TOPICS IN THE MORPHOLOGY AND PHONOLOGY
OF MANDARIN CHINESE

THESIS

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MASTER OF ARTS

BY

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This thesis examines some selective cases of morphophonemic alternation in Mandarin Chinese. It presents analyses of the function of the retroflex suffix -r and describes several conditions for tone sandhi. The suffix -r functions not simply as a noun formative. Some of the suffixed forms have consistently different meanings from the roots on which they are based. The suffix -r also plays a role in poetry as a time-filler to make each line of a poem fulfill the requirements of the strict number of characters and rhyme. This thesis also explains what causes the tone pattern of words such as *xiaojie* and *jiejie* to be pronounced differently. These tonal changes are found to be related to the way in which a word is formed. Compounding, reduplication and suffixation differ with respect to how they effect tone sandhi. Tone alternations in actual speech are explored to determine how tone sandhi produces each pronunciation and how grammatical structure and other factors are relevant.
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Mandarin Chinese has several morphophonemic alternations in connection with the processes of -r suffixation and tone sandhi. Some cases are phonological processes—in other words, the changes take place whenever particular phonological conditions are present in the relevant environments. However, some morphophonemic alternations affect only certain morphemes and cannot be viewed as general phonological processes.

That the -r suffix does result in a number of changes in the stem to which it is attached has been discussed by Hockett (1950), Y R. Chao (1968), Pulleyblank (1984) and Ramsey (1987). But the function of the suffix -r in the language has not been thoroughly recognized yet. Most consider the suffixed forms only a phonetic phenomenon since the relation between the suffixed forms and the independent morphemes on which they are based is not transparent. Its functions in the language will be discussed in chapter two of the thesis.
The alternation of third tones in close succession is phonologically conditioned. However, a question arises: why are the tone patterns of words like xiaojie and jiejie pronounced differently? By studying other cases, I have found some tonal changes are related to the way in which a word is formed, such as suffixation, reduplication or composition. Also, it should be noted that the change of tones in some morphemes is morphologically conditioned and has nothing to do with phonological environment. A process of tonal change can effect a change of meaning and the part of speech of a word. We can find many such pairs in the language. This thesis will examine these selective cases of morphophonemic alternation in Chinese.

Chapter one, the introduction, gives a general background to the Chinese language and clarifies some terms often used by linguists when they discuss Chinese. Chapter two describes the processes of the suffix -r and its particular role in the language. In chapter three tone sandhi rules in actual speech will be studied. By analyzing the data from speech, we want to determine how tone sandhi (both phonetic and phonemic sandhi) produces each pronunciation and how grammatical structure and other factors are relevant. Finally, the conclusion is a summary and a proposal for further study.
1.1. Languages or dialects?

Chinese is a language with a long history, and moreover, it is the language spoken by the greatest number of the world's people (about one billion). What is usually referred to as "Chinese" is the language of China's largest nationality, the Han (the ethnic Chinese). It is the main language spoken in China and used in common by all the Chinese nationalities.

China is a country of many nationalities. Apart from the Han, there are fifty-five national minorities. The peoples of the country are classified into five broad language groupings (related language families), listed below (National Geographic Society 1982).

**SINO-TIBETAN**

1. Sinitic: Han 950,000,000; Hui 7,219,000
2. Miao-yao: Gelo 26,000; Miao 3,920,000; Yao 1,240,000; She 330,000
3. Tai: Bouyei 1,720,000; Dai 760,000; Dong 1,110,000; Li 680,000; Maonan 31,000; Mulam 73,000; Sui 230,000; Zhuang 12,090,000
4. Tibeto-Burman: Tujia 770,000; Yi 4,850,000; Tibetan(zang) 3,450,000; Achang 18,000; Bai 1,050,000
Drung 4,100; Hani 960,000; Jingpo 83,000; Jino 10,000; Lahu 270,000; Lisu 470,000; Lhoba 2,000,000; Monba 40,000; Naxi 230,000; Nu 19,000; Pumi 22,000; Qiang 85,000

ALTAIC

1. Turkic: Kazak 800,000; Kirgiz 97,000; Salar 56,000; Tatar 2,900; Uyghur 5,480,000; Uzbek 7,500; Yugur 8,800

2. Mongolian: Mongol 2,660,00; Tu 120,00; Dongxiang 190,000; Bonan 6,800; Daur 78,000

3. Tungus-Manchu: Manchu (Man) 2,650,000; Ewenki 13,000; Hezhen 800; Xibo 44,000; Oroqen 3,200

4. Korean: Korean 1,680,000

MALAYO-POLYNESIAN

1. Indonesian: Kaoshan 300,000

INDO-EUROPEAN

1. Iranian: Tajik 22,000
2. Slavic: Eluosi (Russian) 600

AUSTRO-ASIATIC

1. Mon-khmer: Benglong 10,000; Blang 52,000; Wa (Va) 260,000;

2. Vietnamese: Ging 5,400

All of China's minority nationalities have languages of their own and all have their own written languages with the exception only of the Hui¹, Man², and She³ nationalities who use Chinese or the language of the Han. Ninety-four percent of the people in China are Han and speak some variety of the Han language, that is, Chinese. The Chinese-speaking area covers three-fourths of the country (see Fig.1). But within 'Chinese' there are at least seven main dialects, which could be considered separate languages if it were not for the tradition of a single written language and a history of unity (discussed by DeFrancis 1984). 'Chinese is an abstraction that covers a number of mutually unintelligible forms of speech' (DeFrancis 1984:39). Are Chinese dialects actual dialects or rather different languages? There is some controversy among scholars as to the classification of Chinese dialects. Some linguists prefer to apply the term 'dialect' to mutually intelligible speech and to define mutually unintelligible forms as 'language' (Bloomfield 1933,
Fig.1 The Chinese-speaking area (reference from The people of China (a map), produced by the National Geographic Society 1982.)
Y.R. Chao 1976 and DeFrancis 1972, 1984). In the view of Bloomfield, Chinese is a family of mutually unintelligible languages (1933:44). Y.R. Chao (1968) refers to these dialects as 'practically different languages'. But Karlgren (1928) argues that

It is mainly in the evolution of sounds that these dialects have diverged so widely; in other grammatical respects they agree so closely that they cannot be called different languages.

Although from the linguistic facts these seven main dialects can be considered different languages, the Chinese scholars, even some famous Chinese linguists such as M.K. Gao and A.S. Shi, believe that they speak dialects of a single language because of a common cultural heritage. On the other hand, Chinese dialects share many important features on all structural levels. A relatively simple syllable structure and tone phonemes as parts of syllables are characteristic of all Chinese dialects. Their main difference is in pronunciation. Kratochvíl (1968) explains that

Irrespective of linguistic evidence, speakers of what is called Chinese share a common cultural heritage which is reflected in many aspects of
their life including their language behaviour. Their common standard form of communication represents an important part of this cultural heritage.

For these reasons, Ramsey (1987) concludes that 'we usually do not speak of Chinese in the plural, even though in other, less cohesive contexts, the dialects would unquestionably be considered different languages'. The term 'Chinese' when used in this context does not have a purely linguistic meaning. It denotes a variety of oral forms which are used within a culturally, politically and socially defined community.

Geographically, the Chinese people like to divide themselves into two large groups, the northerners and the southerners. This is also the case with the Chinese language. The northern group covers more of the country than the southern group, and the northern Chinese, known as the 'Mandarin dialect', today has more native speakers than any other language. About seventy-one percent of the Han people belong to the northern group despite local variations. The Southern group can be further divided into six groups. They are Wu (e.g. Shanghai), Xiang (e.g. Nanchang), Kejia (e.g. Meixian), Min, which can be further divided into Northern Min (e.g. Fuzhou) and Southern Min (e.g. Amoy), and Yue (e.g. Canton) (see Fig.2). The northern area is uniform; almost
Fig. 2 The Chinese main dialects (Li and Thompson 1981)
all of the varieties of the language spoken there are mutually understandable. The Beijing dialect is a representative of the northern dialects. But the southern area is extremely diverse. Ramsey (1987) calls this remarkable linguistic difference "a unified North and a fragmented South". This study treats Mandarin Chinese and ignores the other six groups.

1.2 Mandarin.

The term 'Mandarin' is an established linguistic term in the west. It was called 'guānhuà' (official language) in the Ming (1368-1616) and Qing (1616-1911) dynasties. Under the Qing empire the standard was known as 'guānhuà', or 'Mandarin' in English, based on the court speech of the capital, Peking.

After the end of the empire, Mandarin was given the status of National Language, called 'Guóyǔ' by the Nationalist government, then replaced by Common Language, called 'Pǔtōnghuà' by the communist government. It is the foundation for the standard vernacular, or 'Pǔtōnghuà', in China today. According to Li and Thompson (1981), the word 'Mandarin' denoting the major dialect family of China represents the speech of Beijing, which for centuries has been recognized as the standard language of China because of the political and cultural significance of that city. Norman
The English term "Mandarin" as a designation of the standard language, and as a term for the language group to which the standard language belongs, is obviously merely a translation of guānhuà.

Mandarin as a speech variety for 'public use' is also recognized as an international language for the Chinese all over the world. "Some two-thirds to three-quarters of the Chinese-speaking population speak what is loosely called Mandarin in English or Pǔtōnghuà in Chinese" (DeFrancis 1984). Thus, it is clear that Mandarin refers to both 'Pǔtōnghuà' (common speech) in the mainland and 'Guóyǔ' (national language) in Taiwan. Both embody the pronunciation of the Beijing dialect, the grammar of northern Chinese, and the vocabulary of modern vernacular literature. For hundreds of years since the capital of China was moved to Beijing, which was once the capital of the Yuan (1271–1368), Ming (1368–1616), and Qing (1616–1911) dynasties, the Beijing dialect has been the accepted lingua franca. It can be understood by the educated people throughout the whole country. Thus, the term 'Mandarin' used by the western linguists today indicates a standard vernacular, called 'modern Chinese' or 'hányǔ' (the language of the Hans) in
the Mainland and `Guóyǔ' in Taiwan.

1.3. The Scheme for the Chinese Phonetic Alphabet.

Since the Chinese Pinyin will be used most frequently in the following sections, it is necessary to explain it here. Pinyin (phonetic alphabet) is the official Romanized spelling system in the People's Republic of China. In the long history of Chinese culture, the Chinese traditional method to analyze a syllable is to divide it into an initial and a final part, with a tone included in the final. This traditional phonological description is even adopted by Chinese linguists today, because it suits the characteristics of Chinese phonetics. Before and after the establishment of the Chinese traditional phonology, Qieyin, which is the oldest guide to Chinese pronunciation, there were various ways to record sounds of characters such as Zhuyin, Fanqie and the Roman alphabet.

