Difficulties in Perception and Pronunciation of Mandarin Chinese Disyllabic Word Tone Acquisition: A Study of Some Japanese University Students

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Abstract

Tonal errors pose a serious problem to Mandarin Chinese learners, making them stumble in their communication. The purpose of this paper is to investigate beginner level Japanese students' difficulties in the perception and pronunciation of disyllabic words, particularly to find out which combinations of tones these errors mostly occur in. As a result, the errors made by the 10 subjects were mostly found in tonal patterns 1-3, 2-1, 2-3, 3-2 and 4-3 in both perception and pronunciation. Furthermore, by comparing the ratio of tonal errors of initial to final syllables, we can tell that the initial syllables appear more difficult than the final syllables in perception, but in pronunciation this tendency is not found. Moreover, there seems to be some connection between learners' perception and pronunciation in their acquisition process.

1 Introduction

Many Southeast Asian languages are tonal languages including Mandarin Chinese. Mandarin Chinese is a well-known example of a tonal language, in which each syllable has its own fixed tone, including both high-low distinctions and rising-falling variations. The acoustic characteristics of tones are mainly determined by pitch value. Tones are relatively defined. This so-called "relativity" is the stability of pitch within the pitch range of an individual speaker.

In general, learners start learning the Mandarin Chinese pronunciation by practicing monosyllabic words. From educators' experiences, it seems that learners tend to make fewer errors when they pronounce monosyllabic words. However, one of the most important characteristics of Mandarin Chinese is the collaborative pattern of tones in spontaneous speech, such as the rules of tone sandhi and the patterns of tone combinations. This factor influences learners much more when they pronounce disyllabic words in longer sentences. To improve learners' tonal pronunciation, Zhu (1997) argues that the teaching of tone combinations ought to focus on disyllabic words. Firstly, almost all combination patterns of monosyllabic words in spontaneous speech are included in disyllabic words. Therefore, disyllabic words could be regarded as the foundation. Secondly, modern Chinese contains a large number of disyllabic words. According to Xian Dai Han Yu Pin Lv Ci Dian, there are only 3751 monosyllabic words, but 22941 disyllabic words that make up 73.63% of the total word number. Practicing disyllabic words could solve most problems with tone combinations. The changes of Chinese tones in connected speech pose a serious problem to learners of Mandarin Chinese. It is also found in classroom settings that Japanese students often stumble in their communication because of their tonal errors. The

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purpose of this paper is to investigate beginner level Japanese students' difficulties in the perception and pronunciation of disyllabic words, particularly to find out which tones these errors mostly occur in. The paper also compares the tonal error patterns between the pseudo-disyllabic word /mama/ and real disyllabic words. Furthermore, comparisons will also be made between perception and pronunciation experiment results because the relationship between these two factors in the acquisition process is another interest of the paper. This study will hopefully play an important role in teaching the 4 Chinese tones to Japanese students.

2 Literature Review

2.1 The Phonetic Features of Chinese and Japanese

In Chinese each syllable has its fixed tone. The high and low, falling and rising pitches depend on the vibration rate of the vocal cords. The constitution of Chinese tones is not determined only by pitch level, but also by transition patterns. There are level, rising, falling, and falling-rising tones, which are caused by changes in pitch. In addition to pitch, the intensity and duration of the sound are also relevant to the make-up of the tone. Intensity indicates the weight or strength of a sound. For instance, the neutral tone in Chinese is related to sound intensity. The easiest and the most effective way to transcribe and record tones is the system of tone-letter proposed by Chao (1968). It classifies tone pitch into five degrees, and divides a perpendicular line into four parts to signify the particular location of the tone pitch on the scale. The low, mid-low, middle, mid-high, and high pitches are indicated by the numbers 1

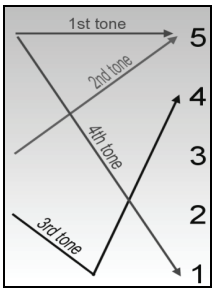


Figure 1. The location of Mandarin Chinese tone

to 5 respectively (Figure 1). The accurate tone-letter of each tone is represented by the high and low pitch, the rising and falling pitch, or the fluctuation of pitch. In a Chinese disyllabic phrase, the tones of the first and the second word are compromised for the sake of being euphonious (Wu, 1992). It is natural to make the pitch in the second syllable lower than that in the first. Take a disyllabic word with two rising pitches for example, the second rising pitch turns into low-rising (Figure 2).

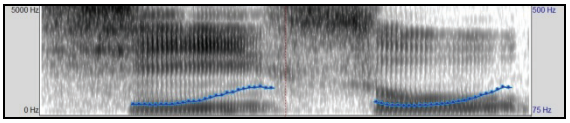


Figure 2. Word of tone 2-2 (xísú, custom) pronounced by a Chinese native speaker. (The underline signifies tone.)

In a disyllabic word with two falling pitches, both syllables are lower due to the mutual influence of these two falling pitches (Figure 3).

