (6-5, SD2)

Here, switching to English numerals is evidently assisted by the fourth falling tone word *'shi, is'* and also topically motivated. When talking about the activities at school in Australia, the child often switches to English words and expressions.

The data analysis shows that the speech of thirty Chinese-Australian bilinguals contains a total of 151 switches to English following the Chinese fourth falling tone words, which amount to 30.75 per cent of the total single English switches within one sentence. The fourth falling tone works together with other falling tones such as the half third falling tone and the neutral falling tone to facilitate the children switching between Chinese and English. Moreover, the fourth falling tone facilitated switches function differently such as distinguishing direct speech from reported one or quotations, qualifying the message and marking types of topics. The following sections will continue to discuss the half third and the neutral tones in order to evidence the falling tones really facilitate switching and the tonal environment is not just accident.

4.2 The half third falling tone aspects

Like the fourth falling tone, the Chinese half third falling tone is the same as the English intonation as well. For instance, 'AI' in 'AI-ZI, a short person' is pronounced about equivalently to 'I' in English. The half third falling tone has been found to be one of facilitating factors in code switching. It may facilitate the switch to English nouns, NPs, verbs, VPs and adjectives in the corpus. Consider, for instance, the following examples:

5. Yī gè rén, liǎng gè yǎn jīng, ér duō, shǒu, jiǎo, *legs, arms, shoulders, eyebrows, nostrils.*
   A person has two eyes, ears, hands, feet, legs, arms, shoulders, eyebrows, nostrils.
   (1-5, SB1)

6. yǒushí lǎoshī ràng nǐ '*research something*'.
   sometimes teacher let you research something
   Sometimes the teacher let you research something.
   (2-5, SD3)

7. [Question in Chn.(Lin): ni xihuan pa shan ma? wei shenme? How do you like climbing mountains? Why?]
   . . . yǒu-shí hěn *boring*
   . . . sometimes very boring
   . . . Sometimes, (it) is very boring. [Copula not possible in this context in Chinese]
   (1-5, SD4)
   (2-1, SD2)

Each of these three examples contains an English switch, before which there is a half third falling tone Chinese word. This suggests that the tone is a facilitating factor in code switching. In the first sentence, the child switches to an English noun phrase of parts of a human body. It is facilitated by the half third falling tone word 'JIAO' to serve as a sentence filler. The second switch, to an English verb phrase '*research something*' is helped by the tone pronoun '*ni*' to mark a distinction between direct and reported speech. In the third, the English adjective '*boring*' is facilitated by the tone adverb '*hen*'. The function of the switch is to distinguish the notion of '*climbing mountains*' and the comment '*boring*'. Since the adjective functions as a verb in this Chinese sentence, it is referred to as an 'adjectival verb'.

In the corpus, a total of 84 single switches to English within one sentence are facilitated by the half third falling tone. It makes up 17.11% of the total single switching instances in my corpus.

4.3 The neutral falling tone aspects

As stated above, like the fourth and half third falling tones, the Chinese neutral falling tone or a word with a weak stress corresponds to English intonation, for instance, '*le*' is equivalent to '*la*' in '*lavabo*' in English. For this reason, the Chinese neutral falling tone or weak stress of word may facilitate the children to switch to English as well. The switches may be to the English nouns (or noun phrases), verbs (or verb phrases), 'adjectival verbs' (or adjectival verb phrases) and sentences. Some examples follow:

8. yǒu yī gè *open fire.*
   there be a -cl open fire
   There is an open fire.
   (2-1, SA2)

9. [Question in Chn.(Lin): ni xihuan qu chengli ma? wei shenme? Do you like visiting the city? Why?]
   xǐhuan, kěyǐ *find something.*
   like, can find something
   Yes, I like it because I can find something.
   (3-2, SD4)

10. (panda) hěn hǎo -de *happy.*
    (panda) very well norms happy
    The panda is very well and happy. [Copula not possible in this context in Chinese]
    (1-5, SC2)

In the above cases, the code-switching facilitated by the Chinese neutral falling tone or weak stressed words is to an English noun phrase in (8), a verb phrase in (9) and an 'adjectival verb' in (10), which is similar to the switching facilitated by both the fourth or the half third falling tones. In (8) the switched English noun phrase '*open fire*' is assisted by the unstressed word '*ge*' to mark typical Australian fireplace. The switched English verb phrase '*find something*' of (9) is facilitated by the unstressed word '*yi*'. This switch qualifies the message of 'visiting the city'. (10) contains an English switch of '*happy*' helped by the neutral falling tone word '*de*'. The function of the switch is to emphasise the message that 'the panda is very well -*happy*'.

