

ILLEGIBLE

**THE FOLLOWING
DOCUMENT(S) ARE
ILLEGIBLE DUE TO THE
PRINTING ON THE ORIGINAL
BEING CUT OFF**

**THIS IS AS RECEIVED FROM
THE CUSTOMER AND IS THE
BEST POSSIBLE IMAGE
AVAILABLE**

ILLEGIBLE

110
TONE SANDHI IN MANDARIN CHINESE

by

JESSE BEING-JANG LIN

B.A. Providence College of Arts and Science, 1974

A MASTER'S THESIS

submitted in partial fulfillment of the
requirement for the degree

MASTER OF ARTS

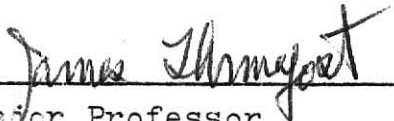
Department of Speech

KANSAS STATE UNIVERSITY

Manhattan, Kansas

1980

Approved by:


Major Professor

**THIS BOOK
CONTAINS
NUMEROUS PAGES
WITH THE ORIGINAL
PRINTING BEING
SKEWED
DIFFERENTLY FROM
THE TOP OF THE
PAGE TO THE
BOTTOM.**

**THIS IS AS RECEIVED
FROM THE
CUSTOMER.**

SPEC
COLL
LD
2668
.74
1980
L53
C.2

ACKNOWLEDGMENT

I would like to express my gratitude to the entire committee for making this thesis possible. Special appreciation is to Dr. James L. Armagost, my major professor, for his patience and invaluable guidance.

Also I would like to thank my husband, Mr. Wei-ling Sun, for his understanding and encouragement during the preparation of this thesis. His capacity of speaking several northern Chinese dialects also offered this study some help. Finally, I would also like to thank those friends who acted as my informants.

CONTENTS

I.	INTRODUCTION	1
II.	TONES IN MANDARIN CHINESE	4
	The Nature of Tones	4
	The Role of Tone	7
	Neutral Tone	7
III.	tone SANDHI IN MANDARIN	9
	1. Allophonic variation	9
	A. When a 3rd tone is followed by another 3rd tone	9
	B. When a 3rd tone is followed by any tone except another 3rd tone	13
	C. When three or more 3rd tones come together	14
	D. When a 4th tone is followed by another 4th tone	19
	E. The change of 2nd to 1st tone in three-syllable groups	20
	F. Unstable neutral tone	22
	2. Morphophonemic variation	26
	A. The changes of the tone of /ī/ 'one, a' . .	26
	B. The change of the tone of /pū/ 'no, not' .	28
	C. The change of the tone of /tṣ ^h ī/ 'seven' and /pā/ 'eight'	29
IV.	CONCLUSION	31
	APPENDIX: CONSONANT AND VOWEL PHONEMES	35
	BIBLIOGRAPHY	36

CHAPTER ONE

INTRODUCTION

As Bernhard Karlgren (1962) said: "Spoken by a larger number of people than any other language, Chinese is at the same time a language having a venerable and extensive literature, a language which has played in eastern Asia a part comparable to that of Latin and Greek in Europe." An exact figure of the number of people who speak Chinese as their mother tongue can not be given. But we can state that Chinese is spoken over an area in eastern and central Asia that is larger than Europe, and by a population of something between 900 and 1000 millions. Hence it is obvious that knowing Chinese is very helpful and convenient since civilization has shortened the distance between countries and one-fourth of the people on earth are using it.

Learning Chinese is getting more and more popular these days, but people have found that it is not as easy as they might have thought. Many people who have learned to speak Chinese fluently and appropriately still have problems in using the right tones.

In traditional studies of Chinese, it is said that each syllable is composed of an initial (a consonant or consonant plus glide), a final (a vowel or vowel plus glide), and, in addition, a tone. A tone language is defined by Pike (1972:3) as "a language having lexically significant, contrastive, but

relative pitch on each syllable". He suggests that it would appear preferable to keep tonal and intonational types distinct in nomenclature. Therefore, he thinks that English should not be called a tone language even though it utilizes significant pitch, since a tone language must have pitch that is both significant and lexical. Because of the nature of tonemes (lexically significant pitches) and their systems, speakers of English find it difficult to hear or pronounce correctly such tone languages as Chinese, Burmese, Vietnamese, Swedish, and many African languages.

If the pitches of tone languages were invariant, English speakers might have an easier time mastering the system. But it is often true in tone languages that when syllables are spoken in succession, both significant and nonsignificant pitches do change. From the viewpoint of applied linguistics, then, studying tone changes is interesting, beneficial, and important.