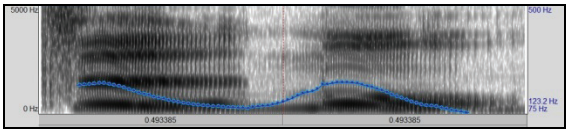


Figure 3. Word of tone 4-4 (zìmù, caption) pronounced by a Chinese native speaker.

Among Japanese phonetic features, accent bears the closest relationship to Chinese tone. There are two types of accents in the languages of the world (Hiroshi, 2003). One is "stress accent", which uses the intensity of sounds to differentiate various lexical items. The other is "pitch accent", which uses the pitch of sounds to distinguish one word from another. Japanese is classified as a pitch accent language. According to several researchers (Vance, 1986; Wang, 1997; Jun, 2001; Kubozono, 2006), the Japanese accent can be classified into two types—flat and non-flat. "Mora" in Japanese means the duration of a sound. The accent in Japanese displays in the mora instead of in the syllable. For example, the word [shimbun] (newspaper) has two syllables but four moras.

The difference between flat and non-flat type lies in the existence of the accent. The accent means there is a transition from high to low pitch in a word. The flat type does not have the accent, whereas the non-flat type does. The transition of the non-flat type can also be classified into three patterns—H-L, L-H-L, and L-H.

In general, a noun of n short syllables can have any of n+1 possible pitch patterns (Vance, 1986). When an isolated word is followed by other enclitic particles, the accent will also follow the pitch of the last mora, because in standard

Japanese (Tokyo dialect), if the pitch in a word falls once, it will not rise up again (Kubozono, 2006).

According to the patterns stated above, the accent in standard Japanese (Tokyo dialect) has the following characteristics. First, there can only be one part with high pitch in a word (with one mora or several consecutive moras). Second, the pitches of the first and the second moras must differ. If the first mora is pronounced with high pitch, the second one must be with low pitch. In the same way, if the first is with low pitch, the second must be with high pitch. Third, the pitch in plural morals in Japanese undergoes less change than those in Chinese. Then, within one syllable, the change of pitches causes a change of meaning in Chinese but not in Japanese. All these factors are assumed to affect Japanese students when they are speaking Chinese.

The Japanese accent and Chinese tone seem to be represented by pitch change. In Japanese, the accent is represented in the pitch change of each mora within a word. The basic component is a mora. However, in Chinese, tone is displayed in the pitch change within each syllable. The basic tone-bearing unit is a morpheme.

2.2 The Tonal Errors of Japanese Students Learning Chinese

When Japanese students listen to Chinese disyllabic words, they often fail to judge which tone is the one they have heard. According to previous studies (Yang, 1999; Nishi, 2004; Liu, 2008; Dong, 2011), Japanese students showed a common error tendency: ① the final syllables and initial syllables received quite different percentage from the right answer, ② tone 2 and tone 3 were more difficult for students to master, ③ the pseudo-word /mama/ received more right answers than the real words. However, they did not point out whether students had the same problems when they pronounced the disyllabic words.

On the other hand, there are three common errors made by Japanese students in pronouncing Chinese (Zhu 1994)—flat tone, mispronunciation of multi-syllabic words, and stress of the neutral tone. Many Japanese students of Chinese pronounce disyllabic words in Chinese with rising-falling tones, regardless of their original tones, such as in the example of [chūnfēng] (spring breeze) changing to [chúnfēng] (pure breeze), and also in [fāngbiàn] (convenient) changing to [fángbiàn] (room convenient). The cause of this mispronunciation is related to the "euphonic change" in Japanese. Whatever the original pitch pattern is, when two words are combined into one lexical item, only the L-H-L pattern is allowed. For example, the original pitch of [waseda] belongs to the H-L pattern while that of [daigaku] (university) the L-H pattern. When these two words are combined, the pitch of [wasedadaigaku] (Waseda University) turns into the L-H-L pattern. This is because in Japanese, there cannot be two pitch changes in one word, which means that only one pitch peak is allowed in Japanese compounds. It is very difficult for Japanese students to pronounce distinguishably tone 3 from tone 4, tone 2 from tone 3, and tone 2 from tone 4 in Chinese (He, 1997). They easily mistake tone 3 for tone 2.

So far, even though the previous studies have identified some tendencies in the perceptional test of disyllabic words, it is still not clear whether the results can be accepted in pronunciation. Also, the "euphonic change" which does not appear in monosyllabic words, has not been discussed yet from both perception and pronunciation fields. This study is aimed at the two points mentioned above.

3 Methodology

3.1 Subjects

10 Japanese students of Kyoto University participated in the experiment of this study. They had Chinese classes for 3 hours per week, continuing for 1 year. They come from different regions of Japan and their native language is Japanese. All subjects were required to read out the disyllabic words shown to them on the slides. Then, they had to mark down the tones they heard from an audio file on an answer sheet.

