# Phonology of Kunming Chinese

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## 1. Introduction

Yunnan is a province in Southern China. Although the province is ethnically and linguistically diverse, the variant from standard Mandarin, Yunnanese, is spoken at many, if not most places. As one of Southwestern Guanhua (lit. court language), it diverged from a common ancestor of Mandarin in early Ming dynasty (14–15th century). When soldiers and government officials were sent from Nanjing to Yunnan, at that time relatively remote and undeveloped, they carried Nanjing Mandarin to the province (Hammarström, Forkel, and Martin, 2017; Zeng, 2018). Over the several hundred years, the Yunnan dialect became mutually unintelligible with modern standard Mandarin (Gui, 1990) and diverse locally in many difference cities and counties. In this project, I will focus on Kunming Chinese, a branch of Yunnanese. Kunming is the capital city of Yunnan province, and Kunming Chinese is used everywhere on the street. The choice of Kunming Chinese, rather than other Yunnanese sub-dialects, is made not because of any prestige reasons, but only because it is more accessible to me.

The Kunming dialect has a speaker population of about 650, 000 (Gui, 1990). It is highly analytic, and belongs to the Sino-Tibetan language family. Syntactically, it has some grammatical particles (/gə31/, /gɑ53/, both question particles, and /nə44/, as a possessive particle) that is distinct from standard Mandarin (Gao, 2004). Lexically, Kunming Chinese also has many unique nouns and verbs. It has several different phonological contrast from other branches of Yunnanese, but is overall unified within the dialect. It has a four-tone system, and the categorization of tones for words is mostly consistent with standard Mandarin, although maintaining some difference. Interestingly, the values of the four tones themselves are different from standard Mandarin, which contributes greatly to the lack of mutual intelligibility. Phoneme-wise, it also underwent a number of changes since the last century, which will be discussed in section 2 and 3.

In this project, I have been working closely with two speakers, my father and mother. My father was born in Beijing in a Kunming family, and spoke Kunming Chinese at home for 12 years, until he returned to Kunming at the age of 12 and used Kunming Chinese mainly until graduation from university. My mother has been born in Kunming and had been speaking Kunming Chinese all the way until the age of 30, when my family moved to Beijing for 15 years. Both of them speak Kunming Chinese and standard Mandarin now. I have also had the chance to communicate with some elder generations of my family, who spent the majority of their lives in Kunming and very conversant in Kunming Chinese.

## 2. Phonemic inventory

Kunming Chinese has a phonemic inventory similar to its close relative, Mandarin Chinese. However, some older phonemes such as /v/ is preserved in Kunming Chinese. With respect to vowels, Kunming Chinese is highly monophthongnized. Although some other close relatives of Kunming Chinese maintains five tones, Kunming Chinese contains four tones (Gui, 1990, 2000).

*2.1 Consonants*

**Table 1:** Consonant inventory of Kunming Chinese.

|  | Bilabial | Labio-dental | Alveolar | Alveolo-palatal | Retroflex | Palatal | Velar |
|---|---|---|---|---|---|---|---|
| Plosive | p  pʰ |  | t  tʰ |  |  |  | k  kʰ |
| Affricate |  |  | ts  tsʰ | tɕ  tɕʰ | tʂ  tʂʰ |  |  |
| Fricative |  | f  (v) | s | ɕ | ʂ  ʐ |  | x |
| Nasal | m |  | n |  |  |  | ŋ |
| Approximant | w |  |  | l |  | j |  |

The consonants of Kunming Chinese are similar to standard Mandarin in many ways (Gao, 2004). Most stops and affricates do not distinguish between voiced and voiceless. Rather, the two-way contrast lies in the aspiration of voiceless sounds. For instance, /ts/ and /tsʰ/ are the two phonemes with the same place and manner of articulation, and both phonemes are voiceless. This contrast is similar to Mandarin Chinese. As a phonetic justification, Kunming Chinese stops have a VOT distribution with a mean of 15 ms for non-aspirated stops (/p/, /t/, and /k/), and 78 ms for aspirated stops(/pʰ/, /tʰ/, and /kʰ/).