PURPOSE

Though there have been some writers studying Chinese tones, only a few have paid attention to tone changes. Foremost among these is Y.R. Chao, a scholar whose name, according to Kratochvil (1970), has dominated modern Chinese linguistics for half a century and whose work is the largest professional statement on modern Chinese published in English. Generally speaking, in the study of Chinese tone changes Chao's works

have covered most other linguists' studies. Nevertheless, there are some tone changes that remain undiscussed.

Chao (1968) declared that his discussion of Chinese tones was totally based on the dialect of Peiping in the middle of the twentieth century. Many linguists have pointed out that the tone system in Chinese has undergone considerably phonetic change in the course of time. Because of the hundreds of dialects in the country, there was no official and uniform spoken language until the Ministry of Education instituted the National Phonetics for the National Language in 1918 (Tang 1965: 188). This was based on the dialect of Peiping because of its political influence and simplest phonetic system, and was adjusted to the acceptance of most people throughout the country. Pu-chou Shen (1969) reports that Mandarin has been influenced for over 60 years by the central, southern, and southeastern areas. Even in today's Peiping the Communist government urges people to learn the language of daily life, which is called "Pu-tung-hwa", from farmers and workers (Lehmann 1975). So there have been many changes, including shifts in the tone system.

In this paper I will discuss the tone changes of modern Mandarin and account for these in rules using distinctive features. The tone changes are discussed under two headings, allophonic variation and morphophonemic variation. In the final chapter all the rules are brought together and ordered, and sample derivations are provided.

CHAPTER TWO

TONES IN MANDARIN CHINESE

THE NATURE OF TONES

We know that tone languages are by no means all alike in the kinds of tonemes they utilize, or in the function of these tonemes in their grammatical systems. One of the most striking differences exists between those systems which are comprised largely of level tonemes--the so-called "register" systems--and those whose tonemes are mostly of a gliding type--the so-called "contour" systems. According to Pike (1972), a level toneme is one in which, within the limits of perception, the pitch of a syllable does not rise or fall during its production. A gliding toneme is one in which there is a perceptible rise or fall in pitch, or some combination of rise and fall, such as rising-falling or falling-rising.

Mandarin has only four tonemes, in contrast with the five, seven, eight, or even nine tonemes in other dialects of Chinese (Hsu 1959, Karlgren 1948, and Lo 1956, etc.). These four are usually referred to as 1st, 2nd, 3rd, and 4th tones. The 1st tone is a level toneme and the 2nd, 3rd, and 4th tones are gliding tonemes. The 2nd tone is a rising glide, the 4th tone is a falling glide, and the 3rd tone is a glide with reverse direction, a falling-rising glide. Since the 1st tone is the only level toneme in Mandarin, it may function as a special type of contour, a zero-glided one (Pike 1972:9). The old Chinese system was a two-step (or maybe three-step) register system. But

in modern Mandarin, that old register system has disappeared, replaced by a largely contour system but with register overlap (or residue).

Because direction of glide is one of the chief characteristics of the Mandarin contour system, the tonal contours can be represented schematically by time-pitch graphs attached to the left of a vertical reference line divided into four intervals by five points (Chao 1948:25):

<u>Tone</u>	<u>Description</u>	<u>Pitch</u> ¹	<u>Graph</u>
1st Tone	High-level	55	⌋
2nd Tone	Mid-rising	35	↗
3rd Tone	Low-falling-rising (Low-dipping)	214	↘↗
4th Tone	High-falling	51	↘

Chao (1948:85) also uses a five-line musical staff to describe these four tones, as in the drawing below:



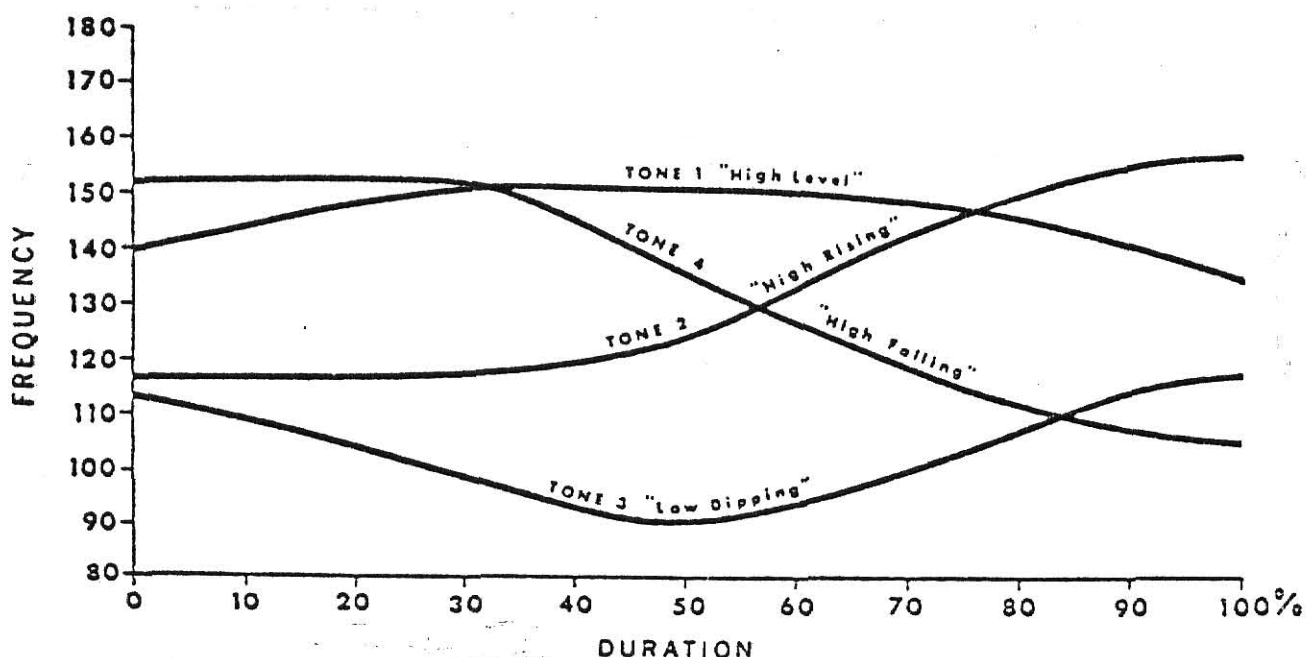
¹On a scale of 1 (low) to 5 (high).

**THIS BOOK
CONTAINS
NUMEROUS PAGES
WITH DIAGRAMS
THAT ARE CROOKED
COMPARED TO THE
REST OF THE
INFORMATION ON
THE PAGE.**

**THIS IS AS
RECEIVED FROM
CUSTOMER.**

The tonemes are not fixed rigidly, as the diagram makes them appear to be, but actually have considerable fluctuation in duration, absolute height of tonemes, relative height of tonemes to each other, and so forth.

According to Howie (1976), in his acoustical studies of Mandarin the frequency and duration of the four tones appeared as follows²:



²Generalized average curves of the four tones in nine syllable types, derived from plots of fifteen syllables per tone, and used as the basis for synthesizing the tones. The mean durations of the voiced part of the syllable are: Tone 1, 237 milliseconds; Tone 2, 271 milliseconds; Tone 3, 277 milliseconds; and Tone 4, 251 milliseconds.

THE ROLE OF TONE

Chinese morphemes are (almost) all monosyllabic, and each syllable has an inherent toneme. A learner should not slight his tone study or fail to attempt to speak with correct tones merely because he can be understood without doing so. One's pronunciation strikes the native ear as very foreign and unpleasant when tones are abused, though meanings may be clear. But misuse of tones may sometimes even cause misunderstanding by the listener. Modern Mandarin has many morphemes distinguished only by tone. A very famous example is³ [mā] 'mother' (1st tone), [má] 'hemp' (2nd tone), [mǎ] 'horse' (3rd tone), and [mà] 'scolding' (4th tone) (Huang 1969:xxv and others).

When syllables are spoken in succession, they often do not have the same tones as they would in isolation. The allophonic and phonemic tone changes are known as tone sandhi. In Mandarin the tone of a syllable is affected much more by the tone of the following syllable than by that of the preceding one (even if Hyman and Schuh 1974 claim that tones universally are more prone to show extension to the right than to the left by purely phonetic assimilation). The same is true for the other dialects of Chinese, but Mandarin's tone sandhi is among the simplest.

NEUTRAL TONE

In utterances of more than one syllable, a weak stress frequently occurs. In that weak stress, the tone range is

³See the appendix for all C and V notations.

flattened to practically zero and the duration is relatively short. Because the tone range is flattened, linguists have called it the "neutral tone". Almost any morpheme in one of the four regular tones can occur with neutral tone under certain conditions, there being only a very small number of morphemes (mostly suffixes and particles) which are always in the neutral tone and do not occur with any of the usual four tones (Chao 1968:36). Neutral tone usually is indicated by a '.' in transcriptions (e.g., [xǎw-té]'all right'). Educators usually include the neutral tone as a "fifth tone" when teaching Mandarin, but most linguists regard it as a matter of tone sandhi (i.e., as predictable). Therefore, in this paper it will be discussed in the following chapter as tone sandhi.