Take Fanqie as an example. 'Fanqie' in Chinese had been a method of the traditional spelling system for reading characters for many centuries. As Ramsey (1987) describes, the 'spelling' system is one in which the reading of a character is indicated by using two known characters to identify the pronunciation of a third, unknown one. The first character, or 'upper' character, represents the initial consonant, and the second character, or 'lower' character,
represents the rest of the syllable---the final and its tone. Here is an example of the Middle Chinese pronunciations of words in Figure 3. Since Chinese phonologists did not analyze a syllable into units smaller than an initial and a final, this bipartite division of the syllable is the way sounds are analysed in the Chinese tradition. Such Fānqiē spellers were the most powerful tool for describing actual pronunciations available in China at that time. Even today in schools the children do not spell a Pinyin syllable by reading each letter by its letter name. They pronounce a syllable (a character) by giving its initial and final, chanting them together in a uniform high pitch, with a vowel sound [ə] added to the initial so that it can be read syllabically. Then the two parts are combined and the appropriate tone added to the resulting syllable. Here are some examples illustrated below (from Ramsey 1987).

<table>
<thead>
<tr>
<th>Example</th>
<th>Pinyin spelling</th>
<th>phonetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>gou 'dog'</td>
<td>(g(\ddot{e}) + ou = gou)</td>
<td>(k(\ddot{e}) + \ddot{u} = k\ddot{eu})</td>
</tr>
<tr>
<td>tāng 'sugar'</td>
<td>(t(\ddot{e}) + ang = tāng)</td>
<td>(t'(\ddot{e}) + a\ddot{j} = t'a\ddot{j})</td>
</tr>
<tr>
<td>rén 'person'</td>
<td>(r(I) + en = rén)</td>
<td>(\ddot{z}(\ddot{i}) + \ddot{a}n = \ddot{z}\ddot{a}n)</td>
</tr>
</tbody>
</table>

To the Chinese, the initial and final, together with the tone, are the way the modern Chinese spell and the elements of which the syllable is composed.
Figure 3. Above is a page from the Qieyun Rhyming Dictionary (Ramsey 1987).

Note: Fǎnqìé, a linguistic term, is a traditional method of indicating the pronunciation of a Chinese character by using two other Chinese characters, the first having the same consonant as the given character and the second having the same vowel (with or without final nasal) and tone, e.g. the pronunciation of 同 tóng is indicated as 时 shí meaning a combination of the consonant 时 shí and the vowel plus nasal ong from 红 hóng.
Although Fanqiē has been replaced by letter spelling, it plays an important role in the history of Chinese phonology. Just as Ramsey (1987:121) points out: 'as long as the Chinese continued to write exclusively with the traditional character system, the Fanqie would remain about the most efficient way to indicate pronunciations'. These traditional ways, however, are neither scientific nor convenient for use. So a scheme for the Chinese phonetic alphabet was adopted at the First Plenary Session of the First National People's Congress of the People's Republic of China on February 21, 1958. It is a set of symbols used to transliterate Chinese characters and combine the sounds of common speech into syllables. The scheme makes use of the Latin alphabet, modified to meet the needs of the Chinese language. It forms the foundation for the creation of a Chinese alphabet system of writing, which is being used throughout the whole country to facilitate the learning of Chinese characters, to help unify pronunciation and to popularize the common speech. It has for years been used among foreign learners of Chinese as well.

The scheme consists of five parts: (1) 26 Latin Phonetic letters; (2) 21 initials; (3) 35 finals; (4) 4 tone-graphs; and (5) a syllable-dividing mark (Table 1).
Table 1. Scheme for the Chinese Phonetic Alphabet

1. Phonetic Alphabet

| Printed forms: | A a B b C c D d E e F f G g H h I i |
| Names:         | [a] [p̂] [tsʰ] [tʃ] [y] [ɛ] [k] [xa] [i] |
| Printed forms: | J j K k L l M m N n O o P p Q q |
| Names:         | [tɕi] [kʰ] [ɛ̃] [ɛ] [ɛ] [n] [o] [pʰ] [tɕʰiou] |
| Printed forms: | R r S s T t U u V v W w X x Y y Z z |
| Names:         | [ar] [ɛ] [tsʰ] [u] [v] [wa] [ɣ] [ja] [tsɛ] |

"V" is only used for spelling borrowed words, minority national languages and dialects.

2. Initials

| Pinyin symbols: | b p m f d t n l g k h |
| Phonetic values: | [p] [pʰ] [m] [f] [t] [tʰ] [n] [l] [k] [kʰ] [x] |
|                  | j q x zh ch sh r z c s |
|                  | [tɕ] [tɕʰ] [ɛ] [ts] [tsʰ] [s] [ʃ] [tʃ] [tʃʰ] [ʂ] |

For simplification, zh, ch, or sh can be shortened as ɻ, ɻ, ʂ.
3. Finals

Pinyin:  a  o  e  i  u  u
IPA:  [a]  [o]  [ɛ]  [i]  [u]  [u]

Pinyin:  ao  ai  ou  ei  le  ia  ua  uo  ue
IPA:  [au]  [ai]  [ɔu]  [ei]  [ei]  [ia]  [ua]  [uo]  [yɛ]

Pinyin:  iao iou  uai  uei
IPA:  [iau]  [iəu]  [uai]  [uei]

Pinyin:  an  en  in  un
IPA:  [an]  [ɛn]  [in]  [yn]

ian  uan  uan  uen
[iɛn]  [uan]  [yan]  [uən]

ang  eng  ong  ing
[ɑŋ]  [əŋ]  [uŋ]  [iŋ]

iang  iong  uang  ueng
[iaŋ]  [iuŋ]  [uaŋ]  [uəŋ]

Final i represents three different sounds: 1) It is used to stand for the blade-alveolar vowel [l] when it occurs
after initials as 'z', 'c', and 's'. 2) It is used to stand for the blade-palatal [?] after initials, 'zh', 'ch', 'sh', and 'r'.

3) After other initials, it sounds like the vowel [i].

"/u/" in modern pronunciation is ér. When it is used as a retroflexed final, it is written as a "r".

4. Tone-graphs

<table>
<thead>
<tr>
<th>Hi-level tone</th>
<th>Rising tone</th>
<th>Falling-rising tone</th>
<th>Falling tone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

The tone-graph is marked on a main vowel of the syllable. There is no mark on a neutral tone.

<table>
<thead>
<tr>
<th>mā</th>
<th>mà</th>
<th>mà</th>
<th>mà</th>
<th>ma</th>
</tr>
</thead>
<tbody>
<tr>
<td>'mother'</td>
<td>'hemp'</td>
<td>'horse'</td>
<td>'curse'</td>
<td>'question particle'</td>
</tr>
</tbody>
</table>

unstressed form word

5. Syllable-dividing marker

When a syllable beginning with a letter 'a', 'o', or 'e' follows another syllable in such an ambiguous way that division of the two syllables could be confused, it is essential to put a dividing mark "'" in between,
e. g. ipherals 'fur-lined jacket'.

1.4. Syllables.

In all forms of Chinese speech, the syllable plays a crucial role. Chinese is monosyllabic from the morphemic point of view. Almost every syllable corresponds to a morpheme. The ordinary written Chinese is formed of characters which are the symbols of the Chinese language. Generally speaking, each character stands for a meaningful syllable. Chinese characters evolved from pictographs cut on oracle bones dating from over 3,000 years ago into characters formed of strokes (Figure 4). Most of the present-day

![Fig. 4 A copy from Practical Chinese Reader (1985)](image-url)
Chinese characters are known as pictophonetic characters, each formed of two elements with one indicating the meaning and the other the sound. See the following examples:

<table>
<thead>
<tr>
<th>Phonetic element</th>
<th>Word</th>
<th>Graph</th>
<th>Meaning determinant (radical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>青</td>
<td>tch'In 'blue or green'</td>
<td>青</td>
<td>虫 'insect'</td>
</tr>
<tr>
<td>青</td>
<td>tch'In 'dragonfly'</td>
<td>蝉</td>
<td>青 'dragonfly'</td>
</tr>
<tr>
<td>青</td>
<td>tch'In 'clear, unmixed'</td>
<td>清</td>
<td>水 'water'</td>
</tr>
<tr>
<td>青</td>
<td>tch'In 'mackerel'</td>
<td>鯖</td>
<td>清 'mackerel'</td>
</tr>
<tr>
<td>青</td>
<td>tch'In 'clear; fine'</td>
<td>日</td>
<td>日 'sky'</td>
</tr>
<tr>
<td>青</td>
<td>tch'In '(cn₂) cyanogen'</td>
<td>气</td>
<td>气 'gas or air'</td>
</tr>
<tr>
<td>青</td>
<td>tch'In 'request; ask'</td>
<td>请</td>
<td>请 'request; ask'</td>
</tr>
<tr>
<td>青</td>
<td>tch'In 'bamboo grove'</td>
<td>竹</td>
<td>竹 'bamboo'</td>
</tr>
<tr>
<td>青</td>
<td>tch'In 'feeling; sentiment'</td>
<td>情</td>
<td>情 'feeling; sentiment'</td>
</tr>
<tr>
<td>第</td>
<td>tl 'younger brother'</td>
<td>弟</td>
<td>哥 'younger brother'</td>
</tr>
<tr>
<td>第</td>
<td>tl 'wife of younger brother'</td>
<td>妹</td>
<td>妹 'wife of younger brother'</td>
</tr>
<tr>
<td>第</td>
<td>tl 'glance at'</td>
<td>睇</td>
<td>目 'eye'</td>
</tr>
<tr>
<td>第</td>
<td>thl 'shave'</td>
<td>剃</td>
<td>刀 'knife'</td>
</tr>
<tr>
<td>第</td>
<td>thl 'wooden stairs'</td>
<td>梯</td>
<td>梯 'wooden stairs'</td>
</tr>
<tr>
<td>第</td>
<td>thl 'weep, tears'</td>
<td>哭</td>
<td>眼 'tears'</td>
</tr>
<tr>
<td>第</td>
<td>tl 'order, sequel'</td>
<td>第</td>
<td>第 'order, sequel'</td>
</tr>
<tr>
<td>第</td>
<td>tl 'wooden stairs'</td>
<td>木</td>
<td>木 'wood'</td>
</tr>
<tr>
<td>第</td>
<td>tl 'water'</td>
<td>木</td>
<td>湿 'water'</td>
</tr>
<tr>
<td>第</td>
<td>tl 'bamboo'</td>
<td>竹</td>
<td>竹 'bamboo'</td>
</tr>
</tbody>
</table>
About 90% of all characters are made in this way. The ambiguity of homophones is resolved by adding semantic indicators.

In both classical and modern Chinese, the majority of morphemes coincide phonologically with a monosyllable. The syllable is, therefore, taken as a kind of self-contained entity which forms the basis of a phonological description of the Chinese language.