**Figure 1:** VOT distribution of Kunming Chinese. Word-initial stops are measured for their VOTs.
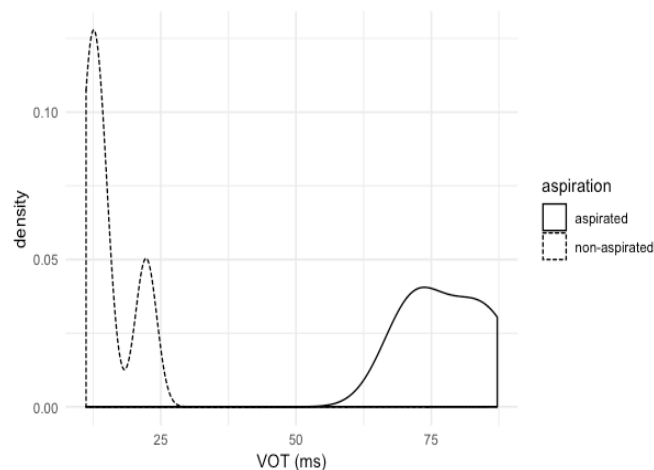


The nasal rhymes in Kunming Chinese is different from Mandarin Chinese. In addition to phonotactic changes that led to drop of nasals in syllables with certain coda vowels, the /ŋ/ nasal, although notated in the literature as a velar nasal (Gui, 1990, 2000), is actually relatively fronted in its place of articulation, approximating an /ɲ/. Speakers of

Kunming Chinese who I work with also pronounce this sound differently from their production of a Mandarin /ŋ/.

In addition, further elicitation of nasals suggests that /n/ and /ŋ/ are in complementary distribution, and one vowel nucleus would only be followed by one of the two nasal codas, never the other. This is further confirmed by Gui (2000), in its documentation of nasal rhymes. The complementary distribution explains the confusion between /n/ and /ŋ/ among some Kunming Chinese speakers, which becomes evident when Kunming Chinese speakers try to learn Mandarin, in which /n/ and /ŋ/ are contrasted phonemes.

**Table 2:** Word list for consonantal sounds.

| IPA | Word | Word in IPA | Gloss of word |
|------|------|-------------|---------------|
| p | 北边 | pə pʲɛ | North |
| pʰ | 婆婆 | pʰɔ pʰɔ | grandmother |
| m | 母亲 | mu tɕin | mother |
| f | 风筝 | foŋ zɛŋ | kite |
| v | 队伍 | tʷeɪ vu | line/team |
| t | 电话 | tʲɛ xʷɑ | telephone |
| tʰ | 天气 | tʰʲɛ tɕi | weather |
| n | 牛 | nʲu | cow |
| l | 鲤鱼 | li ji | carp |
| k | 街子 | kɛ tsɿ | (street) market |
| kʰ | 昆明 | kʰʷɛn miŋ | Kunming |
| x | 海 | xɛ | sea |
| tɕ | 机器 | tɕi tɕʰi | machine |
| tɕʰ | 钱包 | tɕʰʲə pɑɔ | purse |
| ɕ | 现在 | ɕʲɛ tsɛ | now |
| tʂ | 准备 | tʂʷən peɪ | to prepare |
| tʂʰ | 唱歌 | tʂʰɑ ko | to sing |
| ʂ | 扇子 | ʂɑ tsɿ | (hand) fan |
| ʐ | 日子 | ʐɿ tsɿ | day |
| ts | 自己 | tsɿ tɕi | oneself |
| tsʰ | 词语 | tsʰɿ i | word |
| s | 四十 | sɿ ʂɿ | forty |
| w | 围巾 | weɪ tɕin | scarf |

One evident difference between the consonant inventory of Kunming Chinese and Mandarin is the voiced labial fricative /v/. It appears in Kunming Chinese as a surface manifestation of /w/, the labio-velar approximant, and is missing in Mandarin. According to Gui (2001), the distribution of /v/ follows the phonological rule of /w/→[v] / _+nasal. However, my speakers argue that such a word does not exist, and words, e.g., "问" /wɛn3/, would not have its initial consonant pronounced as /v/. I consider this as a change over the several decades between Gui's work (1990, 2001) and my project. However, in another context, the /v/ consonant is preserved: /w/→[v] / _u. As a result, the number five, "五" /wu3/, would have the surface manifestation of /vu/. Alternatively, this can be seen as a phonotactic constraint: *wu.