CHAPTER THREE

TONE SANDHI IN MANDARIN

In this chapter Mandarin tone changes will be discussed. It is convenient to distinguish two types of changes: allophonic variation, in which the physical realizations of one toneme in general do not overlap with those of other tonemes; and morpho-phonemic variation, in which one toneme substitutes for another.

1. Allophonic variation

The most ordinary cases are the changes of the 3rd tone, that is low falling-rising tone, when its syllable is followed by any other syllable. "The 'dipping' quality of the 3rd tone occurs only in isolation or before pause or a neutrally toned syllable. Although the citation form has this dip, the most common value of the 3rd tone is merely 'low'" (Bodman and Stimson 1961:ix). Hence, let's start with the important allophones of the 3rd tone.

A. When a 3rd tone is followed by another 3rd tone

According to Chao (1968:27), when a 3rd tone word is followed by another 3rd tone word the first is pronounced in the 2nd tone. This has been noticed by all linguists. Some examples are given in 1 and 2 :

1. [wǒ] 'I' + [ɕjǎŋ] 'think' --> [wó-ɕjǎŋ] 'I think.'

3rd (falling-rising) + 3rd --> 2nd (rising) + 3rd

2. [fǎn] 'powder' + [pǐ] 'pen' --> [fǎn-pǐ] 'chalk'

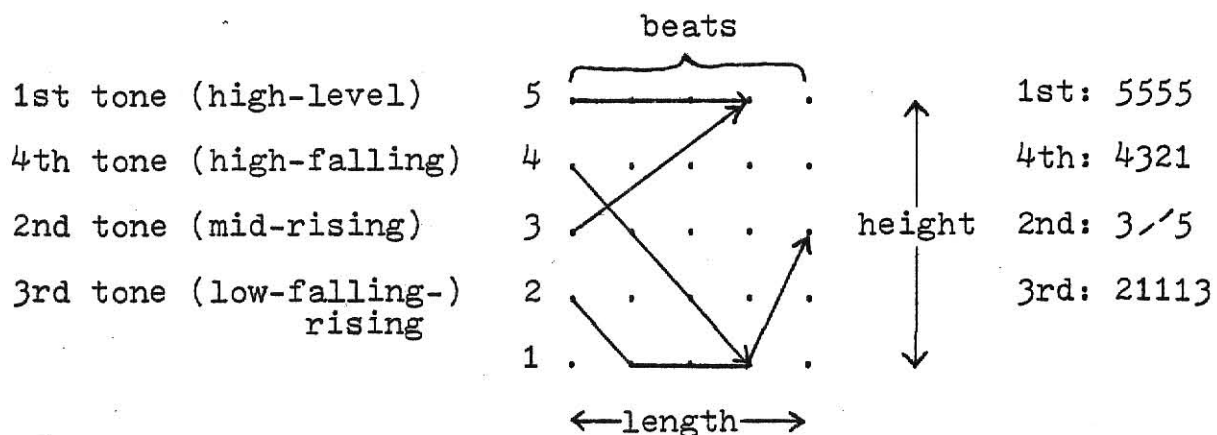
3rd + 3rd --> 2nd + 3rd

But there is one interesting point claimed by Chi (1961:54):

"In fact, when a 3rd tone is followed by another 3rd tone it is changed to a post- $\frac{1}{2}$ 3rd tone. It is different from the 2nd tone. Such as: /xǎw/ 'good' in [xǎw-ǎ] 'good rain' is lower than /xǎw/ 'vigorous' in [xǎw-ǎ] 'pouring rain'; and /ǎ/ 'rain' in [ǎ-xǎw] 'the rain is helpful' is lower than /ǎ/ 'fish' in [ǎ-xǎw] 'the fish is good' also."

Before we start to discuss this point, we know that Mandarin is a contour-tone language, as was mentioned in the preceding chapter. And contours may differ in characteristics other than direction of glide.⁴ Therefore, in order to study the previous point, I will extend the four tones' length and divide the length into five beats of time (compare with Chao's time-pitch graph on p. 5 and Howie's observations on p. 6).

⁴Pike (1972) offers some of the differential qualities of glides as: (1) differences of direction; (2) differences of distance; (3) differences of time (short time; longer time; longest time); (4) differences of beginning-point height; (5) differences in correlation between the time and distance of rise; (6) differences in correlation with stress placement; (7) differences in beginning and ending points, none of which can be equated in height to any other or to the level toneme;...etc.



