

TONES IN TONGLUO – A PHONETIC ANALYSIS

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ABSTRACT

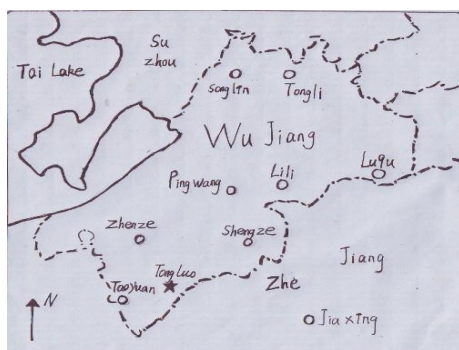
This is an acoustic analysis of the citation tones on the monosyllables from the native Tongluo speakers. Tongluo is located in the south of Wujiang in Jiangsu Province in China and on the east of Jiaxing in Zhejiang Province in China. The purpose of the study is to obtain the citation tones in Tongluo and compare with the tones in other towns in Wujiang district. Results show that there are 7 citation tones in Tongluo. They are *yinping*[44], *yangping*[23], *yinshang*[51], *yangshang*[231], *qusheng*[213], *yinru*[5_] and *yangru*[2_3_].

Keywords: Tongluo, citation tones on the monosyllables, aspirated tones, tone letters

1. INTRODUCTION

Most of the dialects in Wujiang district belong to Wu dialects except the Wanping town. There are many records in past studies in Wujiang district, especially in Songling, Lili, Pingwang, Shengze, Zhenze, Tongli. However, few records mentioned dialect in Tongluo. Since there is no tone record in Tongluo, we can refer to the past studies about towns around Tongluo in Wujiang district, such as Taoyuan, Zhenze and Shengze.

Figure 1: The map of Wujiang district in 2005.



There are four basic tones in Chinese dialects, *pingsheng*, *shangsheng*, *qusheng* and *rusheng*. The tone division of Chinese dialects is much related to the voiced initial consonants and voiceless initial consonants. Wujiang district is the same. The most

notable feature in Wujiang District, which differs from most of the Chinese dialects, is that the initial consonants of aspirated or unaspirated have influence on the tones, for example *yinshang* and *aspirated yinshang* are different in Shengze p. 76 [9]. Because we don't know how many tones are in Tongluo, when we produce the tonal questionnaire of Tongluo dialect, we can predict there are 12 tones in Tongluo according to tonal discipline in Chinese mediaeval time. Most of the past studies recorded the phenomenon of tones separated by aspiration, though their results were different. Some of the studies recorded that the aspirated tones were independent tone and some of them recorded aspirated tones having merged into the *yang tones*. Qian [2] recorded 3 tones, *yingshang*, aspirated *yinshang* and *yangshang* in *shang tone* series. While Wang [4] recorded *yinshang* and *yangshang* in *shang tone* series, because of the *aspirated yinshang* merging into *yangshang*. We can take examples of the studies in Taoyuan, Zhenze and Shengze, the neighbors of Tongluo.

Table 2: Tones of past studies in Taoyuan, Zhenze and Shengze (they are short of T, Z and S) in Wujiang district.

author	site	number
Zhao(1956)	S	10
Ye(1983)	Z	11
	S	10
Qian(1992)	S	10
Wang(2008)	T	8
	Z	8
	S	8

2. METHOD

The speech data were provided by ten native Tongluo speakers, who were born in 1981 to 1989 and grew up in Tongluo. The pronunciation of them tends to be steady, so we can paint the curves by the mean pitch frequency.

In this study, because we don't know how many tones are in Tongluo, 12 tones were predicted in the tonal questionnaire according to the tonal division discipline in Wujiang district.

They are *yinping*, *aspirated yinping*, *yangping*, *yinshang*, *aspirated yinshang*, *yangshang*, *yinqu*, *aspirated yinqu*, *yangqu*, *yinru*, *aspirated yinru* and *yangru*. The finals of the test words contained vowel /a/, vowel /i/ and vowel /u/ in every predicted tone. The recordings of the words were made in a sound-proof room in Shanghai University. The records were made by Computerized Speech Laboratory (CSL Model 4300B) speech analysis software. The citation tones of Chinese on the monosyllables are mainly related to the acoustical pitch, so we use acoustical pitch to analyze the tones. The fundamental frequency was obtained by Praat (version 4.4.30). On the fundamental frequency (F0) curve of every test word, ten points were got from the onset of tonal duration to the offset in average.

3. ANALYSIS AND RESULT

3.1. The result of this study

The curves of mean F0 of the 12 predicted tones from the speakers are shown in Figure 2.1 to 5.2. The beginning portion and the end portion of the curves are considered as the results from the effect of either the preceding syllable-initial consonant or vowel.

In this study, we use the average duration when plotting the curves of mean F0 on the x-coordinate. In this way, we can see clearly how the tones are at the same percentage of their time duration [8].