However, in the corpus, it has been found that the children may also be assisted in the switch to English sentences by the Chinese neutral falling tone or weak stressed words, as follows:

11. nǐ zhīdao ma (*at*) *the end of last year we had a ball?*
you know -Q (at) the end of last year we had a ball
Do you know at the end of last year we had a ball?
(6·5, SD4)

11 contains a switch to an English sentence at the start of a PP, functioning as an object clause facilitated by the Chinese neutral falling tone particle '*ma*, Q'. The function of this switch is to mark personalization vs. objectivization (Gumperz 1982). It distinguishes the specific instance of '*at the end of last year we had a ball*' and other activities.

The data analysis affirms that the children singly switched to 245 English words, expressions and clauses within one sentence facilitated by the neutral falling tone or weak stress of word, which accounted for about 49.9% of total single switches in the corpus.

4.4 Summary of single switches to English facilitated by falling tones

In my corpus, there are 491 single switches to English within one sentence, which make up 47.53% of the total switches. Of these, 480 switches occur at words with the Chinese falling tones such as the fourth falling tone, half third falling tone, neutral falling tone or a word with a weak stress. The switches facilitated by the falling tones account for 97.76% of total single switches within one sentence. This presents evidence that the tones offer a smooth transition from Chinese to English as do trigger-words (see Clyne 1967) and structures complying with the structural integrity constraint (Poplack & Sankoff 1979).

However, 11 exceptions have been found, which amount to only 2.24% of the single switches. Table 4.4 shows numbers of the single switches within one sentence facilitated by the falling tones and exceptions.

In addition, the data also affirm that the pragmatic factors function differently from the Chinese falling tones to facilitate switches to English such as topic, quotation, message qualification (comments), sentence filler, message emphasise, marking personalisation vs objectivisation and so on.

The above examples from 1 to 11 only show that the children singly switch from Chinese to English within one sentence facilitated by falling tones. In Section 5, 6, and 7, it will be separately discussed that the children's switching in and out of English is facilitated by the Chinese falling tones; they switch to English at the beginning of an utterance which is part of Chinese discourse and switch back into Chinese facilitated by falling tones; and their frequent switches are helped by falling tones.

5. Code-switching in and out of English facilitated by the Chinese falling tones

In my corpus, there is a total of 139 instances of switching in English and back to Chinese in the middle of a sentence. This type of switching accounts for 26.91% of the total switches in the corpus. The switches facilitated by falling tones may be in and out of English nouns, verbs, adjectives, idioms and conjunctions. The examples are as follows:

Table 4.4 Single switches facilitated by the falling tones and exceptions

Item	Switches facilitated by the 4th falling tones	Switches facilitated by the half 3rd falling tones	Switches facilitated by the neutral falling tones	Exceptions	Total
Number of switches	151	84	245	11	491
Percentage	30.75%	17.11%	49.9%	2.24%	100.0%

12. zài *city*. *city* hěn rènào.
    be in city. city very bustling
    It is in the city. The city is very bustling.
    (5-1, SA3)

This case contains two switches, one (Chinese-English) at the fourth falling tone verb zai 'exist', the other a switch back to Chinese facilitated by the half third falling tone word hen 'very'. The function of the English switch is to 'fill gaps in vocabulary' (Gumperz 1982). In the interview the child said that he did not know the Chinese equivalent of '*city*'.

13. hěnduō rén zài *running* pǎo.
    many people dur-running run
    Many people are running.
    Stand. Chn.: henduo ren zai *pao*. [Progressive not possible in Chinese]
    (2-4, SB2)

In this case, the Chinese fourth falling tone adverb zai 'dur-' facilitates the switch to English present participle '*running* ' and the Chinese third tone verb pao 'run' helps the switching out of English (possibly due to awareness of the previous switch). Here the discourse function 'reiteration' (Gumperz 1982) works in code switching. In order to emphasise the message, the child said the same thing '*running* , pao' in both languages.

14. yǒu yìdiǎn tài *boring* le.
    exist little too boring -crs
    (It) is too boring. [Copula not possible in this context in Chinese]
    (1-5, SD2)

In this example, a switch to English occurs at the fourth falling tone and a switch back to Chinese appears to be facilitated by the neutral falling tone. This instance also shows that the child wants to draw attention to 'comment' by code-switching.