*2.2 Vowels*

**Figure 2:** Vowel inventory of Kunming Chinese.
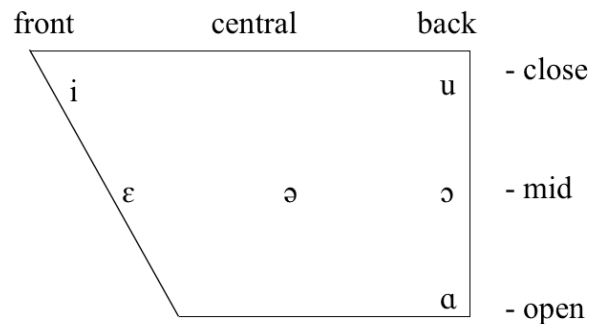


The five-vowel system in Kunming Chinese is similar in number to standard Mandarin. However, the distribution is different, by having an /ɛ/ and an /ɑ/ vowel. Gao (2004) has reported that the prevalence of standard Mandarin has caused many phonemes (namely, vowels) to shift towards the distribution of standard Mandarin. Kunming Chinese also lacks a /y/ vowel, which is present in Mandarin. Sounds in Mandarin that contains /y/ are either pronounced as /u/ or /i/ in Kunming Chinese, as the example below:

(1)       orthography      Mandarin      Kunming Chinese
    a.    绿色      ly sə      lu sə
    b.    鲤鱼      li jy      li ji

According to Zeng (2008), the lack of /y/ vowel could be a remnant feature of the ancestral language in Yunnan. Also, Zeng has noted that the /y/ vowel was not present in Ming Mandarin (ca. 16th century), but was only a feature in Nanjing Mandarin.

**Table 3:** Word list for vowels.

| phoneme | Word | Word in IPA | Gloss of word |
|---|---|---|---|
| i | 礼物 | li vu | gift |
| ɿ | 四 | sɿ | four |
| ɑ | 吃饭 | tʂʰɿ fɑ | to dine |

| | | | |
|---|---|---|---|
| ɛ | 海滩 | xɛ tɑ | beach |
| ə | 咳嗽 | kə səu | cough |
| u | 读书 | du ʂu | read (a book) |
| ɔ | 科学 | kʰɔ ɕɔ | science |
| ɑ | 辣椒 | lɑ tɕʲɑɔ | chili |
| ɑɔ | 桃子 | tʰɑɔ tsɿ | peach |
| əu | 偷盗 | tʰəu tɑɔ | to steal |
| eɪ | 贝壳 | peɪ kʰɔ | seashell |
| ɚ | 官儿 | kʷɑ ɚ | governmental official |

In Kunming Chinese, the high-front vowel /i/ is realized as [ɪ] when preceded by an alveolar fricative or affricate (/ts/, /tsʰ/, or /s/). The same vowel is realized as [ɹ] when preceded by a retroflex fricative or affricate (/ʂ/, /ʐ/, /tʂ/, or /tʂʰ/) (Gui, 2000). In other words, the allophones [i], [ɪ], and [ɹ] are complementarily distributed.

Realization of the rhotic vowel also posts an interesting case. Old Kunming Chinese (spoken in the earlier half of the last century) contains rhotacized vowels, whereas modern Kunming Chinese lost the feature (Gui, 2000). According to Gui (2000), modern Kunming Chinese does not contain rhotacization. However, with a word that contains a rhotacized particle "儿" (/ɚ/), different speakers gave different realizations. For the last word given in Table 3, my father, who speaks the Beijing dialect fluently (which contains frequent rhotacization), readily produced /guɑɚ/. My grandparents, who speak much less Mandarin, however, all agreed with a pronunciation of /guə/, reducing the rhotic vowel to a schwa. In addition, other speakers from the same generation as my father, but only uses Mandarin in a constrained context (mostly official work and business), produced /guɑ ə/, in two syllables. This may be a compromise between the lack of rhotics in Kunming Chinese and the rhotic vowels in Mandarin. Or, the surface form could also be a backformation from the Mandarin orthography, which attaches the character "儿" at the end of a rhotic word to notate rhotacization. The orthography of two characters may have been interpreted as two syllables in the reanalysis of Kunming Chinese speakers.

During the current project, some incoherency with the literature was noted with respect to the vowels. According to Gui (2000), Kunming Chinese is said to contain a contrast between /e/ and /ɛ/, as well as between /o/ and /ɔ/. However, in my analysis, the difference between /e/ and /ɛ/ was not found. For the data given by Gui that was annotated to be /e/, the speakers whom I worked with all produced /ɛ/. Except for the start of the diphthong /eɪ/, the /e/ vowel does not seem to exist in Kunming Chinese. Similarly, although Gui (2000) established a minimal pair between /kʰo/ and /kʰɔ/, the orthography was not given in the reference, and despite the effort of the speakers, the minimal pair was not found: speakers reported that there was only one pronunciation that makes sense, /kʰɔ/. In Gui's account, the /o/ vowel seems to correspond to a subset of

Mandarin /aʊ/ diphthong, whereas the Kunming diphthong /ɑɔ/ would correspond to the rest of Mandarin /aʊ/ vowels. However, in my communication with speakers, they have produced the diphthong /ɑɔ/ for all sounds elicited that would have been produced in Mandarin as /aʊ/. The /o/ case was never found.