Figure 2.1 shows the mean F0 of *yinping* and *aspirated yinping*. As the words and curves of *yinping* were coincident, the average F0 can be used, as well as *aspirated yinping*. As can be seen in Figure 2.1, the curves of *yinping* and *aspirated yinping* are almost the same. They are high and level. Based on the F0 data in Figure 2.1, it reflects that *yinping* and aspirated *yinping* have merged. Because the words and curves of *yangping* were coincident, the average F0 can be used. As can be seen in Figure 2.2, the *yangping* tone is different from the *yinping* tone. The F0 contour of *yangping* keeps rising slowly from the beginning to the end. *Yangping* tone is middle rising.

Figure 2.1: The mean F0 curves of *yinping* tone and *aspirated yinping* tone, *yinping*(diamond) and *aspirated yinping* (square).

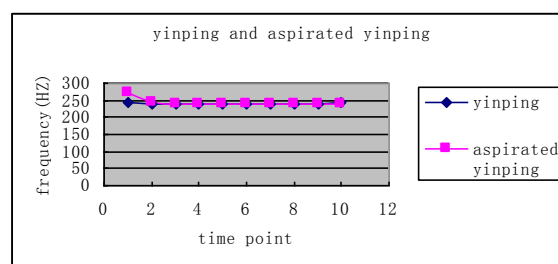


Figure 2.2: The mean F0 curve of *yangping* tone.

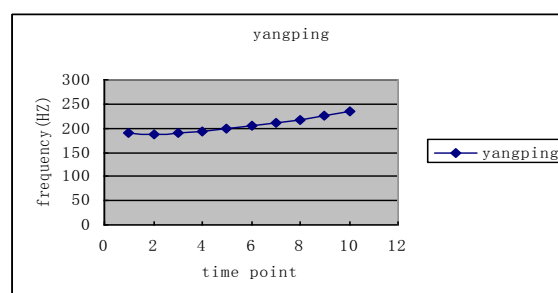


Figure 3.1 shows the mean F0 curves of *yinshang* and *aspirated yinshang*. As the words and curves of *yinshang* were pretty consistent, the mean F0 can be used, as well as *aspirated yinping*. The curves of *yinshang* and *aspirated yinshng* are almost the same. This gives evidence to determine they have merged. Figure 3.2 shows the mean F0 curve of *yangshang*, rising slowly at the first half and falling slowly at the second half. We can see clearly that *yangshang* tone is different from *yinshang* tone.

Figure 3.1: The mean F0 curves of *yinshang* tone and *aspirated yinshang* tone, *yinshang*(diamond) and *aspirated yinshang* (square).

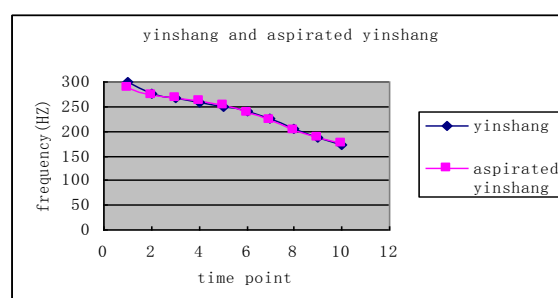


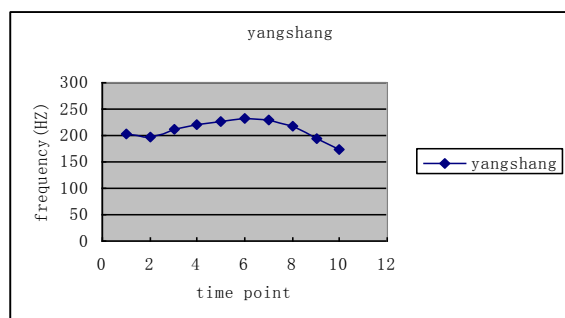
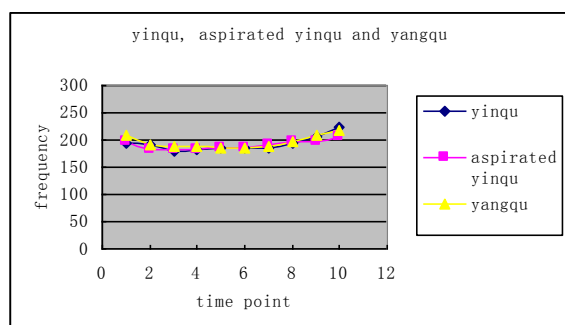
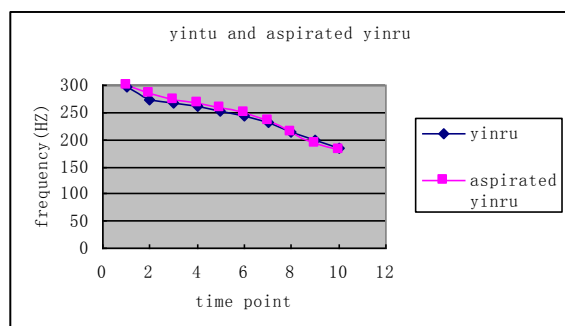
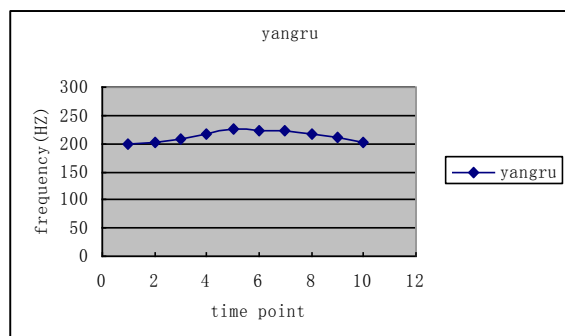
Figure 3.2: The mean F0 curves of *yangshang* tone.**Figure 4:** The mean F0 curves of *yinqu* tone, *aspirated yinqu* tone and *yangqu* tone, *yinqu* (diamond) and *aspirated yinqu* (square) and *yangqu* (triangle).**Figure 5.1:** The mean F0 curves of *yinru* tone and *aspirated yinru* tone, *yinru* (diamond) and *aspirated yinru* (square).**Figure 5.2:** The mean F0 curves of *yangru* tone.