3.2 Design of Word Chart

This study is going to deal with two kinds of disyllabic words. One is real words, which appear in the subjects' textbook. These words are supposed to be familiar to the subjects and practiced in the classes. The other is the pseudo-word /mama/ which is very easy to pronounce so that the subjects are able to concentrate more to four tones. In some cases, /mama/ can be interpreted into the meaning of "mother". However, it must be read as /māma/, in which case the second syllable is neutral tone, and not the research target in this study. Moreover, /màmă/ is another pattern, which may have the

meaning of “scolding the horse” but it is not a typical disyllabic word. Therefore, in this study all tonal patterns of /mama/ will be treated as pseudo-words ignoring any possible meaning transfer.

There are four tones in Chinese. If all four tones are arranged into disyllabic words, sixteen combination pairs are retrieved. However, when 3-3 is pronounced, it changes into 2-3 so it is omitted. In this study, the neutral tone is not included in the word chart. The numbers 1, 2, 3, 4 represent the high pitch, rising pitch, falling-rising pitch, and falling pitch, respectively, as illustrated below.

1-1, 1-2, 1-3, 1-4
2-1, 2-2, 2-3, 2-4
3-1, 3-2, , 3-4
4-1, 4-2, 4-3, 4-4

Moreover, for each pattern, five real disyllabic words with different phonetic syllables were chosen for the speaking part. Ideally, every tone pair should be selected from the same set of syllables to control the segmental structure, considering the potential effects of syllabic structure on tone. However, since the words had to be known by all subjects, the range of the word list was limited. Finally, there were altogether 75 words selected.

To avoid the expectation of a pattern from the subjects, the order of the words were rearranged. Every word was supplemented with Chinese phonetic symbols (Pinyin) and all the disyllabic words listed came from the basic vocabulary contained in the subjects’ textbook. Before the recording, the subjects were familiarized with the demo word slides with no time limit, and were not informed of the correct pronunciation. During the formal recording, if the subjects made any mistakes, they were not allowed to make self-corrections until the same word appeared again. Each word was read four times in order to reduce mispronunciations, such as inserting fillers, repetition, and so on. In the analysis, unless a word was pronounced correctly four times, it was judged as failing to pronounce. Then, the mispronounced words became the target for analysis by software.

In the listening part, besides fifteen pseudo-word /mama/ with different tone patterns, six words were selected for each tone pattern making a total of ninety real words. Half of the words contained in the material were chosen from the textbook and the other half were from outside the textbook, because if the subjects listened to a word they knew, they might get the right answer without any effort. In order to reduce this risk, unfamiliar words were also chosen. The material used in this experiment was pronounced by two native Mandarin Chinese speakers; one male and one female. Each word was read out four times, twice by the male and twice by the female speaker in random order. The material was played by a digital speaker and we made sure the subjects could hear the voice very clearly.

3.3 Procedure

This study was divided into three parts. The first part was to let subjects read the pseudo-disyllabic word /mama/ so as to collect the data with little phonetic influence. The second part was to ask the subjects to read out the disyllabic words on the slides. To prevent the subjects from predicting the answers without hearing the sounds, the words appeared in random order. The third part was to ask the subjects to listen to the pseudo-words and the real disyllabic words with four tones and write down the right answer on the answer sheet.

3.4 Methods of Analysis

On one hand, the results of the perceptual test were collected by counting the answers on the answer sheets, not only marking the right or wrong answers, but also listing what kinds of mistakes the subjects made. On the other hand, the pronunciation test results were analyzed in two ways. First, a perceptual analysis was performed by 4 Mandarin Chinese native speakers to identify the tonal errors made by the 10 subjects in pronouncing those disyllabic words, and to take a record of how subjects mispronounced the tones. Although the neutral tone was not included in the test word chart, the subjects actually pronounced some tones, similar to the neutral tone so it was added into the native speakers’ judgment. Then, the data was analyzed with the phonetic analysis software Praat, too. Finally, we investigated the pseudo-words to real words tonal error ratio in perception and pronunciation.

4 Results and Discussion

4.1 Ratio of Tonal Errors in Perception

It is quite obvious that the 3-1 pattern of pseudo-words and the 1-3 pattern of common words were the most difficult ones for the subjects in the listening test. Both of them contained tone 1 and tone 3 but in a different order. Besides the 1-3, 2-1, 2-3, 3-2, 3-4, 4-2 and 4-3 patterns of pseudo-words, 1-2, 2-1, 2-3, 3-2, 3-4, 4-2 and 4-3 patterns of real words also received higher mistake rates than average. Particularly, 7 kinds of patterns were included in both the pseudo-words and the real words. If the subjects make the same mistakes in their pronunciation, we can suppose that there is some connection between their perception and pronunciation.

4.2 Ratio of Tonal Errors in Pronunciation

From Table 2 we can see that the tonal errors of the 10 subjects are mostly concentrated in tonal patterns 1-3, 1-4, 2-1, 2-3, 2-4, 3-2 and 4-3. Although the highest mistake rates in the pseudo-words and the real words are different from the results of the listening test, the 1-3, 2-1, 2-3, 3-2 and 4-3 patterns seem to be difficult for subjects in both perception and pronunciation (Table 3).

