

# Prosodic Properties of Intonation in Two Major Varieties of Mandarin Chinese: Mainland China vs. Taiwan

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## Abstract

Prosodic properties of intonation in Putonghua (Mandarin spoken in China) and Guoyu (Mandarin spoken in Taiwan) were investigated in this study. The major findings are: (1) Guoyu has a slower tempo than Putonghua. (2) Putonghua demonstrated a general higher register than Guoyu. (3) The neutral tone and the preceding accented syllable in Putonghua form a great F0 change, while the neutral tone in Guoyu is more independent from the preceding syllable, for it tends to be pronounced with a low entering tone regardless the tone of the preceding syllable. (4) The final particle “a” of the Wh-question in j518 has a distinctive rising intonation in Putonghua. (5) The downdrift phenomenon is more prominent for announcers from Taiwan. (6) Putonghua demonstrates more syntagmatic contrasts in the prosodic properties of intonation.

## 1. Introduction

One general impression of the two varieties of Mandarin Chinese is that people from Taiwan speak with a lower voice, and they sound soft and gentle; while Mainlanders have more ups and downs in their intonation, and their voices are high. In order to investigate what factors may have contributed to the perceptual differences in the two Mandarin Chinese varieties, and how the differences reflect their intonation systems, voice data of five sentences were extracted from a Mandarin phonetic database<sup>1</sup>. The five sentences were used by Zhu(1997) to test second language learners of Chinese on how their intonation patterns. Together they form a short dialogue, consisting of two declarative sentences (j519 and j521), one interrogative sentence (j518), one imperative sentence (j520), and one exclamatory sentence (j522). The recorded data were analyzed on Computerized Speech Lab (Model 4300B).

<sup>1</sup> The database was compiled for the project “A contrastive analysis on the pronunciation between Mainland China and Taiwan: A case study of radio announcers” (NSC 88-2411-H-003-017) funded by the National Science Council in Taiwan. Twelve radio announcers participated in the project. Six of them worked for the Zhongyang Renmin Guangbo Diantai in Beijing (China), and the other six worked for Chungguo Guangbo Gongsu in Taipei (Taiwan) at the time of recording. The radio announcers were given a list of words, phrases, and sentences to prepare before the recording. They were instructed to say the materials as if they were speaking to someone naturally. The materials were adapted from “Emergency Chinese” published in Shanghai, examples in Yu-yin-xue Jiao-cheng (Teaching Mandarin phonetics) and Wai-guo Xue-sheng Xue-xi Han-yu Yu-yin Dui-ce (The learning strategies for foreign students to master Mandarin Sounds). Each announcer took about fifty minutes on the average to record the material.

## 2. Subjects&Material

D1-D6 (radio announcers from China)

T1-T6 (radio announcers from Taiwan).

We use D5’s and T1’s voice data as illustrations.

The five sentences used for this study are:

J518: Jie-jie, ni qu nar a? “(address to your older sister), where are you going?”

J519: Shang-jie mai dong-xi. “I’m going shopping.”

J520: Gei wo mai yi-ba yu-san ba! “Get an umbrella for me!”

J521: Hao, wo yi-ding gei ni mai lai. “Alright, I’ll get you one.”

J522: Ni zhen shi wo-de hao jie-jie! “What a nice sister you are!”

## 3. Findings

The major findings are:

1. **Guoyu has a slower tempo than Putonghua.** This may contribute to the perception that people from Taiwan talk softly and gently, because of the longer duration in their declarative sentences. (See Table 1.& Figure 1.). However, the differences seem to be greater in declarative sentences (j519 and j521).

Table 1: *The average duration of the five tested sentences.*

Sentence/ Duration	j518	j519	j520	j521	j522
Putonghua	1.38	0.95	1.32	1.47	1.35
Guoyu	1.44	1.2	1.34	1.76	1.36
Differences in Duration/ sec.	-0.06	-0.25	-0.02	-0.29	-0.01

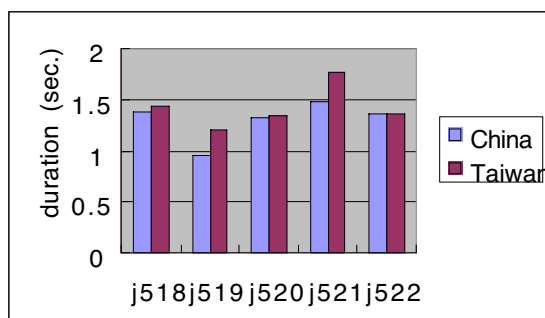


Figure 1: *Duration of the five sentences*

2. **Putonghua demonstrated a general higher register than Guoyu.** In Table 2, four of the sentences show that the differences in F0 are positive, which means the average F0 are higher in Putonghua. This explains why people from Mainland China are perceived to be speaking in a higher voice.