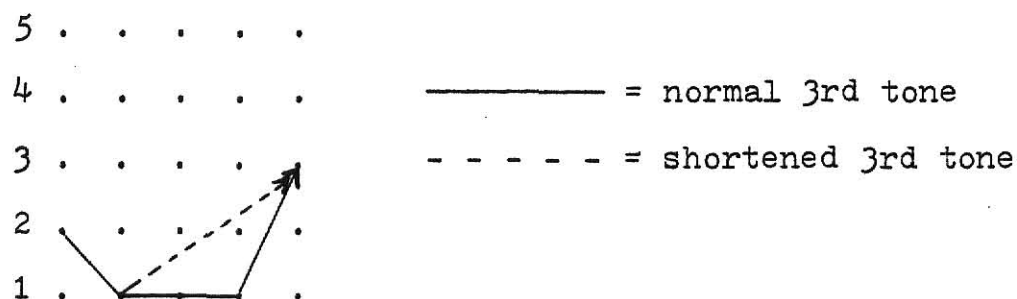
Each tone except the falling-rising tone has four beats, but the falling-rising tone has five beats. In order to distinguish these tones from each other and to study their changes, let them be given the following feature compositions.

	High	Low	Rise	Fall	Concave
1st	+	-	-	-	-
2nd	+	-	+	-	-
3rd	-	+	+	+	+
4th	+	+	-	+	-

The specification [+ concave] captures the falling-rising contour, which contrasts with falling or rising in Mandarin (and with the convex shape of the rising-falling contour occurring in some languages though lacking in Mandarin).

Because the falling-rising tone has one more beat than the others, when two falling-rising tones come together in normal speaking, the first is naturally shortened from its inherent

length so that the syllables will not be too long to be spoken in a natural manner. It appears to be changed from pitch 21113 (falling-rising) to pitch 1-3 (low-rising). Thus, it loses its falling part, as shown:



This change agrees with the tone simplification of Hyman and Schuh 1974, who note that universally contour tones tend to be levelled.

There is one notable point in the above change, and this is that though the direction of the modified 3rd tone tends to be rising and is similar to the 2nd tone (mid-rising), the height of this modified 3rd tone is lower. I would like to call this modified tone a "raised-3rd tone". It has only four beats, the same as the three normal high tones.

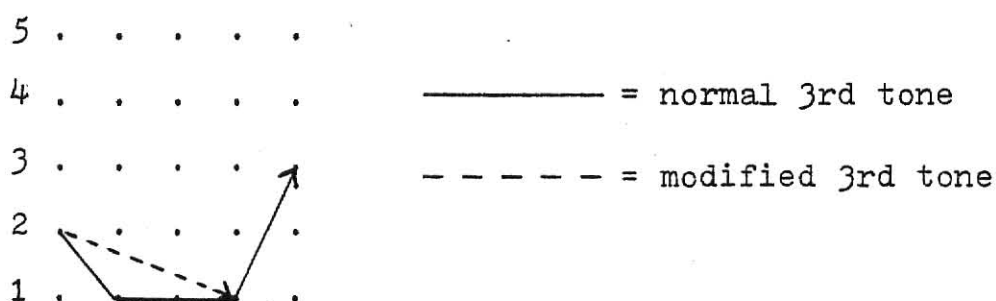
Adopting the notational conventions of Chomsky and Halle (1968), rule (1) shows the change of a 3rd tone when followed by another 3rd tone.

Rule (1)

$$[+ \text{concave}] \rightarrow \left[\begin{array}{l} - \text{fall} \\ - \text{long} \\ - \text{concave} \end{array} \right] / \text{ ————— } [+ \text{concave}]$$

B. When a 3rd tone is followed by any tone except another 3rd tone

When a 3rd tone is followed by any tone except another 3rd tone (or a neutral tone), it is pronounced with a fall from pitch 21113 to 2\1. Its final rise is lost before the next syllable:



It again has only four beats.

Because this 3rd tone loses its final rise and is only low-falling, I'd like to call it a "lowered-3rd tone". The occurrence of lowered-3rd tone can be examined in the following examples:

3. [ɕjǎŋ] 'think' + [tɕjā] 'home' --> [ɕjǎŋ-tɕjā] 'home sick'
 3rd + 1st (high-level) --> lowered-3rd + 1st

4. [pjǎw] 'show' + [tɕyé] 'decide' --> [pjǎw-tɕyé] 'vote for
 a decision'

3rd + 2nd (high-rising) --> lowered-3rd + 2nd

5. [sǎ] 'history' + [sə] 'matter' --> [sǎ-sə] 'historical
 events'

3rd + 4th (high-falling) --> lowered-3rd + 4th

We may describe this phenomenon with rule (2):

Rule (2)

$$[+ \text{concave}] \rightarrow \left[\begin{array}{l} - \text{rise} \\ - \text{long} \\ - \text{concave} \end{array} \right] / \text{---} [- \text{concave}]$$

Rules (1) and (2) can be collapsed as (3).