By comparing the ratio of tonal errors of initial to final syllables, we can tell that the initial syllables seem more difficult than the final syllables in perception, but in pronunciation we received the opposite results. It means that the tone of the final syllable is influenced by the initial syllable so that the subjects mispronounced the tone heavily. At the same time, in the pseudo-word /mama/, listening to a word and choosing the right tone seemed to be harder than pronouncing the same word. The same tendency also can be found in the real words.

Table 1. Ratio of perceptual tonal errors of two types of disyllabic words (%)

	/mama/ (n=150)		Real words (n=900)	
	Number of mistakes	Ratio (%)	Number of mistakes	Ratio (%)
1-1	1	0.67	6	0.66
1-2	3	2.00	29	3.22
1-3	5	3.33	32	3.56
1-4	1	0.67	4	0.44
2-1	7	4.67	22	2.44
2-2	3	2.00	12	1.34
2-3	5	3.33	29	3.22
2-4	0	0	13	1.44
3-1	7	4.67	18	2.00
3-2	4	2.67	28	3.11
3-4	5	3.33	21	2.33
4-1	2	1.34	11	1.22
4-2	5	3.33	26	2.89
4-3	5	3.33	23	2.56
4-4	0	0	13	1.44
Average	3.53	2.36	19.13	2.13

Table 2. Ratio of pronouncing tonal errors of two types of disyllabic words (%)

	/mama/ (n=150)		Real words (n=900)	
	Number of mistakes	Ratio (%)	Number of mistakes	Ratio (%)
1-1	0	0	3	0.40
1-2	1	0.67	6	0.80
1-3	4	2.67	18	2.40
1-4	2	1.33	13	1.74
2-1	2	1.33	14	1.87
2-2	0	0	11	1.47
2-3	5	3.33	15	2.00
2-4	3	2.00	20	2.67
3-1	1	0.67	3	0.40
3-2	2	1.33	15	2.00
3-4	1	0.67	7	0.94
4-1	2	1.34	3	0.40
4-2	0	0	1	0.13
4-3	5	3.33	14	1.87
4-4	0	0	8	1.07
Average	1.87	1.25	10.07	1.34

Table 3. The sum of perception and pronunciation test results (%)

		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-4	4-1	4-2	4-3	4-4
Percep-tion	/mama/	0.67	2.00	3.33	0.67	4.67	2.00	3.33	0	4.67	2.67	3.33	1.34	3.33	3.33	0
	Real words	0.66	3.22	3.56	0.44	2.44	1.34	3.22	1.44	2.00	3.11	2.33	1.22	2.89	2.56	1.44
Pronunci-ation	/mama/	0	0.67	2.67	1.33	1.33	0	3.33	2.00	0.67	1.33	0.67	1.34	0	3.33	0
	Real words	0.40	0.80	2.40	1.74	1.87	1.47	2.00	2.67	0.40	2.00	0.94	0.40	0.13	1.87	1.07

Table 4. Ratio of tonal errors of initial and final syllables (%)

Type / Tonal Pattern	Perception				Pronunciation			
	/mama/		Real words		/mama/		Real words	
	initial	final	initial	final	initial	final	initial	final
1-1	0.67	0	0.44	0.22	0	0	0.13	0.27
1-2	0.67	1.33	1.33	1.89	0.67	0	0.67	0.13
1-3	1.33	2.00	1.78	1.78	0	2.67	0.67	1.73
1-4	0.67	0	0.33	0.11	0.67	0.67	0.67	1.07
2-1	3.33	1.33	2.00	0.44	1.33	0	1.47	0.40
2-2	1.33	0.67	0.67	0.67	0	0	1.20	0.27
2-3	2.00	1.33	1.11	2.11	0.67	2.67	0.67	1.33
2-4	0	0	1.22	0.22	1.33	0.67	1.60	1.07
3-3	2.67	2.00	1.67	0.33	0.67	0	0.13	0.27
3-2	2.00	0.67	1.89	1.22	1.33	0	1.60	0.40
3-4	2.67	0.67	2.11	0.22	0	0.67	0.67	0.27
4-1	0.67	0.67	0.78	0.44	0.67	0.67	0.27	0.13
4-2	1.33	2.00	1.33	1.56	0	0	0.13	0
4-3	1.33	2.00	0.56	2.00	0	3.33	0.40	1.47
4-4	0	0	1.00	0.44	0	0	0.40	0.67
Total	20.67	14.67	18.22	13.56	7.33	11.33	10.67	9.47

4.3 Some Typical Tonal Errors in Each Group

Table 5. Typical tonal error patterns of perception

	/mama/		Real words	
	initial	final	initial	final
1-3	1→4	3→2	1→4/2/3	3→2/4
2-1	2→3	1→2	2→3/1/4	1→2
2-3	2→3	3→2	2→4/1/3	3→2
3-2	3→2/4	2→3/4	3→2/4	2→3/4/1
4-3	4→3	3→2	4→2/3	3→2/4

From Table 3 we can see that tonal patterns 1-3, 2-1, 2-3, 3-2 and 4-3 are typical tonal errors in both perception and pronunciation. In this section, we will present how the subjects mistook the tones in the listening test. In addition, we will show the pitch contour of tonal patterns mentioned above to clarify some error tendencies.