Table 2: *The average F0 of the five tested sentences.*

Sentence	j518	j519	j520	j521	j522
Putonghua	250	264	262	213	234
Guoyu	225	275	242	206	216
Differences in F0 / Hz.	25	-11	20	7	18

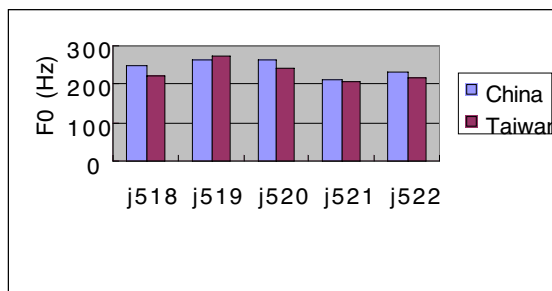


Figure 2: *Average F0 for the five sentences*

3. **The neutral tone and the preceding accented syllable in Putonghua form a great F0 change, while the neutral tone in Guoyu is more independent from the preceding tone, for it tends to be pronounced with a low entering tone regardless the tone of the preceding syllable.**

The prosodic properties of an accent seems to be different in Putonghua and Guoyu. All the announcers from Mainland China pronounced the neutral tone in *Jie3-jie0* ‘elder sister’ with a high pitch ending to form a great F0 change with the preceding low tone. However, there were four announcers from Taiwan who pronounced *jie0* with a low pitch entering tone, which was independent from the preceding low tone.

4. **The final particle “a” of the Wh-question in j518 has a distinctive rising intonation in Putonghua.**

The final rising intonation in Figure 1. shows that there is a greater increase in F0 in D5’s speech. Not only D5, but all the announcers from Mainland China unanimously use a rising intonation at the end of sentence j518 to mark the question, even though the question word “Nar” has fulfilled the function of a Wh- question. On the contrary, three of the announcers from Taiwan did not use a rising intonation for j518, and the rising intonation employed by the other three announcers was not as prominent as the mainlanders’ (See Figure 3.).

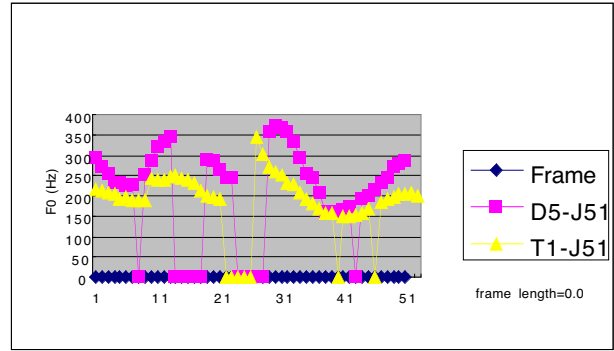


Fig. 3: *Intonation Contour of J518 by D5 and T1*

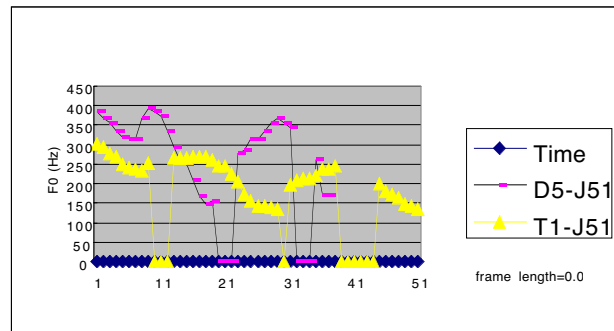


Fig. 4: *Intonation Contour of J519 by D5 and T1*

5. **The downdrift phenomenon is more prominent for announcers from Taiwan.**

The starting F0 of j519 is higher than its second syllable *jie1* in Guoyu. All the six radio announcers from Taiwan pronounced the starting pitch of the first syllable *shang4* higher than the second syllable *jie1*. However, only three Mainland announcers pronounced the starting pitch of j519 higher than its second syllable *jie1*, which suggests that the downdrift phenomenon seems to be less prominent in Putonghua (See Figure 4.). We also observe that the F0 manipulation in the sentence level seems to be less free for Guoyu, but Putonghua can allow more ups and downs (Figure 4.).