The Chinese syllables can be classified into two types, as follows:

In Type A, a syllable is formed by a final and tone. There are four kinds:

1. $V + T$  
   E.g.  "`evil`

2. $V \{ \frac{\acute{\mu}}{\ddot{\iota}} \} + T$  
   ài 'to love', ēn 'kindness'
3. v V + T  
4. v V{\text{N}} + T

\text{ua}^\ddag 'to dig'
\text{uai} 'outside', \text{iān} 'smoke'

In Type B, a syllable is formed by a consonant, final and tone. There are also four kinds:

1. C V + T  
   \text{E.g. mā 'mother'}
2. C V{\text{N}} + T  
   \text{lái 'to come', mén 'door'}
3. C v V + T  
   \text{huā 'flower'}
4. C v V{\text{N}} + T  
   \text{huài 'bad', huáng 'yellow'}

C = \text{consonant}, \quad V = \text{vowel}, \quad N = \text{nasal}, \quad T = \text{tone}

v = \text{glide}

The Chinese syllable has a maximum of four segmental phonemes and one suprasegmental phoneme, as in \text{huài 'bad'}. The initial h is a consonant that begins the syllable and a final uai is the rest of the syllable. The final can be further analyzed into a head vowel or a medial vowel u, a main vowel a and tail vowel or ending i. The tone-graph "\" above the main vowel a is the pitch of that syllable. An initial is always a consonant (there are no consonant clusters in Mandarin) while a final is a vowel, which may be a simple vowel (simple final), or a compound vowel, a diphthong or a triphthong (compound final), or a vowel plus a nasal consonant (nasal final). There are only two consonant
finals\textsuperscript{14} in \textit{Pǔtōnghuà} (Mandarin), as \textit{n} in \textit{sān} 'three' and \textit{ng} [ŋ] in \textit{liǎng} 'two'. A syllable may be without an initial, called "zero initial" (Hartman 1944); that is, there is no actual consonant and the syllable begins with a vowel, e.g. \textit{ài} 'love', but no syllable can do without a final.

Mandarin has altogether twenty-one initials, only a few of which are voiced, i.e. sonorant consonants "\textit{r, m, n}" and "\textit{l}", and the rest are all voiceless. Mandarin Chinese has no series of distinctively voiced obstruent consonants. It lost the feature of voicing on these consonants in Middle Chinese. In the twenty-one initials there are six pairs of corresponding consonants in which six are aspirated and others are unaspirated. These six pairs are illustrated in Figure 5.

Unaspirated: \textit{b \ [p]} \textit{d \ [t]} \textit{g \ [k]} \textit{z \ [ts]} \textit{zh \ [ts]} \textit{j \ [tc]}
Aspirated: \textit{p \ [ph]} \textit{t \ [th]} \textit{k \ [kh]} \textit{c \ [tsh]} \textit{ch \ [tsh]} \textit{q \ [tch]}

\textbf{Fig.5} Unaspirated and aspirated consonants

Note that in Chinese, the unaspirated consonants are also voiceless consonants. In modern Mandarin aspiration, or the lack of it, is capable of differentiating meaning, for example,

(1) (1a) \textit{bā \ [pā]} 'eight'
(1b) \textit{pā \ [pʰā]} 'lie on something.'
Vowels predominate in Chinese syllables. Mandarin has thirty-nine finals (although the above scheme mentions only thirty-five finals), ten simple finals, thirteen compound finals, and sixteen nasal finals.

The combinations of the initials and finals form about 400 basic syllables if tones are disregarded. With tones Mandarin Chinese has about 1,300 tonal syllables. The number of syllables compared with that of English is small. English has more than 8,000 different syllables (Jespersen 1982).

Tone is an important characteristic of the Sino-Tibetan family. In these languages, tone is a part of the morphemic construction in a syllable. Modern Mandarin has four basic tones, represented by the following tone-graphs: "-" (the 1st tone), "/'" (the 2nd tone), "\" (the 3rd tone) and "\" (the 4th tone). The four tones of modern Mandarin are not the
same as the four tones of Middle Chinese (MC), which were the even or level tone, the rising tone, the departing tone and the entering tone (Beijing Foreign Language Institute 1985). The even tone, one of the four tones in Middle Chinese, has evolved into the high and level tone (tone 1) and the rising tone (tone 2) in modern Chinese pronunciation. The rising tone in MC corresponds to the third tone (falling-rising tone) in modern Chinese pronunciation. The departing tone, which was one of the four tones in MC, corresponds to the fourth tone (falling tone) in modern Chinese pronunciation. The entering tone in MC has been totally lost in modern Mandarin. In MC, the entering tone can be identified by syllables ending with -p, -t, or -k consonants. The loss of -p, -t, -k results in the loss of the entering tone in Mandarin dialects (Fig. 6).

<table>
<thead>
<tr>
<th>Middle Chinese</th>
<th>Even</th>
<th>Rising</th>
<th>Departing</th>
<th>Entering</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>平</td>
<td>上去</td>
<td>入</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Modern</th>
<th>Hi-level</th>
<th>Hi-rising</th>
<th>Low-dipping</th>
<th>Hi-falling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandarin</td>
<td>55</td>
<td>35</td>
<td>214</td>
<td>51</td>
</tr>
</tbody>
</table>

Fig. 6. Four tones of Mandarin Chinese
The first tone of Middle Chinese split by the Tang time. The split was caused by the phonetic quality of the initial consonants. A syllable with a voiceless initial consonant became tone 1 in modern Mandarin, while a syllable with a voiced initial consonant became tone 2. (see Ramsey 1987:139)

<table>
<thead>
<tr>
<th>Middle Chinese</th>
<th>Modern Mandarin</th>
</tr>
</thead>
<tbody>
<tr>
<td>'east'</td>
<td>tung¹</td>
</tr>
<tr>
<td>'pass through'</td>
<td>t'ung¹</td>
</tr>
<tr>
<td>'boy'</td>
<td>dung¹</td>
</tr>
<tr>
<td>'agriculture'</td>
<td>nuong¹</td>
</tr>
<tr>
<td></td>
<td>tung¹ (dōng)</td>
</tr>
<tr>
<td></td>
<td>t'ung¹ (tōng)</td>
</tr>
<tr>
<td></td>
<td>t'ung² (tōng)</td>
</tr>
<tr>
<td></td>
<td>nung² (nōng)</td>
</tr>
</tbody>
</table>

To sum up, tone in Chinese is as important as initials and finals. The number of tones varies from language to language. Mandarin has four tones. But in some Chinese dialects, there are three, five, and even nine, as in Cantonese. In the southwest of China some minority dialects have more than ten tones, as for example, the Dong [tuŋ] language, which has fifteen tones.
Notes

1The Hui are essentially the same as the Han, except that they are Muslim, the Islamic religion having been introduced by Arab soldiers and merchants 1,200 years ago (National Geographic Society 1982).

2The Man (Manchu) conquered China in the 17th century and were gradually assimilated by the Han with little remaining of their ancient customs or language (National Geographic Society 1982).

3The She, who now speak mainly Chinese, may be descended from the Yao who retreated to the west 500 years ago under pressure of Han expansion (National Geographic Society 1982).

4Bernhard Karlgren was the first person to apply the comparative method to the Chinese language.

5Ming-kai Gao and An-shi Shi are linguists at Beijing University.

6Kejia is called "Hakka" in Catonese which means 'guest' or 'stranger', since the Hakka were mistakenly thought not to be Chinese at all. Thus these 'guests' are treated as
outsiders of the Han territory.

7 Guoyu replaced ‘guanhua’ as the name of the common national language.

8 Putonghua is the official name of the standard language in Mainland China.

9 Hanyu (the language of the Hans) is quickly becoming the way to refer to the standard national language.

10 Zhuyin is a traditional method of indicating the pronunciation of a Chinese character by citing another character with the same pronunciation.

11 For more information about Fanqie, see Norman 1988; Pulleyblank 1984 and Ramsey 1987.

12 Norman (1988:45) says: “Writing all three with the same Pinyin letter causes no confusion because they never occur after the same initial---a reader who knows Chinese sees the initial and adjusts the pronunciation of the vowel automatically”.

13 Only three high vowels in modern Chinese, i, u, u, can
function as a medial vowel.

Modern Mandarin does not have -p, -t, -k, or -m as ending consonants. These final consonants disappeared during the late Tang period.
CHAPTER II

THE RETROFLEX FINAL

Introduction

Except for the monosyllabic core, the vast majority of words of Chinese today consist of two or more morphemes. Suffixation is one of the ways to create new words. There are several common word-forming elements in Mandarin such as er [ʔər], zi [ʦi] and tou [ʈʰou], which occur only as word constituents with grammatical and semantic functions and are attached to nominal or verbal root morphemes to form complex words. They receive zero stress since they are dependent. Er, the retroflex final, is the most common in Mandarin.

In Mandarin Chinese, there are several morphophonemic alternations in connection with the processes of -r suffixation. The retroflex final has a specific function in the language. It can not only distinguish the meaning and the class of words, but also add the emotional notion (color) of smallness, kindness and mild tone to the speech. Moreover, by retroflexion, all the finals of the language can be grouped into seven rhyme groups. Thus, it plays a role in rhyming in poetry. The r-ending retroflexion is a typical phenomenon in the sound system of the language. The r-
ending, when suffixed to nouns and sometimes verbs, causes a retroflexion of the preceding vowel and is often accompanied by certain morphophonemic alternations in the final of the preceding syllable. How the r-sound affects the preceding syllable is discussed in this section.

2.1. The retroflex final.

Mandarin Chinese has a series of "rhotacized" (er-hua) finals (Ramsey 1987). The term 'er-hua final' refers to suffixation of a nonsyllabic 'r' to nouns and sometimes verbs, causing a retroflexion of the preceding vowel, typical of the pronunciation of standard Chinese and of some dialects. "er" is a simple final which can stand for a syllable all by itself; for example, the syllable er [ər] means 'son' when it occurs in isolation with its full tone and syllabicity. But when it is used as the word-formative suffix attached to another final to form a retroflex final, it is no longer an independent syllable and loses its syllabicity and tone completely, becoming part of the preceding final. In this case, a retroflex final is represented by the letter 'r' added to the final of the preceding syllable in question. Here are some examples of these two cases.
(1) the independent final 'er':

értóng [ěrtʰǔŋ] 'children'
érzi [ěrtsl] 'son'
nǐ'er [nǐər] 'daughter'
ěrduo [ěrtuo] 'ear'
èrshí [èrςí] 'twenty'
èrbǎi [èrpǎi] 'two hundreds'

(2) the retroflex final (-r as part of the preceding final):

quānr [tchʰuǎr] 'circles'
wánr [wár] 'to play'
yánr [iǎr] 'hole'
yīdiàn[ jìtiǎr] 'a little, a bit'
xiāoháir [gjǎwxǎr] 'little child'

The -r suffix is thought the only morpheme in the language that is less than a syllable long, and it is named the 'non-syllabic' suffix. This is not strictly the case, since in Mandarin Chinese we can still find some other cases in which the unit of a morpheme is smaller than a syllable, such as la (Particle occurs at the end of the sentence) which represents two morphemes, le (Aspect Part.) + a (Particle of mood), and péng 'needn't' represents two morphemes, pú 'not' and yòng 'need'.
In Chinese written form, the -r suffix is indicated by the character "儿" which always follows another character, as for example, 信儿 'message' and 小儿 'child'. The clustering of the -r retroflex suffix with the preceding final causes certain morphophonemic alternations. All of the changes caused by this suffix are ignored in Pinyin orthography, because the pronunciation of it is complicated and difficult to describe in a simple way. Generally, an -r is simply added to the end of the preceding final, as for example, [ʨin + r] = tcinr 'today'. But in actual speech, it sounds like [ʨi3r].