Rule (3)

$$[+ \text{concave}] \rightarrow \left[\begin{array}{l} - \alpha \text{fall} \\ \alpha \text{rise} \\ - \text{long} \\ - \text{concave} \end{array} \right] / \text{---} [\alpha \text{concave}]$$

C. When three or more 3rd tones come together

In sections A and B, the changes of 3rd tones in dissyllabic phrases have been discussed. We may now consider whether the above changes also happen in polysyllabic phrases and whether rule (3) can still account for them. Let's investigate the following data:

6. [wǒ] 'I' + [ɕjǎŋ] 'think' + [tɕjā] 'home' -->

[wó-ɕjǎŋ-tɕjā] 'I am home sick.'

3rd + 3rd + 1st --> (raised-3rd) + (lowered-3rd) + 1st

7. [láj] 'come' + [pjǎw] 'show' + [tɕjé] 'decide' -->

[láj-pjǎw-tɕjé] 'Let's vote.'

2nd + 3rd + 2nd --> 2nd + (lowered-3rd) + 2nd

8. [t^hā] 'he' + [ɕjǎŋ] 'think' + [k^hàn] 'see' -->

[t^hā-ɕjǎŋ-k^hàn] 'He likes to see (it).'

1st + 3rd + 4th --> 1st + (lowered-3rd) + 4th

9. [xǎw] 'good' + [rán] 'man' + [xǎw] 'good' + [sè] 'thing' -->

[xǎw-rán-xǎw-sè] 'good man and his good deeds'

3rd + 2nd + 3rd + 4th --> (lowered-3rd) + 2nd +
(lowered-3rd) + 4th

In these phrases rule (3) seems to apply correctly. For example, in sentence (6) wǒ 'I' is followed by sījǎn 'think', and therefore is modified to raised-3rd tone. But sījǎn 'think' is followed by a non-3rd tone, and therefore is modified to lowered-3rd tone. The result is as predicted.

As noted earlier (p.9), however, 3rd tone retains its full form before a pause. Locations of pause may thus affect the application of rule (3). Consider the sentence /wǒ jǎn swěj/ 'I drink water', with its two realizations (10) and (11).

10. [wǒ-jǎn-swěj] 'I drink water'
(raised-3rd) + (raised-3rd) + 3rd
11. [wǒ#jǎn-swěj] 'I drink water'
3rd + (raised-3rd) + 3rd

There is no pause in (10), but a pause occurs between [wǒ] 'I' and [jǎn] 'drink' in (11). Thus [wǒ] is emphasized in (11) but not in (10), and receives its full "dipping" 3rd tone.

It needs to be understood that each syllable of a word not only has tone, but also some degree of stress. Chao (1968:35) says that "stress in Chinese is primarily an enlargement in pitch range and time duration and only secondarily in loudness." Thus, when a low-dipping tone is stressed it is dipped lower, and when a high-falling tone is stressed it starts higher and falls lower. Chao continues: "All syllables that have neither weak nor contrastive stress are said to have normal stress."

Actually, sequences of normally stressed syllables without intermediate pause, whether in a phrase or in a compound word, are not all of the same degree of phonetic stress, the last being the strongest, the first next, and the intermediate being least stressed, as in 好人, hao 'ren. 'good man', ... 我没懂, woo, mei 'doong. 'I did not understand'...." In brief, when a phrase has three or four syllables, the last syllable has the strongest stress, the first the next strongest, and the remaining syllable or syllables the least stress.

Based on the above, I assume that all lexical items have one [1 stress] syllable.⁵ So we can formulate a phrasal stress rule in the following way:

Rule (4)

$$\left[\overset{V}{1 \text{ stress}} \right] \rightarrow [1 \text{ stress}] \left/ \begin{array}{l} \left\{ \begin{array}{l} \#C. \text{---} \\ \text{---} C. \# \end{array} \right\} \end{array} \right. \begin{array}{l} (a) \\ (b) \end{array}$$

where # = pause

By the application conventions of SPE we get

	#	wǒ	jǎn	ʃwěj	#	BUT	#	wǒ	#	jǎn	ʃwěj	#
		1	1	1				1		1	1	
(a)		1	2	2				1		1	2	
(b)		2	3	1				1		2	1	

If we apply rule (4) to (10) and (11), both [wǒ] and [ʃwěj] get [1 stress] in (11), only [ʃwěj] gets [1 stress] in (10).