Table 5 indicates two important things: firstly, the answers to the pseudo-words and the real words share similar error patterns; secondly, the subjects made various types of errors when they listened to real words. More specifically, tone 1 of the initial syllable was mostly mistaken for tone 4, sometimes for tone 2 or 3 in the real words. Tone 2 of the initial syllable was often mistaken for tone 3, which also has a rising tendency. When tone 3 is in the initial position, it is likely to be heard as tone 2 or tone 4. On the other hand, initial tone 4 was heard as tone 2 or

tone 3. For the final syllable, except for the 3-2 pattern, the other tones were mostly mistaken for tone 2. This is a very interesting phenomenon of Japanese students.

Table 6. Typical tonal error patterns of pronunciation

	/mama/		Real words	
	initial	final	initial	final
1-3		3→0/2	1→4	3→0/2/4
2-1	2→3/4		2→3/1/4	1→2/4
2-3	2→4	3→0/4	2→4/1	3→0/4/1
3-2	3→1/2		3→1/2/4	2→1
4-3		3→0/2	4→1/3	3→0/4/1/2

From Table 6 we can see that no subject made mistakes in some of the syllables of the pseudo-words. This is different from the perceptional test results. Moreover, when the subjects pronounced the real words, they made more mistakes than in the pseudo-words. This is the same tendency as in perception.

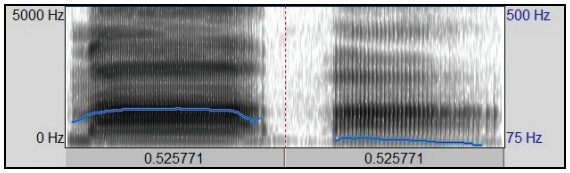
If we compare Table 5 and Table 6, we can see that the subjects share the same tonal pattern errors in some aspects of their perception and pronunciation. For instance, they heard the pseudo-word of tonal pattern 1-3 as 1-2, and also pronounced them in the same way. We may see more details in Table 7.

Table 7. Common tonal error patterns shared by perception and pronunciation

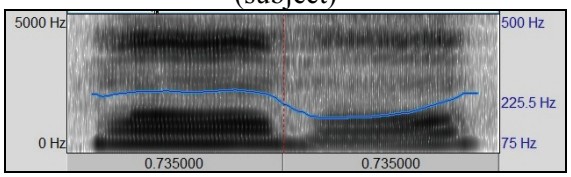
	/mama/		Real words	
	initial	final	initial	final
1-3		3→2	1→4	3→2/4
2-1	2→3		2→3/1/4	1→2
2-3			2→4/1	
3-2	3→2		3→2/4	2→1
4-3		3→2	4→3	3→2/4

We also found several differences between perception and pronunciation. For example, as mentioned before, there were fewer mistakes in pronunciation than in perception. No one mispronounced the first syllable of the 1-3/4-3 patterns, or the second syllable of the 2-1/3-2 patterns. In addition, when subjects pronounced disyllabic words, they made different mistakes from listening to those words. For example, the most obvious difference was in the final syllable of tone 3. In the listening test, it was mostly mistaken for tone 2, but in the pronunciation test, it was always pronounced as neutral tone (tone 0).

In the following paragraphs, we are going to select some typical words and make comparisons of pitch contour between subjects and native speakers.



(subject)



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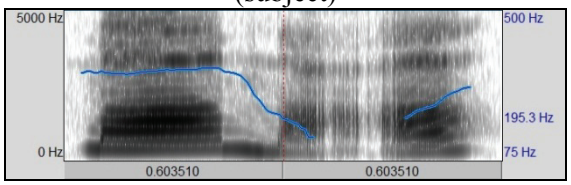
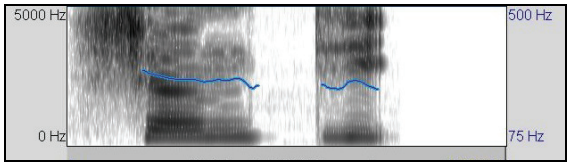
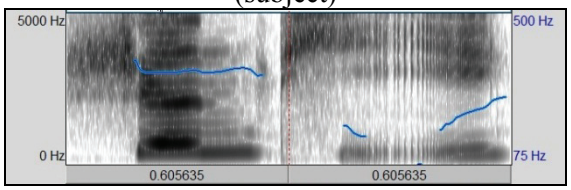


(native speaker)

Figure 4. Pitch contour of /māmă/



(subject)

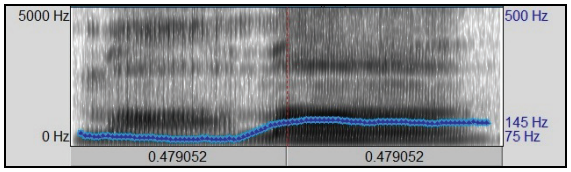


(native speaker)