There are two circumstances in connection with the pronunciation of the r-ending suffix: (1) the original final is not changed; this final is only produced by a single tongue gesture with coarticulated retroflexion, e.g. huār [χuər] (LvO; (2) certain modifications of a morphophonemic kind take place in the original final, e.g. shengr [ʂɔ] (ʃ i̯). All the finals or endings produced by these two circumstances are listed in Table 2.1.

Now we examine the first group. In articulating the vowels [a, ɔ, u, o] which are all back, the tip of the tongue is free to be retroflexed at the same time. Therefore, no phonetic modification is effected on the finals.
Table 2.1. Finals affected by the -r suffix

<table>
<thead>
<tr>
<th>Finals or Endings</th>
<th>Retroflexion</th>
<th>Example (actual pronunciation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>no phonetic modification, when adding -r</td>
<td>[ma̯]~[ma̯] 'small horse'</td>
</tr>
<tr>
<td>o</td>
<td>[mja̯o̯]~[mja̯or] 'young plant'</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>[kɨr]~[kɨr] 'song'</td>
<td></td>
</tr>
<tr>
<td>u</td>
<td>[tʰou̯]~[tʰour] 'leader'</td>
<td></td>
</tr>
<tr>
<td>i</td>
<td>the ending i or n is, [kai̯]~[kar] 'a lid'</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>deleted, when adding -r [jan̯]~[jar] 'hole'</td>
<td></td>
</tr>
<tr>
<td>ng</td>
<td>[ɲ] is deleted, when [tɨn̥-jɨɲ]~[tɨn̥-jɨr] 'movie'</td>
<td></td>
</tr>
<tr>
<td></td>
<td>adding -r and nasalization of the preceding vowel. [pə̯n̥-tɔ̯ɲ]~[pə̯n̥ tər] 'stool'</td>
<td></td>
</tr>
</tbody>
</table>
The front endings, \( i \) and \( n \) in the second group, which are incompatible with retroflexion, are simply dropped. This deletion also conforms to the phonotactic structure of the syllable.

The velar nasal ending \([ŋ]\) in the third group is deleted before \( r \)-ending suffixes and is replaced by nasalization of the preceding vowel.
In the fourth group, the high front vowels [i] and [y] produced with the tongue flat, are incompatible with retroflexion (Chao 1968:46). Thus, a schwa is inserted between a high front vowel and the retroflex ending -r.

The fifth group shows that apical vowels, -i [l] and -i [l]² plus the retroflex suffix become [Ar]. Hartman (1944:118) points out that these two finals are in complementary distribution with respect to the initial. The first occurs only after ts, tsh, s, the second only after ts, tsh, s, z. They never occur initially. They are homorganic with the preceding consonant and hence the point of articulation falls outside of standard vowel classification.

Their ([l] and [l]) vowel qualities are conditioned by the preceding consonants. Y.R.Chao (1968) transcribes them as syllabic consonants z and r, simply as a syllabic extension of the preceding initials. Since they are found only after retroflex and plain alveolar sibilant initials, respectively, Pulleyblank (1984) says 'Chao's transcription is more economical than introducing a separate vowel phoneme with such a restricted distribution.'
In the last group, \( n \) in \( in, un, \) and \( ün \) is deleted before the \(-r\) suffix, and a schwa is inserted in between as in group four (high front vowel [i] and [y]). The final \( un \) in Pinyin is phonetically \([u\ n]\). Pulleyblank (1984) notes that 'at a synchronic level in Pekingese it also reflects a tendency for matching vowels and final consonants in terms of frontness'. Thus in the case of final \( un \), the \([-\text{back}]\) ending \( n \) is separated from the \([+\text{back}]\) \( u \) by a schwa.

\[
\begin{align*}
 & \text{[?] insertion } \quad \text{n deletion} \\
 & un \quad \rightarrow \quad u\tilde{n} + r \quad \rightarrow \quad u\tilde{r}
\end{align*}
\]

\[
\begin{align*}
 & \text{n deletion } \quad [?] \text{ insertion} \\
 & in + r \rightarrow inr \quad \rightarrow \quad ir \quad \rightarrow \quad i\tilde{r} \\
 & un + r \quad \rightarrow \quad ünr \quad \rightarrow \quad ür \quad \rightarrow \quad ü\tilde{r}
\end{align*}
\]

Although they all involve the process of a schwa insertion, one is inserted before \( n \) deletion, as in \([un]\) and the other after \( n \) deletion, as in \([in]\) and \([yn]\).
Some homophones can be caused by the retroflex final.

Here are some examples:

(3) (a) 菊 jiā [tɕja] 'home' → [tɕjär]
(b) 尖 jiān [tɕjan] 'sharp' → [tɕjär]

(4) (a) 鸡 jī [tɕǐ] 'chicken' → [tɕjär]
(b) 筋 jīn [tɕin] 'tendon; sinew' → [tɕjär]

(5) (a) 针 zhēn [tsōn] 'needle' → [tsōr]
(b) 枝 zhī [tsū] 'branch of a tree' → [tsōr]

(6) (a) 大 dà [tā] 'big' → [tār]
(b) 蛋 dàn [tān] 'egg' → [tār]

(7) (a) 柜 guī [kul] 'cupboard' → [kwār]
(b) 棍 gùn [kūn] 'stick' → [kwār]

(8) (a) 几 jǐ [tɕjǐ] 'a few; how many' → [tɕjĕr] 'what day'
(b) 姐 jiě [tɕjĕ] 'sister' → [tɕjĕr]

In modern Mandarin Chinese thirty-nine finals are classified into thirteen or eighteen rhyme groups. After the retroflexion of these finals, the thirteen rhyme groups can be classified into seven rhyme groups (Table 2.2). This specific characteristic of the retroflex final is often employed in poetry, opera, ballad singing and comic dialogues.
Table 2.2 A table of the result of the retroflexion of thirteen rhyme groups

<table>
<thead>
<tr>
<th>Thirteen Rhyme Groups</th>
<th>all finals in the scheme</th>
<th>after retroflexion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Fa-hua Rhyme</td>
<td>a ia ua</td>
<td>1.</td>
</tr>
<tr>
<td>6 Kai-huai Rhyme</td>
<td>ai uai</td>
<td></td>
</tr>
<tr>
<td>10 Han-qian Rhyme</td>
<td>an ian uan üan</td>
<td></td>
</tr>
<tr>
<td>3 Jie-xue Rhyme</td>
<td>ê ie üe</td>
<td></td>
</tr>
<tr>
<td>7 Fei-duei Rhyme</td>
<td>ei uei</td>
<td></td>
</tr>
<tr>
<td>11 Ren-qin Rhyme</td>
<td>en in uen ün</td>
<td></td>
</tr>
<tr>
<td>2 Ge-po Rhyme</td>
<td>e</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o</td>
<td>uo</td>
</tr>
<tr>
<td>------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>5 Gu-su Rhyme</td>
<td>u</td>
<td></td>
</tr>
<tr>
<td>9 Hou-qiong Rhyme</td>
<td>ou iou</td>
<td></td>
</tr>
<tr>
<td>8 Hao-tiao Rhyme</td>
<td>ao iao</td>
<td></td>
</tr>
<tr>
<td>12 Tang-jiang Rhyme</td>
<td>ang iang uang</td>
<td></td>
</tr>
<tr>
<td>13 Bing-dong Rhyme</td>
<td>eng ing ueng</td>
<td></td>
</tr>
</tbody>
</table>
2.2. The significance of the -r suffix

The use of -er as a grammatical word-formative was already widespread by the Tang dynasty (A.D.618-907); the following examples are all taken from Tang sources (discussed by Norman 1988): yàn-er 'wild goose', fēng-er 'bee', yú-er 'fish', píng-er 'bottle'. As a rule, in Tang texts the use of 'er' as a suffix is mainly limited to animate nouns. By the Song dynasty (A.D.960-1279) it is found with nouns of all categories. In later sources the use of 'er' is even more extensive. It occurs in a large number of words to form nouns from nominal and verbal morphemes, whether bound or free. But at the Tang and Song dynasties, the suffix -er served as a whole syllable by itself. When it began to cluster with the preceding finals is still not clear.

According to Chao (1968:46), the nonsyllabic suffix -r is often regarded as a diminutive suffix because its original meaning is 'ér' 'child', whence 'smallness'. Chao also claims that suffix -r is not derived from one morpheme alone; in origin, -r represents rather the conflation of three different but homophonous suffixes, each derived respectively from 仁 'therein', 日 `day', and 子 'child'. I think this statement is correct because nar⁴ 'there' has a disyllabic variant, nà-li 'there', in formal speech. And it never occurs, in fact, in the shape of a separate syllable *nà-er and always clusters with the preceding syllable.
is also the case with [ts̪i̯ŋr]-[ts̪i̯ər] 'today'. The status of the -r suffix is very complicated and requires more study. As it is actually used now it usually serves to mark a form as a noun, a change of grammatical function with or without a change of meaning from that of the root morpheme. It occurs freely with both monosyllabic and polysyllabic nouns or verbs, sometimes even with adjectives to form nouns. The retroflex final has the functions of (1) changing a part of speech (nominalization); (2) indicating a meaning extension; (3) representing smallness and lightness; and (4) expressing a mild tone, cordiality, loving care or gentleness. Here are some examples:

(9) The change of part of speech.