Among the total of 139 examples of switching in and out of English, 128 switches into English and 134 switches back to Chinese show evidence of falling tones offering a smooth transition from both Chinese to English and English back to Chinese. The exceptions in English switching number eleven instances while there are five exceptions in switching back to Chinese. So within 139 examples, the switches into English facilitated by falling tones make up 92.09% while the exceptions amount to 7.91%, the switches back to Chinese assisted by the tones account for 96.4%, but the exceptions make up only 3.6%.

The data also prove that the switches in and out of English are motivated by the pragmatic factors such as filling gaps in vocabulary, reiteration, drawing attention to comment, English idiom usage, habitual usage and so on.

6. Code-switching of English phrases at the beginning of an utterance which is part of Chinese discourse with switch back to Chinese occurring

This section will demonstrate some examples of code-switching of English words, phrases or clauses at the beginning of an utterance which is part of Chinese discourse before switching back to Chinese. The data analysis shows that there are a total of 77 instances of this switching group, making up 7.46% of the total switches. In the interviews, some children responded to the Chinese-utterance questions using English nouns, noun phrases, prepositional phrases, adverbs, adverbial phrases or adverbial clauses before switching back to Chinese at a word with falling tones. Consider, for example, the following sentences:

15. [Question in Chinese (Lin): na xie dongwu you si zhi jiao?
    Which animals have four legs?]
    bird, swan sì zhī jiǎo.
    bird, swan four -cl legs
    The bird and swan have four legs.
    (3-4, SB1)

In (15), the switch back to Chinese at the tone word 'SI, four' shows evidence of the fourth falling tone. This sentence contains a switched English noun phrase '*bird, swan*' so as to mark personalization vs objectivization. The child uses the English switch to show his personal knowledge of a bird and swan. The data also show evidence that the tones offer a smooth transition from an English

prepositional phrase back to Chinese. For example:

16. [Question in Chinese. (Lin): ni meitian fangxue yihou zuo shenme? What do you do after school?]
after school care, dào jiā wǒ tán qín . . .
after school care, arrive home I play piano . . .
(After) after school care, as soon as I arrive home I play piano.
(6-5, SD2)

In this sentence, the child made an error in the switched prepositional phrase deleting the English preposition '*after*'. In (16), the response to the Chinese question is habitually made in an English prepositional phrase first, with a switch back to Chinese at the four falling tone. The child often switches to the English of school hours or times of her daily life. In addition, the evidence also shows the instances of responding in an English adverb or adverbial phrase with a switch back to Chinese facilitated by falling tones. For instance,

17. [Question in Chinese.] (Lin): ni wanfan chi shenme? [What do you have for your dinner?]
same as the lunch, mǐfàn, cài.
same as the lunch, rice, dish
Same as the lunch (we have) rice and dishes.
(3-2, SD3)

This sentence includes a switch to the English adverbial phrase '*same as the lunch*' with a switch back to Chinese facilitated by the half third falling tone. The switch is possibly motivated by the topic about the child's daily life in Australia. Finally, three cases of switching to English adverbial clauses have been found from the data of the same child's interviews. Consider, for example, the following sentence:

18. [Question in Chn.] (Lin): ni renwei yi ge ren shuo liangzhong yuyan hao bu hao? wei shenme? [Do you think it is a good idea for people to speak two languages? Why?]
If you come to Australia, nǐ kěyǐ shuō yīngwén.
. . . you can speak English
If you come to Australia, you can speak English.
(2-4, SD2)

In this case the child responds to my Chinese question in an English adverbial clause with a switch back to Chinese at the tone word '*ni*'. The function of the switch is to qualify the message by separating the notional topic of '*ni keyi shuo yingwen*, you can speak English' and comment of the discourse '*If you come to Australia*'.

In my corpus, among the total of seventy-seven examples of code-switching of English phrases at the beginning of an utterance which is part of Chinese discourse, with a switch back to Chinese occurring, seventy three switches present evidence that the tones offer smooth transition back to Chinese from English nouns, noun phrases, prepositional phrases, adverbs (adverbial phrases) and adverbial clauses. These switches make up 94.81% of the total cases. However, there are four exceptions, which only amount to 5.19%. In addition, these English switches at the beginning of an utterance function differently such as topic, habitual usage, marking personalization vs objectivization, qualifying the message, filling gaps in vocabulary or marking injections and so on.