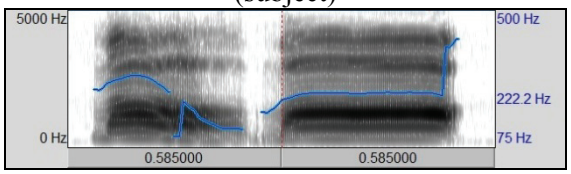
Figure 5. Pitch contour of /shēn tǐ/

First of all, let us start with the pseudo-disyllabic word /mama/, which is pronounced with typical tonal errors. Figure 4 shows that some subjects have problems pronouncing the final rising-falling tone (tone 3). We can hardly see the falling-rising procedure in the upper pictures in Figure 4, but the native speaker's

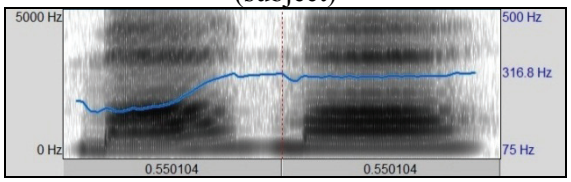
pitch contour shows the process very clearly. Most subjects mispronounced it as a neutral tone or even a rising tone. The same tendency can also be found in real words (Figure 5).



(subject)

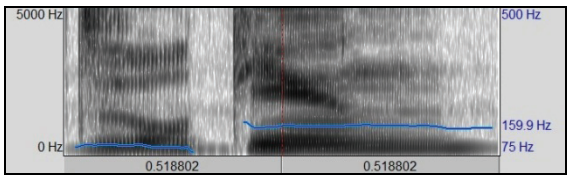


(subject)

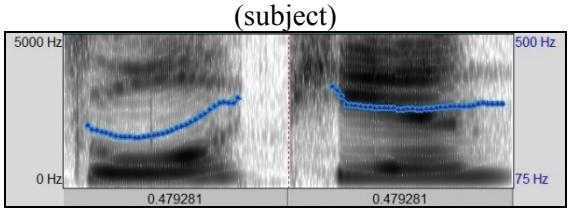


(native speaker)

Figure 6. Pitch contour of /mámā/ (subject)



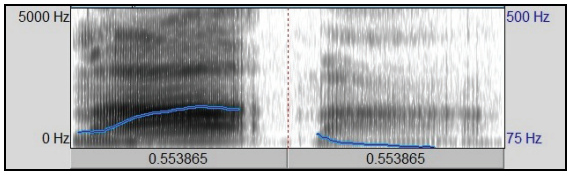
(subject)



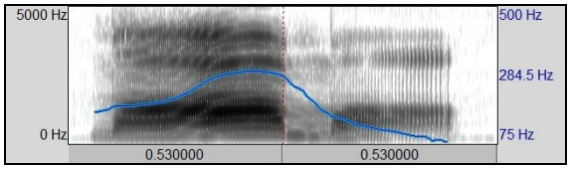
(native speaker)

Figure 7. Pitch contour of /zuó tiān/

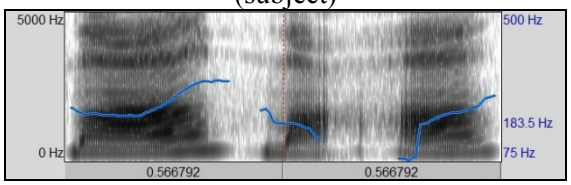
The initial tone 2 (rising tone) requires a swift rising of the voice. However, we can hardly see this tendency from the subject's pitch contour in Figure 6 and 7, in which tone 2 is even lower than the level of tone 1. As a result, it sounds like tone 3 of the first syllable in the native evaluation.



(subject)

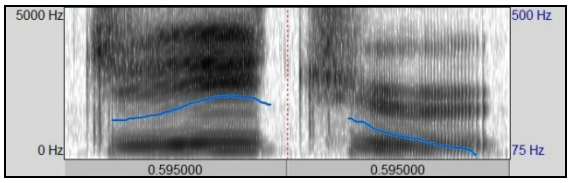


(subject)

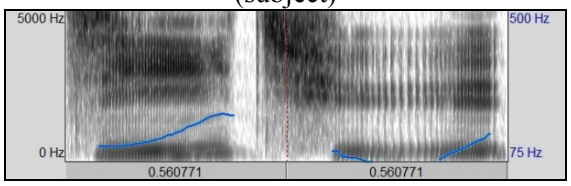


(native speaker)

Figure 8. Pitch contour of /mámǎ/



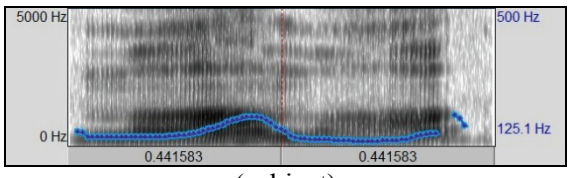
(subject)