⁵The inherently stressless particles won't be affected by this. Rule (4) won't give them any stress either, then.

According to this, I assume when a 3rd tone gets [1 stress], it won't be changed to a raised-3rd tone even if it is followed by another 3rd tone. In other words, a 3rd tone is changed to a raised-3rd tone only when followed by another 3rd tone without a pause intervening. On this point, Chi (1961:59) also notes: "When three or more 3rd tone words are in series, if one speaks in a faster speed without having any pause, the preceding 3rd tones except the last one may be changed to be modified rising tones; if there is a place that can be interrupted by any light pause, the word which precedes the pause does not change to the rising tone." Chan (1951:xxi) also states: "When three or more 'stressed' syllables in the third tone come together, they must be examined in the light of grammatical structure of the sentence in which they are found. ... If they are not to be spoken together, ...syllables retain their original third tone because they are both at the end of a conversational unit." When Chan (p. xix) explains stress, he says: "A 'stressed' syllable in Chinese is spoken with a relative loudness and given the full duration for its delivery while its characteristic tone quality is reproduced distinctly and without any modification."

The above phenomena can be examined in the following surface phonetic forms:

12. a. [sów-tšé-təjá] 'fingernail'

hand point crust

3rd + 3rd + 3rd --> (raised-3rd) + (raised-3rd) + 3rd

b. [sǒw#tɕə-tɕjǎ] 'fingernail'

3rd # 3rd + 3rd --> 3rd # (raised-3rd) + 3rd

13. a. [tɕ^hiŋ -tɕý-sǒw] 'Please raise (your) hands'

please lift hand

3rd + 3rd + 3rd --> (raised-3rd) + (raised-3rd) + 3rd

b. [tɕ^hiŋ #tɕý-sǒw] 'Please, raise (your) hands'

3rd # 3rd + 3rd --> 3rd # (raised-3rd) + 3rd

In addition, the preceding discussion can be applied to the occurrence of lowered-3rd tone. That is, a 3rd tone is changed to the lowered-3rd tone only when there is no pause intervening between that 3rd tone and the following non-3rd tone. In (14), there is no pause preventing the 3rd tone of /pǎw/ 'show' from changing to lowered-3rd tone; but in (15), the 3rd tone word /sǒw/ 'hand' remains unchanged because of the pause.

14. [tɕý-sǒw-pǎw-tɕje] 'raise hands for a vote'

lift hand show decide

3rd + 3rd + 3rd + 2nd --> (raised-3rd) + (raised-3rd) +
(lowered-3rd) + 2nd

15. [tɕý-sǒw#tɕje-tiŋ] 'decide by raising hands'

lift hand decide decide

3rd + 3rd # 2nd + 4th --> (raised-3rd) + 3rd # 2nd + 4th

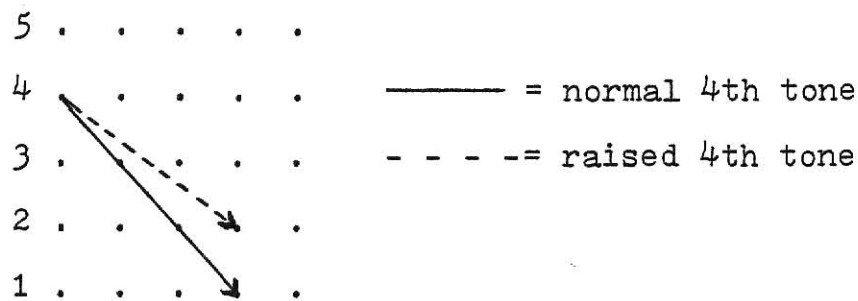
Therefore, it is necessary to revise rule (3) as rule (5).

Rule (5)

[+concave] --> $\left[\begin{array}{l} \neg \text{fall} \\ \neg \text{rise} \\ \neg \text{long} \\ \neg \text{concave} \end{array} \right] / \left[\overline{-1 \text{ stress}} \right] [\neg \text{concave}]$

D. When a 4th tone is followed by another 4th tone

Pike (1972:29) states: "Tonemes may be modified by being raised or lowered a bit because of partial attraction (partial assimilation) to neighboring tonemes." Similarly, Hyman and Schuh (1974:87) suggest: "It should be expected that a stressed syllable will raise a preceding unstressed syllable slightly (low-raising)." Evidence shows that the preceding comments can be applied to allophones of the 4th tone in Mandarin if "stressed" and "unstressed" be considered as "stronger stressed" and "less strong stressed". Chao (1968:28) says that when "a high-falling (4th) tone is followed by another high-falling tone, it does not fall to the bottom." It is changed from pitch 4321 to 4\2, or what can be called a "raised-4th tone".