Figure 4 shows the mean F0 curves of *yinqu*, *aspirated yinqu* and *yangqu*. The three curves are so coincident that we can not distinguish them from each other. They all fall from the beginning portion, then rise from 1/4 portion to the end. And the end portion is a little higher than the beginning portion. As can be seen in Figure 4, a conclusion can be drawn that the *qu* tone series have merged.

Ru tones are different from the tones mentioned above, they sound much shorter. Figure 5.1 shows the mean F0 curves of *yinru* and *aspirated yinru*. As the words and curves of *yinru* were pretty consistent, the mean F0 can be used, as well as *aspirated yinru*. The curve of *yinru* is similar to the *aspirated yinru*. They are all high and degressive. We can suppose that they have merged. As shown in Figure 5.2, *yangru* tone is different from *yinru* tone and it rises slowly.

3.2. The duration of the 7 tones

Table 2: tone duration of the 7 tones in Tongluo.

tone	Time(s)
<i>yinping</i>	0.6310
<i>yangping</i>	0.5849
<i>yingshang</i>	0.4374
<i>yangshng</i>	0.5108
<i>qusheng</i>	0.5812
<i>yinru</i>	0.4274
<i>yangru</i>	0.3023

The mean durations of the seven citation tones in Tongluo in descending order are shown as follows.

yangping > *yangping* > *qusheng* > *yangshang* > *yinshang* > *yinru* > *yangru*

4. DISCUSSION

As can be seen in the Figures, the phenomenon of tones separated by aspiration, existing in Wujiang district, is not obvious nowadays at this stage. *Yinping* and *aspirated yinping* have merged, *yinshang* and *aspirated yinshang* have merged and *yinru* and *aspirated yinru* also have merged. The *qu* tone series have merged into *qusheng*. The aspirated tones and *yin* tones have merged, which differs from the most of the tones in other towns in Wujiang district. Wang [5] recorded that the aspirated tones merged into *yang* tones in most of the towns in Wujiang district, such as in Shengze, Tongli, Songling, Lili and so on. When we refer to other studies, we can find that the merging of the tones in Tongluo is different from which are in the

towns in the north Wujiang district. In the south Wujiang district, such as in Taoyuan and Zhenze, the *yin tones* and *aspirated tones* merged [4]. And also that is much similar to Jiaxing in Zhejiang Province. Zhao [9] recorded *yinping* and *aspirated yinping* merged, *yinqu* and *aspirated yinqu* merged and *yinru* and *aspirated yinru* merged in Jiaxing. Qian [4] also agreed with Zhao [9].

The *Ru tone* series sounds much short than other tones, and they are uncomparable with other tones. So we don't put *ru tone* series into the same category. So there are 7 citation tones on the monosyllables. They are *yinping*, *yangping*, *yinshang*, *yangshang*, *qusheng*, *yinru* and *yangru*. The aspirated tones and *yin tones* have merged, which differs from most of the tones in other towns in Wujiang district.

5. CONCLUSION

In general, there are 7 citation tones in Tongluo, which are based on the results of analysis. The tone letters for the 7 citation tones on the monosyllables can be calculated by the following formula [5]:

$$(1) \quad T = \frac{\lg x - \lg \min}{\lg \max - \lg \min} \times 5$$

x is the test point, \min is the upper limit of the fundamental frequency and \max is the lower limit. The *ru tone* series are much shorter than the other tones. In order to distinguish the tone letters of *ru* tones with other tones, we put a short line under the tone letter. The tone letters of the 7 tones are *yinping*[44], *yangping*[23], *yinshang*[51], *yangshang*[231], *qusheng*[213], *yinru*[5_] and *yangru*[2_3_]. The aspirated tones always merged into *yang tones* in most of the towns in Wujiang district, such as *aspirated shang* merged into *yangshang* and *aspirated qu* merged into *yangqu* in Shengze, Lili, Pingwang and Shengze in Wang [5]. However Tongluo is different from them--the aspirated tones merged into *yin tones*, which is close to the tones in Taoyuan and Zheze and Jiaxing in Zhejiang Province.

6. REFERENCES

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