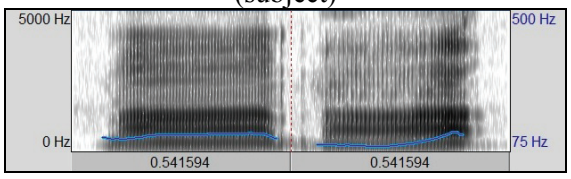
(native speaker)

Figure 9. Pitch contour of /jí qǔ/

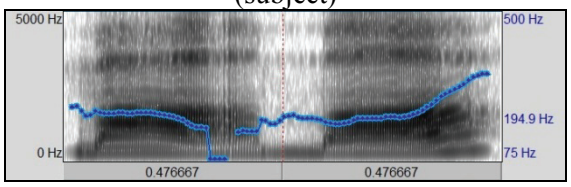
Also with an initial tone 2, when the final tone is tone 3, the rising trend is much clearer than in the 2-1 pattern. On the other hand, almost all subjects failed to pronounce tone 3 in the correct falling-rising process (Figure 8, Figure 9). Their pitch contour fell down without rising.



(subject)

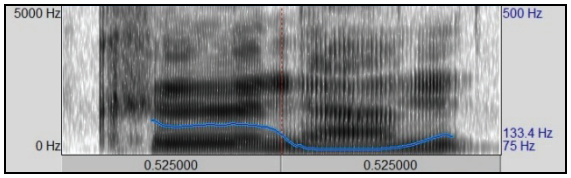


(subject)

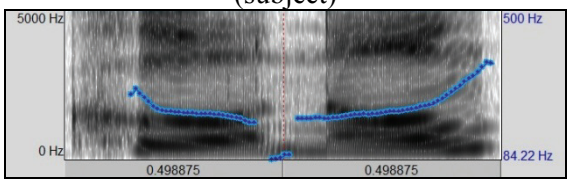


(native speaker)

Figure 10. Pitch contour of /mǎmá/



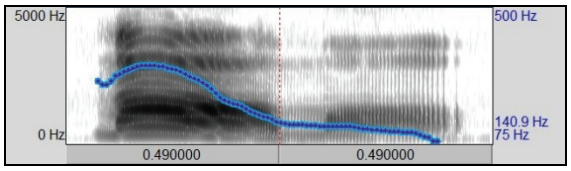
(subject)



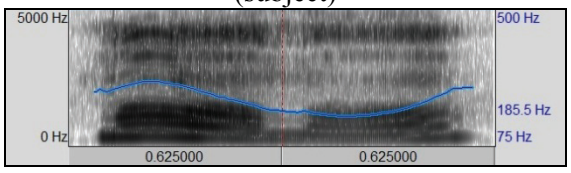
(native speaker)

Figure 11. Pitch contour of /kě néng/

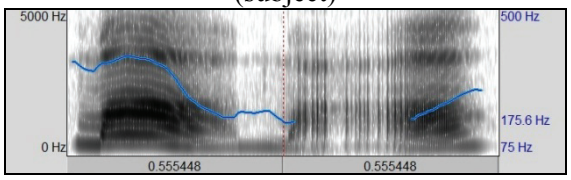
In Mandarin Chinese, the 3-2 pattern is a difficult tonal combination for learners. The voice must be suppressed into a low level first and then raised immediately (Figure 10, Figure 11, native speaker). In this study, some subjects were successful, while others failed. In the failed cases, we can hardly see any difference between initial and final tones (Figure 10, Figure 11, subject).



(subject)



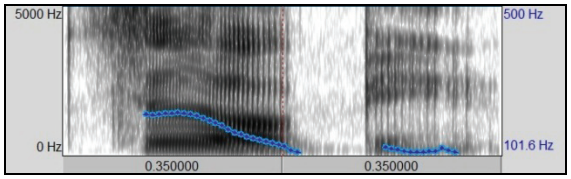
(subject)



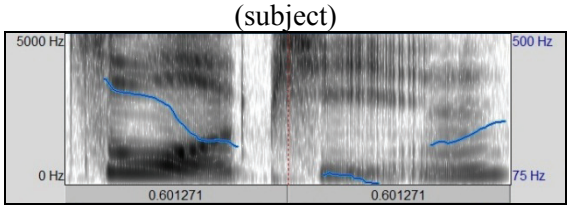
(native speaker)

Figure 12. Pitch contour of /màmǎ/

By comparing the pitch contour of the subject's and the native speaker's, it becomes obvious that the subjects pronounced tone 4 with little difficulty but still failed to pronounce tone 3 correctly. They made mistakes in one of two ways: the voice was either suppressed without rising or not suppressed enough. In the first case, it sounded like neutral tone and in the second case, it sounded like tone 2.



(subject)



(native speaker)

Figure 13. Pitch contour of /zuò pǐn/

From the tonal pitch contour analysis we can see why tonal patterns 1-3, 2-1, 2-3, 3-2 and 4-3 are most easily mispronounced by all subjects. When they pronounce initial tone 1 (flat tone), the start is not high enough to distinguish from the following tone. Then, the pronunciation of initial tone 2 (rising tone) is too moderate so the listener cannot identify it very clearly. Also, the subjects failed to pronounce tone 3 in the correct falling-rising process no matter whether it was the initial or the final tone. Finally, if subjects pronounced tone 4 win short or moderate falling trend, the voice would sound like the neutral tone.