7. Chinese utterances but with frequent code-switching facilitated by falling tones

Assisted by falling tones, the Chinese-Australian children may frequently switch within one sentence. The data analysis shows that there are 109 examples of frequent switching to English and 78 back to Chinese, which account for 18.10% of the total switches. The frequent switching is mainly to English nouns or noun phrases verbs or verb phrases, prepositions or prepositional phrases and adjectives.

The following are examples of frequent switching to English nouns:

19. [Question inChinese.] (Lin): ni kan zhei zhang tu, gaosu wo zhexie shi shenme? [Look at this picture and tell me what these are.]
country, nàr hái yǒu *stones*
country, there also have stones
It is the country and there are also some stones.
(6-2, SA3)

This case contains two switches, one responding to the Chinese question using an English noun *'country'* at the beginning of the utterance motivated by the Australian scene in the picture, with a switch back to Chinese at the tone word *'nar*, where', the other to an English noun *'stones'* facilitated by the tone word *'you'*. It is possibly to draw attention to the 'comment'. (20) which contains three switches to English motivated habitually. The unstressed measure word *'ge'* offers all these smooth transitions from Chinese to English. The other two switches from English back to Chinese are assisted by the fourth falling tone verb *'qu'*:

20. (you) liǎng gè *list*, qù yī gè BBQ, qù yī gè *holiday program*
there be two-cl list, go one-cl BBQ, go one-cl holiday program
There are two lists: one for going to BBQ and the other for going to holiday program.
(5-5, SD4)

In this case, not only are switches to English helped by the same word *'ge'*, but switching back to Chinese is also facilitated by the identical word *'qu'*. However, apart from this instance, few examples show frequent switching triggered at the same word.

In my corpus the examples of frequent switching to English nouns (noun phrases) and verbs (verb phrases), nouns (noun phrases) and prepositions (prepositional phrases), nouns (noun phrases) and adjectives, a noun and an adverb, and a noun and a conjunction have been found. Here is an instance:

21. xiànzài tā zài *bicycle* shàng *ride*.
now he dur- bicycle -on ride
Now he is riding on a bicycle. [Progressive not possible in Chinese)
(6-5, SB2)

This sentence contains two switches to English both facilitated by the fourth falling tone. One is to an English noun and the other to an English verb. The first switch occurs habitually. The child said that she often used English vocabulary of vehicles such as *'car'*, *'bus'* and *'bicycle'* in Chinese discourse and so did her parents. The second switch is motivated by 'message qualification' so as to distinguish the notion's topic 'Now he is on a bicycle' and comment '(to) *ride*' of the discourse. An example of frequent switching to an English noun (noun phrase) and a preposition (prepositional phrase) follows:

22. yǒu māma, bàba *with* tāmen de *baby*.
there be mother, father with they -noms baby
There are mother and father with their baby.
(2-4, SC2)

In this sentence the Chinese personal pronoun *'tamen'* functions as an object of the preposition *'with'*. According to Chinese pronunciation and intonation, the personal pronoun receives a weak stress only when it is used as an object, which might help the child switch out of English in the sentence. The second English switch *'baby'* is facilitated by the neutral falling tone. The function of the switched *'with'* is to qualify the message that *'the parents are with their baby'*. The switching of *'baby'* is motivated by 'habitual usage'. Within the 30 minutes' interview, the child switched to *'baby'* four times. A case of switching between an English noun and an adverb is as follows:

23. [Question inChinese].(Lin): ni hai kanjian le xie shenme?
[What else have you seen from it?]
balloon shàngmian rén yě zhāo shǒu *back*.
balloon -in person also wave hand back
The people in the balloon are also waving back. [Grammatical inflection not possible in this context in Chinese]
(3-5, SA1)

This utterance contains two switches: one with switch back from an English noun *'balloon'* to Chinese facilitated by the fourth falling tone word *'shang-'*, the other from Chinese to an English adverb *'back'* assisted by the half third falling tone word *'shou'*. The first switch functions as marking the type of discourse in the *'balloon'*, not anywhere else. The second switch of *'back'* serves as a sentence filler because in Chinese, adverbial modifiers should precede the verb and the child possibly did not know how to express it in Chinese.