There are two possible reasons for such incoherency with the literature. One is that Kunming Chinese has undergone further change, especially with its increasing interaction with Mandarin (Gao, 2004). Another reason may be that the speakers I have access to is only a sub-community, and demonstrated merging of some phonemes.

**Figure 3:** Vowel space of monophthongs (left) and diphthongs (right) of my father.
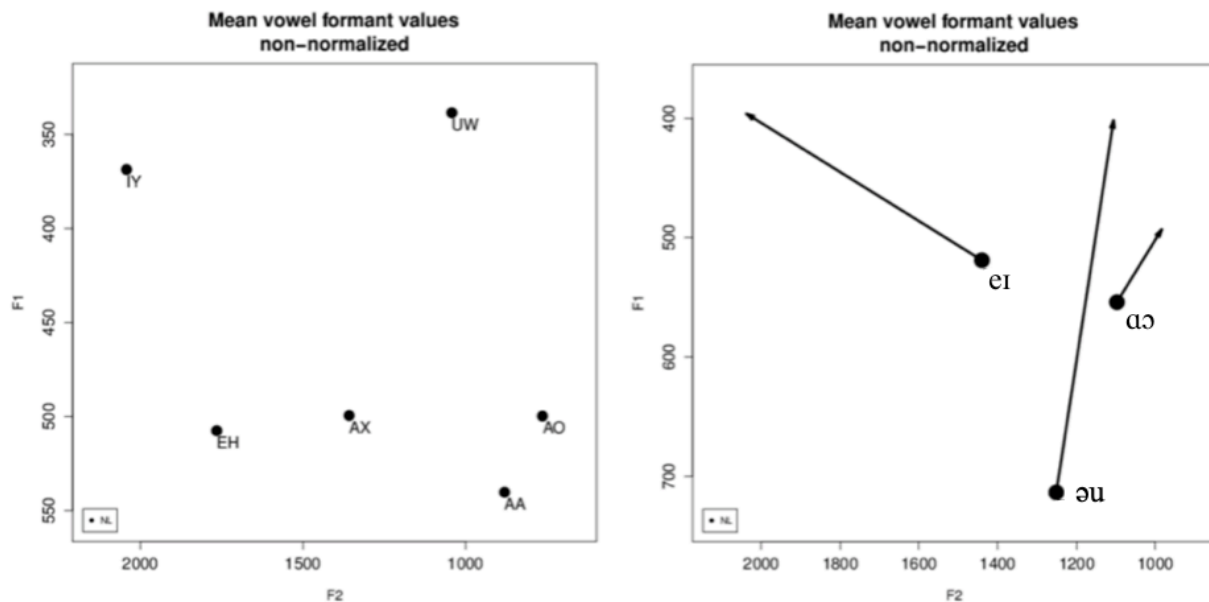


## 2.3 Tones

**Figure 4:** Demonstration of the four tones in Kunming Chinese. The four tones are read on the same syllable construction /vu/, with only the tones being different. In Tone 4, a significant vocal fry is noted, and speaker seems to always produce Tone 4 with vocal fry.
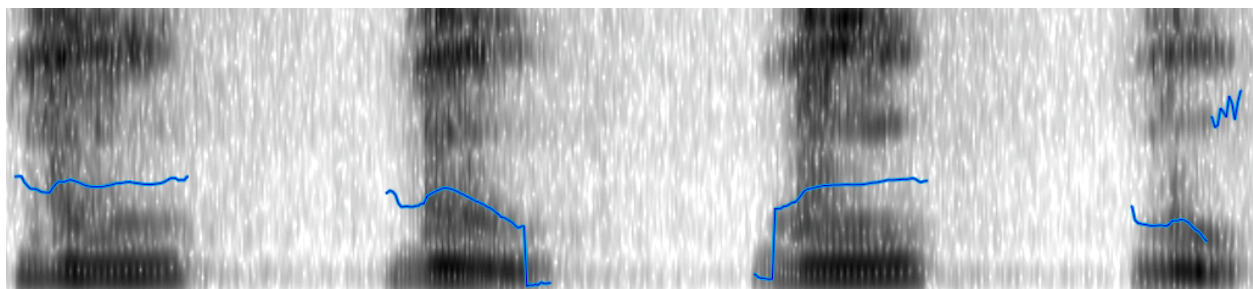