5 Conclusion

This study focused only on disyllabic words. In Japanese, the pitches of the first and the second moras must differ. If the first mora is pronounced with high pitch, the second one must be with low pitch. In the same way, if the first is with low pitch, the second must be with high pitch (Kubozono, 2006). A rising-falling pattern was proposed (Zhu, 1994) based on the pitch changes of Japanese students and it was argued that regardless of the original pitch in Japanese, new compounds are always of Low-High-Low tones. The tonal errors of the ten Japanese students in this current study are also similar to this pattern because of the negative transfer from the students' mother tongue.

In this study, the errors made by the 10 subjects were mostly found in tonal patterns 1-3, 2-1, 2-3, 3-2 and 4-3. They mistook these five patterns the most in both perception and pronunciation. Particularly, the 3-1 pattern of the pseudo-words and 1-3 pattern of the real words were the most difficult for the subjects in the listening test. About pronunciation, they pronounced initial tone 1 (flat tone) not high enough and initial tone 2 (rising tone) too

moderately to distinguish from the following tone. Also, the subjects had problems mostly with tone 3 no matter whether it was initial or final.

Furthermore, by comparing the ratio of tonal errors of initial to final syllables we can tell that the initial syllable seems to be more difficult than the final syllable in perception, but in pronunciation this tendency was not found.

Moreover, the subjects quite often mispronounced the words the same way as they misheard them. We also found several differences between perception and pronunciation. As mentioned before, there were fewer mistakes in pronunciation than in perception. In addition, there were more variations of pronunciation mistakes than perceptional ones.

This study discussed the tonal errors by only 10 subjects. It is recommended that in a future study of related issues more subjects should be included to make the experimental results more representative. Also, words with a carrying phrase should be added in further studies to obtain a more complete picture of the acquisition of Chinese tones.

Since the functions of Chinese tones and Japanese pitch accent differ, by means of contrastive analysis one can help teachers pay special attention to those tones learners frequently confuse, so as to make them fully acquainted with the correct tone production in various tone combinations.

References

Chao L.- J. 2003. Special Phonetic Instruction in Chinese to Japanese Students. *Journal of Yunnan Normal University*, 1(3): 66-67.

Chao Y. R. 1968. *A Grammar of Spoken Chinese*. Berkeley: University of California Press.

Dong Y. T, Tsubota Y and Dantsuji M. 2011. The Perceptional Error Patterns of Japanese Mandarin Chinese Learners in the Disyllabic Words, *Proceedings of the 9th National Congress of Japan Association of Chinese Language Education*, 15-19.

He P. 1997. Studies in Basic Phonetic Instruction in Chinese to Japanese Students. *Language Teaching and Linguistic Studies* 3, 49-50.

Hiroshi W. 2003. The Theory of Japanese Stress and Phonetic Categorization. *Journal of Wu Feng Institute of Technology* 11, 283-286.

Jun S. 2001. Problems and Solutions of Japanese Learning Chinese Tones. *Proceedings of the International Symposium in Teaching Chinese to Japanese Students* 172. Peking: Chinese Social Science.

Kubozono H. 2006. *Akusento no Hosoku*. Tokyo: Iwanami Shoten.

Liu J. P. 2008. RiBen LiuXueSheng HanYu ShuangYinJi Ci ShengDiao PianWu DiaoCha BaoGao, *ShangYe WenHua*, Vol. 3, 33-34.

Nishi T. 2004. Nihongo Bogowasha no Chugokugo Seicho Kikitori ni Kansuru Ichi Kousatsu – Dainisei to Daisansei no Kondou, *Tagen Bunka*, Vol. 4, 15-27.

Vance T. J. 1986. *An Introduction to Japanese Phonology*. Albany: State University of New York Press.

Wu Z.- J.& Lin M-Z. 1989. *An Outline of Experimental Phonetics*. Peking: High Education Press.

Wu Z.- J. 1992. *Introduction to the Phonetics of Modern Chinese*. Peking: Chinese Language Teaching.

Wang S.- Y. 1992. Japanese Tone and Pronunciation. *Foreign Languages in Fujian* 2, 24-26.

Yang L. M. 1999. Chugokugo no Seicho Chikaku ni Kansuru Jikkenteki Kenkyu – Seicho Kyoiku no Tame no Kisoteki Kenkyu, *Meiji Daigaku Jinbun Kagaku Kenkyusho Kiyo*, Vol. 45, 294-307.

Zhu C. 1994. Contrastive Experiments on the Suprasegmental Features of Chinese and Japanese. *Journal of East China University* 1, 85-86.

Zhu C. 1997. *The Strategies of Foreign Students for the Phonetic Learning in Chinese.* Peking: Beijing Language and Culture University Press.