(i) \( V + r \rightarrow N \)

\begin{align*}
huà [xwà] & \text{ v. 'to draw'} & huàr [xwàr] & \text{n. 'a picture'} \\
gài [kài] & \text{ v. 'to cover'} & gài [kär] & \text{n. 'a lid'} \\
fêng [fàŋ] & \text{ v. 'to sew'} & fêng [fàr] & \text{n. 'a crack'} \\
bāo [pāw] & \text{ v. 'to wrap'} & bāor [pāwr] & \text{n. 'a package'} \\
yèn [iën] & \text{ v. 'to print'} & yènr [iër] & \text{n. 'a mark'} \\
chàng [tsʰàŋ] & \text{ v. 'to sing'} & chàng [tsʰär] & \text{n. 'song'} \\
dîng [tîŋ] & \text{ v. 'to nail'} & dîng [tiër] & \text{n. 'nails'} \\
zhul [tsuɭ] & \text{ v. 'to fall'} & zhul [tsuər] & \text{n. 'pendant'} \\
duí [tuɭ] & \text{ v. 'to pile up'} & duír [tuər] & \text{n. 'heap; pile'}
\end{align*}
huó [xuó] v.or a. 'to live; alive'  huór [xuór] n. 'work'
e.g. zhòng-huór  'heavy work'

(ii) Adj. + r → N
liàng [liàng] a. 'bright'  liàngr [liār] n. 'light'
wān [wān] a. 'bent'  wānr [wār] n. 'a corner in the road'
kōng [kōŋ] a. 'empty'  kōngr [khuř] n. 'leisure'
huáng [xuáng] a. 'yellow'  huángr [xuár] n. 'yolk'
gān [kān] a. 'dry'  gānr [kār] n. 'dry food'

(10) With meaning extension:
zǐ [tsǐ] n. 'child; son'  zǐr [tsǐr] n. 'a seed'
yǎn [jǎn] n. 'eye'  yǎnr [jǎr] n. 'small hole'
tiān [tiān] n. 'sky'  tiānr [tiār] n. 'weather'
xīn [xīn] n. 'letter'  xīnr [xīr] n. 'message; news'
bāimiānr [pāimiān] n. 'flour'  bāimiānr [pāimiār] n. 'heroin'
jīzǐ [tći/tsǐ] n. 'chicken'  jīzǐr [tći/tsǐr] n. 'eggs'

(11) The meaning of smallness and short duration:
māo [māw] 'cat'  māor [māwr] 'kitten'
mǎ [mǎ] 'horse'  mār [mār] 'small horse'
qiú [tchjú] 'ball'  qiúr [tchjúr] 'small ball'
tāo [tāw] 'knife'  tāor [tāwr] 'small knife'
yìdiǎnr [lítica] 'a little bit'
yǐhuír [jíxuér] 'a short period of time'
The suffix -r has a commendatory sense, while the suffix -zi has a derogatory sense; both of them are noun suffixes.

This (13b) is a very common expression used by the Chinese people when they say farewell to guests or friends at the door, like the English expression "Good-bye, take care of yourself". With the suffix -r, the tone is milder (with loving care) than without it.

There are, however, some exceptions. A few verbs, when suffixed by -r, still remain as a form of a verb without meaning and grammatical changes.
\( (14) \ V + r \rightarrow V \)

\[
\begin{align*}
\text{wán} \ [\text{wán}] \ v. & \quad \rightarrow \quad \text{wánr} \ [\text{wár}] \ v. \ 'to \ play' \\
\text{huó} \ [\text{xwó}] \ v. & \quad \rightarrow \quad \text{huór} \ [\text{xwór}] \ v. \ 'got \ mad'
\end{align*}
\]

The \(-r\) suffix has another usage. A proper demonstrative can be changed into a place word by adding the \(-r\) suffix. The \(-r\) suffix added to the proper demonstrative is a different \(-r^3\) suffix, though with the same morphophonemics as the noun suffix \(-r\).

\( (15) \)

\[
\begin{align*}
zhè \ [\text{te-}] \ 'this' & \quad & \text{zhèr} \ [\text{teirr}] \ 'here' \\
nà \ [\text{nà}] \ 'that' & \quad & \text{nàr} \ [\text{nár}] \ 'there' \\
nà \ [\text{nà}] \ 'that' & \quad & \text{nár}^4 \ [\text{nár}] \ 'where'
\end{align*}
\]

Additionally, \(-r\) is sometimes suffixed to the time words to form complex time words (this \(-r\) is originally derived from \(rì\) 'day' [see Chao 1968]).

\( (16) \)

\[
\begin{align*}
jīnr \ [\text{tɕìr}] \ 'today' & \\
míngr \ [\text{miér}] \ 'tomorrow' & \\
qiánr \ [\text{tsʰjár}] \ 'the \ day \ before \ last' & \\
hòur \ [\text{xəur}] \ 'the \ day \ after \ next'
\end{align*}
\]

Sometimes, the \(-r\) suffix is added to measure words to form nouns:
(17) **gè [kə]** a general measure word meaning: 'one piece of or one item of'

**gèr [kər]** 'height, status of body'

e.g. **gāo-gèr** 'tall person'

The retroflex final plays a role in rhyming in poetry, especially, in children's poetry or songs, as for example,

(18) **zàochóng mǎ, báitóu xīnx [qír]**

shēngle yīge xiāomājūr [tējør].

xiāomājū, huīhūīhuīr [xwær]

wéizhe yǐyie dōuquānzhì [tsær].

yǐyie shāichāo yǒubànliào,

wǒ gěi xiāomājū duān dòuzhǐr [tēɔr].

xiāomā xiāomā kuāikuāi zhāngyà,

zhāngshàng yīshēng hǎolǐqìr [qír].

lāchē zhòngdì sòng gōngliáng,

jiànshè zǔguó xīnnóngcūn [tjœér].

A purplish red horse with white fur on its forehead gave birth to a foal. The foal whinnied and walked around the grandpa in circles. The grandpa sifted and mixed fodder for him. And I served the foal soybean milk. I hope the foal grows up quickly and has great physical strength. So he can pull the cart, till land and deliver public grain to build
our homeland into a new world.

The retroflex suffix has two functions in poetry: (1) The -r suffix with the final of the preceding syllable forms a particular rhyme and changes the rhyming words that end a line of verse with different rhyme groups into the same rhyme group:

(19) Ren-qin Rhyme: xīn, cuēn
Zhi-qi Rhyme: jū, zī, zhī, qì
Fei-duì Rhyme: huēi

But when all the finals of these seven morphemes cluster with the -r suffix, they become /xie r juēr huēr zhēr qiēr cuēr/ respectively and belong to the same rhyme group, Xiaoren-qin-er Rhyme. And (2) retroflexion makes a description more vivid and adds the connotation of smallness, loveliness and agility.

In Pūtōnghuà there are over 800 retroflexed words. Their occurrence depends on the speech styles and the contexts. Not every word can undergo the process of retroflexion.

Retroflexion is frequently used in oral speech and informal situations. The monosyllabic unit 'root+ r' also
has its disyllabic variant when the context needs it; for example, for the requirement of the rhythmical pattern, and the number of syllables in each line in poetry, the suffix -r must be an independent syllable.

(20) 小鸟在前面带路，
fēng-er cuī-着 wǒ-men.

'A little bird is leading the way ahead,'
'mild wind is blowing to us.'

Independent 'er' here functions as a time-filler. Fēng-er, a disyllabic noun, should match the disyllabic noun, xiǎo-niǎo 'little bird'. That is the reason why it occurs in the shape of a separate syllable although it is often pronounced in cluster-form in conversation. Here are more examples.

(21) 花儿多得意; *花儿多得意

jiāo huār *jiāo huā-er

xiàn-er 长, zhēn-er 好. (in song or in poetry)

xiàn’ěr zhēn 长, zhēn’ěr 好. (in conversation)
Kratochvil (1968) says that the word-formative suffix -r never occurs in the shape of a separate syllable. This is not true.

The retroflex suffix is extremely common and productive in the speech of Beijing and of some other Mandarin dialects like Sichuan. Also, the retroflex is the mark of elegant Peking pronunciation, which is very much admired (Norman 1988). The retroflex distinction is officially considered part of the standard language. Thus, the use or non-use of -r also serves to distinguish standard pronunciation from non-standard pronunciation.
Notes

1 Er is produced in the same way as "e" [ɛ], but with the tongue curled and raised towards the hard palate.

2 [ɯ] and [ɺ] are identified as -i in Pinyin, indicating the blade-alveolar or the blade-palatal vowel respectively.


4 Nar with the third tone is different from nar with the fourth tone. The former means 'where' and the latter means 'there'.
CHAPTER III

TONE

In Mandarin Chinese, one of the well-known features is its suprasegmental phonemes, the tones, which are capable of differentiating meanings. Study of actual speech of the language reveals that it is not a monotonous succession of monosyllables to each of which one of four tones is unchangeably attached. There are several alternations in connection with the process of tone sandhi. Some cases are phonologically determined—in other words, the changes take place whenever the particular phonological conditions are present in the relevant environment. Also there are cases of morphophonemic alternations, which affect only certain morphemes and thus cannot be regarded as general phonological processes. In addition, we find that alternations can be conditioned by other factors such as stress, pause, intonation and grammatical constructions which permit a certain amount of flexibility. This section will focus on the natural speech of the language in order to explore how tones are actually used in speech, how tone sandhi produces
each pronunciation, and how the grammatical structure is relevant.

3.1. Tone

Chinese, as well as many other languages, uses features of pitch as primary phonemes (Bloomfield 1933:83). Mandarin Chinese has four tones that function like consonants and vowels in distinguishing meaning. A tone operates within the framework of the syllable. Chao (1968:25) notes that tone is primarily the pitch pattern of the voiced part of the syllable. For example, if the initial is voiced, the tone begins with the initial and spreads over the whole syllable, as in nián 'year', while if the initial is voiceless, the tone is spread over the final only, as in kàn 'look at'. But phonetically, tone-spread goes beyond the limitation of the voiced part of a syllable. Tone is regarded as a feature of the whole syllable.

Tones are perceived as differences in pitch. Pitch is plotted on a vertical scale which represents the normal voice range of a speaker. The scale (first introduced by Chao 1968:26) is divided into five points, of which 5 is the highest pitch and 1 is the lowest, 3 is mid pitch, 4 half-high, and 2 half-low. A tone can be described by indicating its beginning and ending point in Figure 3.1.
The first tone is high-level. It is pitched at the top of the speaking range (5) and is held constantly in its loudness (5). The second tone is high-rising. It begins from the middle of the normal range of the voice (3) and rises immediately to the top (5). The third tone is falling-rising. It starts off half-low (2) and drops to the very bottom (1), then rises to half-high point (4). The fourth tone is high-falling. It begins on a pitch at the very top of the speaking range (5) and falls quickly to the bottom (1). Of the four tones the fourth tone is the shortest tone in duration\(^1\). Tones, 1\(\text{(high-level)}\), 2 \(\text{(high-rising)}\), 3 \(\text{(falling-rising)}\), and 4 \(\text{(high-falling)}\) are classified as four tone categories, while 55, 35, 214 and 51 are called their tone values. Since the tone categories of Mandarin Chinese and some Chinese dialects are derived from those of Middle Chinese, the names of the tone categories are almost the same in these dialects. But the tone value of each category is
different. For instance, Tiānjīn dialect has the same tone categories as Pǔtōnghuà, but their tone values are not the same as those of Pǔtōnghuà (see M.K.Gao 1963:64).

<table>
<thead>
<tr>
<th>Tone category</th>
<th>Example</th>
<th>Putonghua</th>
<th>Tianjin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>mā 'mother'</td>
<td>[55]</td>
<td>[11]</td>
</tr>
<tr>
<td>2</td>
<td>má 'hemp'</td>
<td>[35]</td>
<td>[55]</td>
</tr>
<tr>
<td>3</td>
<td>mǎ 'horse'</td>
<td>[214]</td>
<td>[24]</td>
</tr>
<tr>
<td>4</td>
<td>mà 'scold'</td>
<td>[51]</td>
<td>[42]</td>
</tr>
</tbody>
</table>

Each stressed syllable in the language bears one of the four phonemically distinctive pitches. Here are some examples of words that contrast with each other.