6. **Putonghua demonstrates more syntagmatic contrasts in the prosodic properties of intonation.**

The final rising contour in Figure 4. is the F0 contour for the word *dong1-xi0* ‘things; stuff’. The neutral tone *xi0* in Putonghua is an unstressed syllable. Its prosodic properties are in contrast with the preceding stressed syllable. It is shorter in duration, lower in pitch to form a falling contour with the preceding stressed syllable, and the intensity is much lower than the preceding stressed syllable (Compare the energy window in Figure 5, and Figure 6.). On the other hand, the neutral tone in Taiwan demonstrates a paradigmatic contrast, i.e., it is more like a fifth tone. It seems to be in contrast with the other four tones in a designated syllable. Thus, the preceding syllable is not lengthened as much, and the intensity of the neutral tone syllable is higher comparing with Mainlanders’ speech. The prosodic properties of a neutral tone in Taiwan should be characterized as low in pitch and often ends with a glottal stop (See Figure 6.).

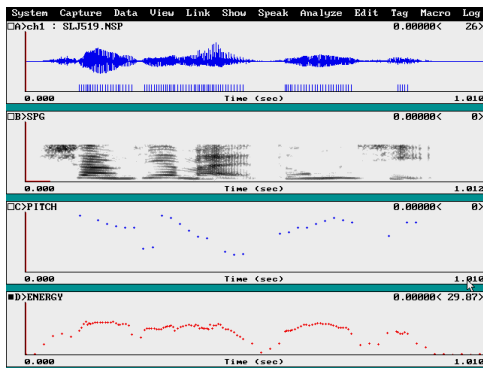


Fig. 5: Prosodic properties of J519 by D5

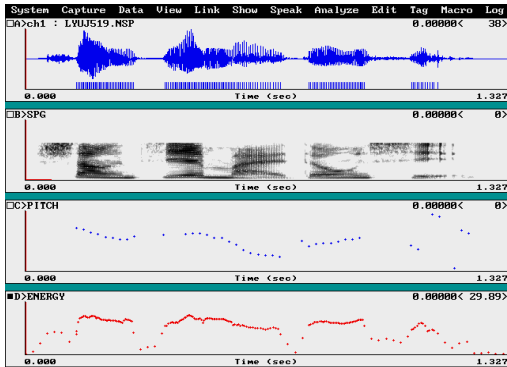


Fig. 6: Prosodic properties of J519 by T1

#### 4. Discussion

j520 is an imperative sentence. We again see the downdrift phenomenon was more prominent in Guoyu. The above phenomena suggests that the F0 variation seems to be more limited in Guoyu, which prefers to use a continuing downdrift pitch pattern as a default intonation pattern. In the radio announcer's speech of Mainland China, pitch variation plays a more important role in their intonation realization. Instead of a general downdrift contour, we see three major peaks in j520. One occurs at wo3 mai3, the other occurs at yi4 ba3, and another occurs at yu3 san3, while only the first peak could be easily identified in Guoyu. The observation that Putonghua shows more ups and downs in the intonation contour than the standard variety Guoyu in Taiwan maybe due to Putonghua may have more stress-timed features than Guoyu. Therefore, the duration, intensity, and the pitch of each syllable in Putonghua were not as regular as the ones in Guoyu. The greater variation in duration, pitch, and intensity can be a prosodic form of stress.

The majority of Mainland China's radio announcers pronounced the last syllable lai2 in j521 as a neural tone, while for Taiwan radio announcers, five of them pronounced lai2 with its original tone, i.e., the second tone. This phenomenon again shows that Putonghua was more stress-timed than Guoyu. Therefore, we see more stressed vs. unstressed contrast occurring in Mainlanders' speech.

J521 is an exclamatory sentence. We see that a big pitch change occurs between zhen1 and shi4. It was because the adverb zhen1 was stressed in the sentence Ni3 zhen1 shi4 wo3 de0 hao3 jie3-jie0. 'How nice of a sister you are!' As we mentioned before, Mainlanders' speech was more stress-timed.

Thus, their speech demonstrates a much greater pitch change between zhen1 and shi4.

#### 5. Conclusions

To sum up, the standard Mandarin in Mainland China was more stress-timed comparing with the variety in Taiwan. The close correlation between the length of a sentence and the number of its syllables could be an indication that the Mandarin in Taiwan was more of a syllable-timed language. Our study also suggested that the greater pitch fall, and the greater contrast in duration and intensity we observed in Mainlanders' speech was an indication of the stress features in Putonghua.

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