The data affirm the frequent switching mainly among English nouns or between an English noun and other parts of speech such as verb, preposition, adjective, adverb or conjunction. However, a few cases are exceptions: two examples between an English verb (verb phrase) and other parts of speech such as a prepositional phrase, or a pronoun, one between prepositional phrases themselves. Consider, for instance, the following examples:

24. [Question in Chinese.](Lin): ni wanshang dou zuo xie shenme? [What do you do in the evening?]
anything, kàn diànshì, *go to bed*
. . . watch TV . . .
(I do) anything, watch TV, and go to bed.
(6-1, SD3)

The fourth falling tone helps the child switch back to Chinese from an English pronoun, and switch to an English VP as well. The switch to '*anything*' functions as filling gaps in vocabulary. The child mentioned that it was difficult to find a brief equivalent of '*anything*' in Chinese. The nearest equivalent in Chinese is '*shenme shi dou gan*, I do anything'

In general, the evidence strongly supports the thesis that tones are factors facilitating frequent Chinese-English code-switching. Among the total of 109 instances of frequent switching to English with 78 switches back to Chinese, 106 switches to English and 77 switches back to Chinese appear to be assisted by falling tones. The incidence of frequent switching to English in the context of falling tones is 97.25% of the total examples and the exceptions make up 2.75%. The switches back to Chinese facilitated by falling tones amount to 98.72%, while the exceptions account for only 1.28%.

The functions of frequent switching are various such as topic, habitual usage, quotation, message qualification, sentence filler and marker of discourse types.

8. Summary of different kinds of code switching facilitated by falling tones

In Section 4, 5, 6, and 7 the code-switching facilitated by falling tones has been discussed in the following details:

1. Single switch to an English word or phrase within one sentence.
2. Switch in an English word or phrase first, then switch back to Chinese.
3. Response to a Chinese question in an English word or phrase with switch back to Chinese.
4. Frequent switch in and out of English.

Nevertheless, the corpus includes code-switching to English and back to Chinese at the Chinese first or second rising tone. The exceptions of switching to English resulting from falling tones have a relatively low rate of incidence. They account for only 3.39% of instances in the corpus, while switching at falling tones make up 96.61% of the total 1,033 examples. This result shows strong evidence that the tones facilitate switching. They offer a smooth transition from

Table 11
Switches in English and back to Chinese

Item	Switches in English		Switches back to Chinese		Total
	Facilitated by falling tones	Exceptions	Facilitated by falling tones	Exceptions	
Number	714	25	284	10	
Percentage	69.12	2.42	27.49	0.97	
Total number	739		294		1033
Total per cent	71.54		28.46		100.0

both Chinese to English and English back to Chinese as do trigger words and structures complying with structural integrity constraints.

The data analysis also demonstrates the high proportion of switching in English and comparatively low incidence of switches out of English. The following table indicates the proportion of switching into English and back to Chinese.

The X2 test shows the significance of switches to English nouns at Chinese falling tones. According to the hypothesis (H), the percentages of falling tones, and high pitch or rising tones before English nouns and noun phrases in the Chinese-Australian bilinguals' mixed speech (expected frequency) would match the percentages of falling tones before Chinese nouns and noun phrases in monolingual Chinese speech (actual frequency).

The falling tones before English nouns and noun phrases in the Chinese-Australian children's mixed speech make up 96.54% of the data, while the high pitch or rising tones account for 3.46%. However, the falling tones before Chinese nouns and noun phrases in monolingual Chinese speech (Beijing Language Institute, 1988) amount to 59.3%, and the high pitch and rising tones make up 40.7%.

Class	Falling tones	High pitch and rising tones
Actual frequency	59.30	40.7
Expected (28:1)	96.54	3.46

X2 = S(actl - expt)2/expt
= (59.3 - 96.54)2/96.54 + (40.7 - 3.46)2/3.46
= 14.37 + 400.81
= 415

P << 0.001 Probability is less than 0.05 therefore, reject H.

Conclusion: the percentage of switches to English nouns and NPs at the Chinese falling tones does not match the percentage of falling tones before Chinese nouns and NPs in monolingual Chinese speech thereby showing that code-switching to English nouns at Chinese falling tones is significant.

The evidence appears to suggest that tonal aspects play a very important role in code-switching among Chinese-Australian bilingual children. The tonal aspects in question include the fourth falling tone, the half third falling tone, the neutral falling tone as well as the weak stress of word in Chinese. The tonal aspects may work together with other factors to facilitate the bilingual children switching into English and back to Chinese.

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