Kunming Chinese has four tones. The division of the four tones are largely coherent with that of Mandarin. However, categorization of some tones deviates from the Mandarin tone categorization. For example, the number six (六, /lu/ in Kunming Chinese and /lʲu/ in Mandarin), is assigned to the fourth tone in Mandarin. But, in Kunming Chinese, it is assigned to the second tone. As a result, number six (六) and the number ten (十, /ʂʰɿ/) are

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judged by the speakers to have the same tone in Kunming Chinese. However, number six (六) and number four (四, /sʅ/), which have the same tone in Mandarin, are judged to have different tones in Kunming Chinese.

In addition to the different division, the tone values of Kunming Chinese are also different. (Gui, 2000; also see Gao, 2004). Table 4 offers a comparison of tones between Kunming Chinese and Mandarin, using the Five-degree-scale pitch marking method.

**Table 4:** Comparison of tones between Kunming Chinese and Mandarin

| Tone | Tone name | Kunming Chinese | Mandarin | Example | Gloss |
|------|-----------|-----------------|----------|---------|-------|
| 1 | Upper Level Tone | 44 | 55 | /vu44/ | Black, dark |
| 2 | Lower Level Tone | 31 | 35 | /vu31/ | Empty, none |
| 3 | Rising Tone | 53 | 214 | /vu53/ | five |
| 4 | Departing Tone | 212 | 51 | /vu212/ | fog |

It is worth noting that old Kunming Chinese, which also consists of four tones, are mostly level tones (Gui, 1990). The tone values are respectively 44, 3 (short), 53, and 11 from Tone 1 to Tone 4 in old Kunming Chinese. During the past century, the shortness feature was lost, where tones have obtained more contour features. Due to the recent changes in the tone contour, it is also debated whether modern Kunming Chinese has contour tones at all. An alternative hypothesis is that Kunming Chinese still maintains the level tones as underlying forms, but tones form contour in speech due to tone sandhi (Gui, 1990). Considering the great extent of tone sandhi in Kunming Chinese, such hypothesis is worth exploring. However, due to the scope limitation of this paper, and the fact that speakers of Kunming Chinese are able to produce different contour tones when reading isolated syllables, the tones will be considered contour tones in the current project.

## 3. Other features and rules

### 3.1 Syllabic structure & Phonotactics

Kunming Chinese has a simple syllable structure. The coda is restrained to nasals (/n/ and /ŋ/). Interestingly, nucleus vowels are sometimes nasalized to substitute the nasal coda (Gui, 2000).

In addition, On-glides (/j/ and /w/) are allowed before the nucleus, although the combination is constrained by the vowel nucleus. The result is syllable types of CV, CCV, CVC, and CCVC.

### 3.2 Tone sandhi

As reported by Gui (2000), Kunming Chinese is edge sensitive. Various combinations of tones would change the tone value, depending on the tones of neighboring words, and especially in duplicates. Communication with speakers further confirmed that the great extend of tone sandi is extant in Kunming Chinese. A few examples are given below, drawn from Gui, 2000:

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| (2) | | orthography | Original | Tone Sandhi | Gloss |
|---|---|---|---|---|---|
| | a. | 舌头 | sə31 tʰəu31 | sə31 tʰəu44 | tongue |
| | b. | 白文文 | pə31 wə31 wə31 | pə31 wə51 wə31 | pale, white |

While the first example demonstrates a rule of "/31/→[44] / 31_", and the second example demonstrates the higher pitch of the second syllable in reduplicates, both cases of tone sandhi in Kunming Chinese.

*3.3 Vowel devoicing*

In Gui (2000), it was noted that some emphatic words can be entirely devoiced in speech. Gui indicates that such vowel devoicing usually occurs in private conversation with the fourth tone. For example, "不对" (/pu4 dʷeɪ4/, lit. NEG-true) may be entirely devoiced for emphatic purpose. My communication with speakers suggest that this is the case, although even when the word is voiced, under an emphatic mood, the first syllable may be extremely reduced, and the /p/ may be voiced. The result is a production of /b'dʷeɪ/. Gui (2000) also points out that although tones cannot be heard due to devoicing of vowels, the meaning can usually be inferred from the context.

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