1st tone | 2nd tone | 3rd tone | 4th tone
--- | --- | --- | ---
pā 'eight' | pá 'pull out' | pǎ 'target' | pà 'father'
mái 'bury' | mǎi 'buy' | mài 'sell' |

Tones described in the chart are in their isolation forms. Chinese tones are regarded as a fortunate device for removing some of the ambiguity which might otherwise result from the excessive number of monosyllabic homophones in the language.² Here is a typical example (an antithetical couplet)³.
(1) the upper line of a couplet

⁷wa⁷ tuò ⁷wa⁷ chū ⁷wa
child pull frog out tile

the lower line of a couplet

⁷mā ⁷mà ⁷má ⁷chī ⁷má.
mother scold horse eat hemp

In many cases these isolation forms are identical to the values that tones have when they are preceded and followed by other syllables, but in some other cases, the contextual variants of tones can be very different.

Before tone alternations are examined, tone features for each of the four tones should be noted. Jakobson's theory of distinctive features—that is, some kind of classification of speech sounds in terms of shared phonetic properties—is employed here to analyze the four tones of Mandarin Chinese. Their features are listed below:

Tone 1  [+High, +Level]
Tone 2  [+High, +Rising]
Tone 3  [-High, +Falling, +Rising]
Tone 4  [+High, +Falling]

In this scheme, the third tone is the only tone with [-High] feature. Since the other three tones all have high tone value [5], they are regarded as high tones. In addition to [-High], the third tone is different from the other three tones in that it is a two-way pattern tone, which has two directions, falling and rising. But the two features seldom occur at one time when words with this tone category occur in continuous speech. It often becomes a one-way tone type and the direction of the pitch change (which feature, Falling or Rising, occurs) always depends on the relevant tonal environment.

3.2 Tone Change

Tone sandhi is a phenomenon of the sound systems in many Chinese dialects. Mandarin has some examples of tone sandhi, that is, the tones of some syllables change when they occur together with the tones of other syllables. The most typical kind of tone sandhi in Mandarin Chinese is the change of a third tone. When a third tone is followed by the first, second, fourth or neutral tone (toneless syllables such as particles and suffixes)—that is, anything except a third tone—it changes to a half-third tone. The half-third tone
is a low falling tone and has the pitch value [21]; that is, the tone only falls but does not rise [214 → 21] (see Fig.3.2).

Fig.3.2. a half-third tone

A third tone is seldom used in full unless it occurs as an independent tone, or is followed by a long pause or is emphasized. In most cases it is changed into a half-third tone.

(2) nǐ²¹ gēge    Nǐ²¹ mánɡ ma?    Wǒ²¹ bù mǎnɡ?

'your brother'  'Are you busy?'  'I am not busy.'

From the above examples, we find that the tones of the syllables of gēge 'older brother', mánɡ 'busy', and bù 'not' all share a feature [+High]. Thus a third tone becoming a half-third tone is conditioned by the high tone of the following syllables.
A third tone, when immediately followed by another third tone, becomes a low-rising tone, which has the pitch value $[24]$, a little lower than the pitch of a second tone (Hockett [1947] calls it "raised-third tone"). Since its pitch almost reaches to the range of second tone $[35]$ and listeners cannot distinguish them, some linguists, like Norman (1988), think that the new shape of the third tone in a given context coincides with the value of another distinct tone (the second tone) in the same context; for example, $máí má 'bury a horse'$ vs. $máí má 'buy a horse'$ are pronounced the same. Thus they state that a third tone, when followed by another third tone should be pronounced in a second tone, for instance, $ni hao 'how are you'$.

If this statement is correct, then, the new shape of the third tone before another third tone must be considered a case of morphophonemic tone sandhi and not an allophone of the third tone.

No matter what people call it—'raised third' tone or a second tone—it is a fact that a third tone changes to a rising tone when followed by a low tone. It is more accurate to treat this rising tone as an allophone of a third tone, because (1) although it sounds like a second tone, native speakers perceive it as a third tone; and (2) it allows us a simple explanation for the other variant of the third tone—the falling tone, which occurs before a high tone. For these reasons we propose that a third tone has two variants; one
which occurs before a high tone and the other which occurs before a low tone. They are in complementary distribution. Otherwise Mandarin Chinese cannot have only four tones; as Hockett (1947) says, Peiping has five tones except a neutral tone (toneless syllables). He calls the "raised-third" tone a "fifth" tone. If we propose that a third tone has two phonetic variants, then the description of these alternations should be much simplified.

Intonation is also an important feature of Chinese speech. Tone operates within the framework of the syllable, while intonation, on the other hand, is spread out over the whole sentence.

When three syllables in the third tone occur in close succession, the first two syllables usually change to the rising tone with the third one retaining the full third tone (or changing to a falling tone).

(3) (3a) nǐ hǎo ma? 'How are you'
[ nǐ xàw²¹ ma?]

(3b) wǒ hěn hǎo, nǐ ne? 'I am very well, and you?'
[ wǒ xěn xàw²¹, nǐ²¹ ne?].

(3c) Yě hěn hǎo. 'Very well, too.'
[ jiě xěn xàw]
Hao [xaw] in (3a) is pronounced in a half-third tone and stressed with the voice drawing out a bit, together with ma ending in a rising intonation. Their pitch pattern should be a little higher because of rising intonation at the end of the sentence, while in (3b), the first part of sentence is in the low-pitch sentence tune, ending in a falling intonation. Thus the pitch of hao in (3b) is lower than in (3a), although they both have pitch value [21]. Generally speaking, the stress of a phrase in most cases falls on the last syllable. The rest of sentence (3b) nǐ ne? is in rising intonation. In simple questions formed with the modal particle ne, a word nǐ which precedes ne is stressed, together with ne, forming a sentence uttered in the high-pitch with a fall at the end. In (3c) the first two syllables in the third tone change to the rising tone with the third one retaining the full third tone.

When more than three syllables in the third tone come together in close succession, they can be divided into tone-groups according to their grammatical relationships. Pauses of this kind are very short, marked with the sign / here. Each tone-group may consist of one, two or three syllables and is pronounced according to the rules concerning changes of syllables in the third tone.
Sentence (4) is divided into three tone groups.  wo and ba are pronounced in the half third tone.  xiang mai and yu are in the rising tone and last syllable san is pronounced in the full third tone.

Also, grammatical information can be a factor to condition a tone alternation.  I will illustrate with an example from Cheng (1973:49) as follows to see how grammatical information is relevant.

(5)

(5a)

'SOld Li buys good wine'.

(4) wo / xiang mai ba / yu-san.
[wo siang mai pa ju san]
'I want to buy an umbrella'.
The two examples given by Cheng (1973) have exactly the same phonetic elements, but the syntactic structures are different. According to the syntactic relationships or the levels of the syntactic boundaries, the possible pronunciations of the two examples can be as follows:

(6) / Lao Li mai hao jiu./

(6a) LaoLi mai haojiu.

(6b) LaoLi maihao jiu.

The tone sandhi rule, in slow speech, applies only to words, or a noun phrase (NP). Hao in (6a) is an adjective + Noun, while Hao in (6b) functions as a resultive of verbs, indicating finished action.
In normal speech, the rule applies to verb phrase (VP).

(7)  (7a) Láolí mái-háojíú.
(7b) Láolí máihao-jiú.

The tone sandhi rule, in fast speech, applies to the whole sentence (S).

(8)  (8a) Láolí-mái-háojíú.
(8b) Láolí-máihao-jiú.

Thus, the sentence's structure correlates with the tone sandhi phenomena. It is now generally accepted that morphosyntactic structure can often exert an influence on the sound system of a language (Hyman 1975). The surface structure itself provides correct phonological phrases for the application of the tone sandhi rule. But the boundary of phonological phrases varies with factors such as speed and casualness. As Kenstowicz and Kisseberth (1979:390) point out

In many languages "fast" speech provides the context for the application of rules which do not operate in "slow" speech. In addition to providing the context for new rules, fast speech frequently exhibits the extension of slow speech rules to new and wider contexts. One of the most common extensions is across word boundaries.
This also suggests that tone change is closely connected to the speed and casualness with which a sequence is produced.

The alternation of a third tone in a given condition is automatic irrespective of what morpheme is involved. It ordinarily takes place even when the second syllable has a weak stress. Since the alternation can be attributed to the phonological nature of the morphemes to which they are attached, such alternations can be accounted for on purely phonetic grounds without reference to specific morphemes.

\[(9) \quad \text{xiao\text{-}jie} \quad [\text{cjaw}\ \text{tcie}] \quad (\text{xiao} + \text{jie}) \quad \text{\textquoteright miss; young lady\textquoteright}\]
\[\text{zou\text{-}zou} \quad [\text{tsou}\ \text{tsou}] \quad (\text{zou} + \text{zou}) \quad \text{\textquoteright take a walk\textquoteright}\]

But in a few cases of combination, usually kinship terms, the expected shift does not occur:

\[(10) \quad \text{laolao} \quad [\text{lau}\ \text{lau}] \quad (\text{lao} + \text{lao}) \quad \text{\textquoteright maternal grandmother\textquoteright}\]
\[\text{baobao} \quad [\text{pau}\ \text{pau}] \quad (\text{bao} + \text{bao}) \quad \text{\textquoteright little baby\textquoteright}\]
\[\text{jiejie} \quad [\text{tcie}\ \text{tcie}] \quad (\text{jie} + \text{jie}) \quad \text{\textquoteright elder sister\textquoteright}\]
\[\text{shenshen} \quad [\text{san}\ \text{san}] \quad (\text{shen} + \text{shen}) \quad \text{\textquoteright aunt\textquoteright}\]
\[\text{nainai} \quad [\text{nai}\ \text{nai}] \quad (\text{nai} + \text{nai}) \quad \text{\textquoteright grandmother\textquoteright}\]
\[\text{yieyie} \quad [\text{je}\ \text{je}] \quad (\text{yie} + \text{yie}) \quad \text{\textquoteright grandfather\textquoteright}\]

Since such forms differ from the regular pattern of tone change, they are listed as exceptions by grammarians (Norman
1988). The difference between 小姐 [ciāw tciě] 'miss; young lady' and 兄姐 [tciě tciě] 'elder sister' has been observed by some linguists for a long time but none has proposed a solution (Cheng 1973 and Chao 1968). To understand why such forms depart from the regular pattern of tone change, first of all we must know how these two words are formed. Since this concerns the neutral tone, it will be considered in section 3.3.

A fourth tone is sometimes modified before another fourth tone. For example, when a fourth tone is followed by another fourth tone, the first one is not pronounced as low as its original speaking range [51]. It becomes [53], that is, a half-falling tone.

\[(11) \ zhu^{51}yi^{51} \rightarrow zhu^{53}yi^{51} \quad \text{'pay attention to'}
\]
\[
\mu u^{51} tan^{51} \rightarrow \mu u^{53} tan^{51} \quad \text{'charcoal'}
\]
\[
\text{zai}^{51} jian^{51} \rightarrow \text{zai}^{53} jian^{51} \quad \text{'see you again; Good-bye'}
\]

This alternation is connected with the rhythmic stress of a compound word, because the length of the medium stressed syllable is shorter than the main stressed syllable. When the stress is shifted on the first syllable, it has its full tone even though followed by another fourth tone. But in most cases the second syllable becomes a weak syllable and loses its tone.
There are also a few specific cases in which particular morphemes exhibit several alternations which cannot be subsumed under regular phonological processes. The four morphemes, \textit{yr} [jɨ] `one', \textit{bu} [pù] `not', \textit{qɨ} [tcɨ] `seven' and \textit{ba} [pə] `eight', undergo a certain set of tonal changes. Here only two are discussed. Take \textit{yr} `one' and \textit{bu} `not' as examples. There are four types of tone change of \textit{yr} `one':

(1). When \textit{yr} is used individually or at the end of the word or phrase, it is normally pronounced in the first tone, \textit{yr}.

\begin{align*}
\text{\textit{yr} shì} & \text{ \textit{yr} \ `one is one'} \\
\text{\textit{yr} ěr sān} & \text{ \ `one, two, three'} \\
\text{tì \textit{yr}} & \text{ \ `number one'}
\end{align*}

(2). When \textit{yr} is followed by a syllable in the fourth tone, or a syllable in the neutral tone (originally a fourth tone), it is pronounced in the second tone, \textit{yɨ}.

\begin{align*}
\text{\textit{yɨ} kàn jiù hù} & \text{ \ `One knows when one sees'} \\
\text{\textit{yɨ} gé} & \text{ \ `one piece or one item'}
\end{align*}

(3). When \textit{yr} is followed by a syllable in tones of the first, second and third, it is pronounced in the fourth tone.

\begin{align*}
\text{\textit{yɨ} tiān} & \text{ \ `one day'}
\end{align*}
yi rën  'one person'
yì bāi  'a hundren'

(4). When 'yi' is inserted into a reduplicated verb, it loses its tone and becomes a so-called "neutral" tone.

shiyishì 'have a try'
kányikàn 'have a look at'

The changes of tones of 'bù' are of three kinds:

(1). 'Bù' is pronounced in the fourth tone when it stands by itself or precedes a first, second or third tone.

wò bù 'I am not'
bù shuō 'not say'
bù mài 'not buy'
bù, zhè bù hǎo. 'No, this is not good.'

(2). It is pronounced in the second tone when it precedes another fourth tone or a neutral tone that is originally a fourth tone.

bù kàn 'don't see'
bù yào 'don't want'
bù mài 'don't sell'

(3). If it is inserted into phrases, it becomes a neutral tone.

zòubutòng 'cannot walk any more'
In spoken Chinese, certain types of adjectives can be repeated. The second syllable of a repeated monosyllabic adjective is often pronounced in the first tone, and becomes retroflexed, e.g. 慢慢 'very slow'; 早早 'very early'. I think that this rising (high-level) might be caused by the retroflex -r (-r can "soften" the speech), because in formal situations or in reading non-oral literature pieces, the repeated syllable is not retroflexed and its tone is not changed either.

It is interesting to note that some tonal changes are totally morphologically conditioned. This should be distinguished from the tone sandhi (phonetic and phonemic sandhi) discussed above, because no meaning change is involved in the tone alternations except for the neutral tone. In Mandarin Chinese there is also a phenomenon that a word is created by changing the tone and the internal structure of a syllable, as in the following sets:

(12) 好 a. 'good' 好 v. 'to like'
    難 a. 'difficult' 難 n. 'disaster'
    中 a. 'middle' 中 v. 'to hit'
    靈 n. 'nail' 靈 v. 'to nail'
Word-formation by changing the tone and internal structure of a syllable is different from word-formation by compounding, affixation and reduplication. Changing the feature of a tone (part of its morphemic shape) to alter the part of speech of a word was popular in ancient times (Zhuo-nan, Li and Li Ren-xiao 1985). This linguistic means is also used by writers in making Chinese couplets. Here is an example written by Xu Wei, a scholar of the Min Dynasty (Xiang-xin, Guo 1989):

(13)

 Hao du shu bu hao du shu,

easy read book not like read book

 Hao du shu bu hao du shu.

like read book not easy read book

The upper line means that it is a good time for one to study when he is young, but he doesn't like to. The lower line means it is not the best time to study when one is old, but that is when he begins to like to study. The word hao ㄏ in
line one means 'easy' or 'like', depending on the tone. When
pronounced in the third tone, Hao has the meaning of 'right
time to do something'. When its tone changes into the fourth
tone, it means 'to like', a verb. Without the tone marks on
hao, the upper line and lower line seem totally the same, but
if pronounced with its marked tone, the meaning is clear.
The author properly employs the principle of cohesion in
phonology, vocabulary, symmetry and interplay of sameness and
difference. Certainly phonology plays an important role in
the Chinese couplet and poetry.

3.3 Neutral Tone

The neutral tone is another interesting phenomenon in
Mandarin Chinese. Many words and phrases contain a syllable
which has a neutral tone, which in some cases is fixed, as in
all particles and suffixes, but in others is in free
variation with one of the four tones. A neutral tone
pronounced weak and short is shown by the absence of a tone-
graph over a syllable, as in hao ma? 'O.K?' and wom'en 'we'.
The pitch of the neutral tone is determined by the tones of
the preceding syllables. According to Chao (1968:36), the
pitch of a neutral tone is half-low [2] after the first tone
[55], as in tâ-de 'he-Gen =his'; mid pitch [3] after a second
tone [35], as in hóng-de 'red-Nom = red one'; half-high [4]
after a third tone [214], as in wo'-de 'I-Gen =my'; low [1]
after a fourth tone [51], as in ụ̀-de 'green-Nom =green one'. The pitch of a neutral tone after the first tone, the second tone and the fourth tone is lower and after the third tone is higher. The pitch of de in tā-de, hόng-de, ụ̀-de is low, a pitch that sounds like the fourth tone, while the pitch of de in wo'-de is high, a pitch that sounds like the first tone.

To return to the problem posed earlier in section 3.2., why do xìàojìe (xìào + jìé) and jìéjìe (jìé + jìé) have different tone patterns? This is because the two words are basically formed in two different ways. One is formed by compounding (xìào+jìé) and the other is formed by reduplication (jìéjìe). In compounding, two roots combine to form one unit, xìàojìe. Most compound nouns are formed from existing words, which have tones of their own. Compound nouns have two stress patterns. Most of them have a medium-strong pattern and some have a strong-weak pattern. Generally, if a sequence of two morphemes cannot be solely determined from the meaning of the parts, it has a strong-weak pattern, e.g. tόngxì 'things; objects' (tόng 'east' + xì 'west'), while if a sequence of two morphemes can be determined from the meaning of the parts, it has a medium-strong pattern, e.g. tόngxī 'east and west' = (tόng 'east' + xī 'west'). In these cases, any of the four tones can be replaced by a neutral tone with the stress shift. Therefore
a neutral tone can not be predicted in these compound nouns.

Jiejie 'older sister' is formed by reduplication. As a rule, the repeated part of reduplicated kinship nouns is never stressed; in other words, it has no tone at all. A neutral tone on the repeated form of these nouns is fixed and can be predictable, as illustrated in the two words below:

(14) (14a) jie jie (xiao^214 + jie^214)
      (14b) jie jie (jie^214 + jie)

If the tone sandhi rule is applied to word (14a), then, the tone of the first syllable changes to a rising tone [35]. Since the word stress is shifted on the first syllable and the second syllable is unstressed, the tone of the second syllable is replaced by a neutral tone. (14b) does not undergo the same process as that of (14a), because jie is not followed by an unstressed syllable, which normally has a third tone. A third tone, when followed by a neutral tone, becomes a low-falling tone [21]. It has been mentioned before that the pitch of a neutral tone is entirely determined by the tone of a preceding syllable. The neutral tone of a word jie in (14a) has a pitch [3] and the neutral tone of jie in (14b) has a pitch [4]. The tone-graph over the two words should be xiao^35jie^3 and jie^21jie^4 respectively.
This can be further proved by the other disyllabic words such as yangyang 'itches' (reduplication), zhengou 'pillow', which are formed by suffixation and undergo the same processes as jiejie, while, lao-zi 'the name of a book', and kong-zil 'Confucian', which are formed by compounding and undergo the same process as xiao-jie. This is because zi and tou in the former cases are both noun suffixes, bound morphemes, which are always toneless, while zil 'an ancient form of address to a Confucian scholar' in the latter case is a root morpheme with its full tone. This phenomenon supports the claim that the alternation of a third tone is automatically conditioned by the phonological environment. The alternation even takes place when the second syllable is unstressed. But two different situations should be distinguished. A neutral tone in some cases is fixed and never stressed, but in other cases it is in free variation with one of four tones. Although xiao-jie and jiejie both have a second syllable unstressed, their tone patterns cannot be the same because their stress patterns are different, one having the stress-shift pattern and the other the stress-neutral pattern.

Most of the neutral tones are specified by lexicon and grammar. For instance, bound-morphemes (grammatical morphemes) always bear a neutral tone when affixed to other free morphemes (full morphemes), as illustrated below:
(15) Various Particles:

- nǐ-de 'you + structure Part. = your'
- hǎo-de-hén 'good + structure Part. + very = very good'
- kū-zhe 'cry + Aspect Part. = crying'
- zōu-le 'walk + Aspect Part. = have left'
- hǎo-ma 'good + Ques. Part. = O.K?'
- chī-a 'eat + Modal part. = Please eat'
- kàn-guo 'see + Aspect Part. = saw'

(16) Suffixes:

- mù-tou 'mood + Noun suffix = mood'
- gāi 'cover + Noun suffix = a lid'
- wǒ-men 'I + plural suffix = we'
- zhuō-zi 'table + noun suffix = table'

(17) Position words:

- wū-li 'room + Localizer = in the room'
- zhuō-sang 'desk + Localizer = on the desk'

Localizers are bound morphemes suffixed to nouns to indicate certain spatial relationships, as in -li 'inside' and -shang 'above'.

(18) Complements of verbs:

- zān-qilai 'stand + Compl. = stand up'
- chī-fàn-qu 'eat food + Compl. = go to eat'
- lā-xialai 'pull + Compl. = pull down'
(19) Reduplicated kinship nouns:

- bāba 'father'
- māma 'mother'
- bāobāo 'little child'
- dīdī 'younger brother'

It is unnecessary to list all the positions where a neutral tone can occur. Sometimes, a morpheme has a tone in one place, but it becomes a neutral tone in another place. Here is an example concerning pronouns functioning as objects.

(20)  

\[ \checkmark wo \overset{vi-le}{\varepsilon} ta y\text{\`{i}}ben sh\text{\`{u}}. \]  
\[ 'I give him a book' \]

I give-perf him a book

The dative (indirect object or beneficiary of an action) is shown by its position after the verb and by the neutral tone (except when occurring with contrastive stress), as in 'wo \[ \checkmark x\text{\`{i}}-h\text{\`{u}}\text{\`{a}}n \overset{t\text{\`{a}}}{\varepsilon}, bu x\text{\`{i}}-h\text{\`{u}}\text{\`{a}}n ni\].' 'I like him, I don't like you'. But in bā sentences, the recipient following the verb is usually stressed.

(21)  

\[ \checkmark wo ba zhe\text{\`{e}}\text{\`{e}}n sh\text{\`{u}} gei-le t\text{\`{a}}. \]  
\[ 'I gave this book to her.' \]


\textit{Ba} used here indicates that something has been handed over to a recipient as a result of an action performed. Tone realization is therefore also interrelated with the sentence structure.

The presence or absence of a neutral tone can distinguish meaning and class of words:

\begin{verbatim}
(22) (without neutral tone) (with neutral tone)
dōngxi [tüŋə]^*^ `east and west` dōngxi [tüŋə] `thing`
dūltōu [twit¹°u] `right` adj. dūltōu [twit¹ho] `opponent` n
maimai [māimāi] `buy and sell` māimai [māimāi] `business`
uòshāo [xwósaw] `burn` huòshāo [xwósaw] `baked wheaten cake`
\end{verbatim}

The words in the left column have a medium-strong pattern, while the words in the right column have a strong-weak pattern. In these pairs the only distinctive feature is stress. A weakly stressed syllable is also characterized by a number of other phonetic modifications: unaspirated voiceless consonants become fully voiced in a weakened position, vowels tend to become centralized, and a syllable which originally has one of the four tones loses its original pitch. For example, /lī pa/ `fence' becomes [lība]; /kīkér/ `elder brother' becomes [kīgə]. All these changes are caused by stress. Neutral tone results from the lack of
stress, and any of the four tones in Mandarin Chinese can be replaced by the neutral tone when they are in a weakened position (Hyman 1975). Here is an example.

(23) a) \( \text{Wo } \ddownarrow \text{xiăng } / \text{qilaile}. \)

'I want to get up (I don't lie in bed any more).'

b) \( \text{Wo } / \text{xiăngqilaile}. \)

'I forgot it, but now I have remembered it.'

\( \text{xiăng} \) in (23a) is an optative verb, which indicates volition or intention. It emphasizes one's plan or wish, while \( \text{xiăng} \) in (23b) is an action verb meaning 'recall, call to mind, and remember'. \( \text{qilaile} \) in (23a) is a verb meaning 'to get up', so it is stressed, while \( \text{qilaile} \) in (23b) functions as a complement of the verb 'xiăng', and has no tone at all. We sometimes can not tell which category a word belongs to from its shape since other than a few nominalizers such as \(-r\), \(-zi\) and \(-tou\), the Chinese language lacks a way of changing the morpheme's shape to distinguish the part of the speech of a word, and this is particularly true of the written language. Although word order is a clue to the grammar relations, it does not work in some cases. The sentences discussed above have the same word order and the same underlying elements; in other words, they are totally the same in the segmental and tonal representation. But their meanings are quite
different. The different meanings are derived by properly using stress, pause and intonation.

3.4. Alternations conditioned by other factors

Tone alternations can be conditioned by the tone environment of the given syllable, speed, and grammatical information as discussed above, and they are also influenced by other factors such as rhythmical pattern, pause, and intonation of a sentence. These factors can influence the shape of tones in various ways. In actual speech the rhythm of multisyllabic words is fairly regular. Rhythm is a feature of continuous speech resulting from the alternation of long and short vowels, and the distribution of stressed and unstressed syllables. In Mandarin Chinese two stressed syllables do not normally occur continuously. Thus, utterances appear as regular arrangements of stressed syllables alternating with unstressed syllables and occasional pauses. Generally, multisyllabic words have about the same length. A multisyllabic word containing more syllables is uttered rapidly and one with fewer syllables is uttered slowly. The length of weakly stressed syllables is short and that of stressed ones is long. There are a number of rules in Mandarin concerning length and rhythm.

In disyllabic words the length of the stressed syllable is twice as long as that of the unstressed one. If the word
mu-tan 'charcoal' is pronounced in the medium-strong pattern, its tone pattern is modified by the time distribution.

\[ \text{mu-tian} \]

In the strong-weak pattern, the distribution of time would be 2:1; the first syllable being pronounced twice as long as the second one. For example, in xiaojie 'miss; young lady', the original tone patterns is modified as follows.

\[ \text{xiao-ge} \]

Similar modifications take place in sequences of three or more syllables and even in a phrase and a sentence. In a trisyllabic word, when the first two syllables are uttered in quick succession, this trisyllabic word may be said to be structured on a "2 + 1" pattern (see Chao 1968), in which case, the last syllable takes about the same length of time as the preceding two syllables. If the trisyllabic word, tushuguan 'library' is to be pronounced in the medium-weak-strong pattern, its modified tone should be as follows:

\[ \text{tushu-ge} \]
Most quadrisyllabic words follow the "2 + 2" pattern. The stressed syllable takes up half of the total length of time needed for all four syllables. If a four-syllabic word such as ˋoutrageous' is to be uttered in the medium-weak-medium-strong pattern, the tone pattern should be:

(27)  vvvv >  _

A phrase forming part of a long sentence normally makes up one beat. A phrase containing four to five syllables can be divided into two groups, each of which takes the same length of time (Zhang 1984):

(28)  gāoxīndi sou 'speaking happily'

bāba hé-māma 'mother and father'

Due to the influence of rhythm, some syllables in the sentence are stressed while others become unstressed. It is clear that, besides the factor of tone sandhi, alternations of tones are caused by the influence of other cooccurring factors. This influence gives tones their final phonetic shape since unlike tone sandhi it affects practically every syllable in continuous speech and since it also affects
syllables whose tones were already modified by tone sandhi.

Intonation is the main factor which decides the actual manifestation of tones in a context. These manifestations in many cases differ considerably from those which occur with morphemes uttered in isolation. Intonation influences the shape of tones, but it does not fundamentally change them so that the distinctions are lost. Here is another example:

(29)
/fu-mu shuang-shuang bu-neng ke-shang yi-wei/

father-mother in pairs cannot die one-person

a. Fumu shuangshuang / buneng ke-shang yíwei. (a declarative sentence)

'Father and mother should both be alive, neither of them can die'

b. Fumu shuangshuang buneng / keshang yíwei. (an exclamatory sentence)

'Father and mother can not be both alive, one of them died.'

c. Fumu shuangshuang / buneng keshang yi...wei.

'Since father and mother are alive in pairs, they must die in pairs.'

The three sentences are segmentally not different from each
other, but their different intonations to which pauses are closely tied can produce different sentences. Sentence 1 uses a normal intonation, while sentence 2 and sentence 3 use an emphatic intonation. Thus intonation incorporates a successive speech into a unit of a higher order. Without changing the lexical values of the words or morphemes, it influences the meaning and function of the sequence as a whole and colors it with additional content, such as the speaker's emotional attitudes.

As Henne, Hansen, and Rongen (1977) claim, intonation has three basic functions:

1. to help tie together what belongs together;
2. to help keep separate what is to be kept separate; and
3. to indicate the speaker's own attitude to what he or she is saying.

The categories of the suprasegmental system of Mandarin Chinese, such as tone, stress and intonation, are interwoven into an organic whole; their coexistence results in a more complex accentual system. Therefore, we cannot study the tones in isolation from the contexts in which they are used.

To sum up, tone, stress, and intonation are of great importance in Mandarin Chinese and must be taken into account for a fully detailed description of the natural speech of the
language. In actual speech only about half of the syllables are uttered with their lexical tones. Such an analysis shows the difference between the general tendencies of tones and the concrete suprasegmental shape of syllables in a sentence, and also demonstrates the importance of knowing what lies between phonemic abstraction and phonetic reality.
Notes

1There is disagreement about each tone length. Hartman (1944) says that the first and the second tones are shorter than tones 3 and 4. Hockett (1947) says that third tone is the longest, fourth tone is half-long, and the others are relatively short.

2See DeFrancis 1972:166.

3It was said that this antithetical couplet was composed by a person called Bi-Cuan Huang. When he was a boy, one day he saw a child knocking a tile with a hoe, causing a frog to jump out of the tile. This scene made him write down the first line of a couplet. Twenty years later, he rode a horse in the countryside. His horse went into the field of hemp and ate the hemp. A farm-lady saw it and shouted at the horse. This made him write down the second line.

4In Mandarin, as well as in other Chinese dialects, the tone of a syllable is affected much more by the tone of the following syllable than by a preceding one (see Chao 1968: 27).

5Since the Pinyin orthography does not reflect such
changes in tone, the syllable subject to tone sandhi is always written with basic, lexical tone.

6Chao (1968) explains that if the two third tone morphemes are in one word, the tone of the first morpheme does not change to a rising tone.
Mandarin Chinese is a syllable-based language, monosyllabic from the morphemic point of view. The basic Chinese phonetic elements represent not phonemes but syllables. The correspondence between sound and symbol in the written language is not one to one. Syllables can vary in their phonetic representations as determined by their contexts and functions. We have discussed phonological processes governed by various morphological constructions and processes of affixation in Mandarin Chinese. Morphemes do not always have the same shape in the different environments where they occur. There are cases of morphophonemic alternation in connection with the -r suffix, tone sandhi, neutral tone, tone shift and some sentence-ending particles such as a, le and ne,¹ which form typical phenomena in the sound system of Mandarin Chinese.

In the preceding sections I have presented analyses of the function of the retroflex suffix -r and described several conditions for tone sandhi. I have also explained what causes the tone pattern of words such as xiaojie and jiejie to be pronounced differently by analyzing the way these words are formed. The function of the suffix -r is not simply as a
noun formative. Some of the suffixed forms have distinctions from the morphemes on which they are based. The suffix -r also plays a role in poetry as a time-filler to make each line of a poem fulfill the requirements of the strict number of characters and rhyme.

The suprasegmental structure in Mandarin consists of tone, stress and intonation. Tone is a syllable feature and it works within the framework of a syllable. Stress is a phrase feature and each phrase has a nuclear stress. Intonation is a sentence feature and is not tied to a morpheme but is added on top of the other layers. No sentence analysis is complete without intonation. Stress and intonation should be further studied as an autosegmental linking of tone units to text according to metrical theory. Such discussion is outside the realm of this paper and can be left for future study.

Nowadays there is an increased interest in sentence prosodies (such as tone, rhythmical stress and intonation), which is resulting in an integration of work in phonetics, phonology, syntax, semantics and pragmatics. Language is a great deal more than just a lexicon. The Chinese language will provide rich examples for this field of study.
Note

REFERENCES