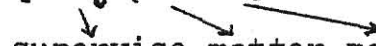
Consider the following examples:

16. [tsaj] 'again' + [təjaŋ] 'meet' --- [tsaj-təjaŋ] 'Good-bye!'
- 4th + 4th --> (raised-4th) + 4th
17. [pjaŋ] 'change' + [xwà] 'melt' --- [pjaŋ-xwà] 'change'
- 4th + 4th --> (raised-4th) + 4th

When 4th tones come together in a phrase of two or more syllables, all the preceding 4th tones tend to be raised, if

there is no pause intervening. As the preceding discussion showed, the word preceding a pause usually gets the strongest stress. As Pike (1972:29) has observed, "stress may affect the length, height, or quality of tonemes." Thus, the location of strongest stress blocks the change from normal 4th tone to raised 4th tone. Some examples:

18. a. [tũŋ-sə-xwè] 'board of directors'


 supervise matter meeting

3rd + 4th + 4th --> (lowered-3rd) + (raised-4th) + 4th

b. [tũŋ-sə#xwè] 'meeting of board of directors'

3rd + 4th # 4th --> (lowered-3rd) + 4th # 4th

19. [tɕi-xwà#ɕwè-tɕaw] 'planning to go to sleep'

4th + 4th # 4th + 4th --> (raised-4th) + 4th # (raised-4th) + 4th

Hence, raised 4th tone can be predicted as follows:

Rule (6)

[+low] --> [-low] / $\left[\begin{array}{c} +\text{fall} \\ -1 \text{ stress} \end{array} \right] \quad \left[\begin{array}{c} +\text{fall} \\ +\text{low} \end{array} \right]$

The word [pù] 'no' is the only exception in which this rule does not apply. It will be discussed later in Section 2B.

E. The change of 2nd to 1st tone in three-syllable groups

Chao (1968:27) claims that if in a three-syllable word or phrase ABC, A is in the 1st or 2nd tone, B is in the 2nd tone, and C is in any except the neutral tone, then B changes to the

1st tone for speech at conversational speed. Some of his examples are:

20. / $\rho\bar{i}$ -jáŋ-sən/ 'ginseng'

1st + 2nd + 1st --> 1st + 1st + 1st

21. /sān-nján-təí/ '3rd grade'

1st + 2nd + 2nd --> 1st + 1st + 2nd

22. /mé-lán-fāŋ/ 'Mei Lanfang (name)'

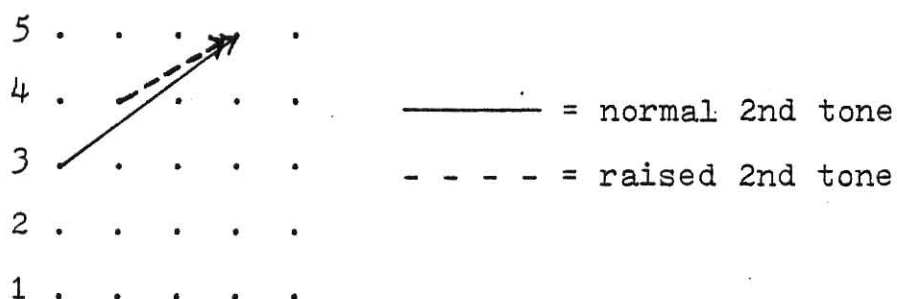
2nd + 2nd + 1st --> 2nd + 1st + 1st

Chao admits it does not change at a "more deliberate" speed. And Chan (1951:xxi) thinks that "this type of tone sandhi occurs only in fairly speedy conversation."

Chao collected his data from the dialect of Peiping more than twenty years ago. As Shen (1969:172) states, "whenever a dialect becomes a standard language, it is usually changed partially to be adjusted to other dialects." Additionally, it has been mentioned that the tone of a syllable is affected much more by the tone of the following syllable than by a preceding one in Mandarin. After examining the data I collected, it appears that the above change occurs only in the language of the native Pekinese and a few other northern speakers when speaking at a very rapid speed. It is possible that this tone change is dying out. Chao himself considers it of minor importance even within the Pekinese dialect.

The change, for those speakers who have it, may be considered an omission of the beginning pitch of the high-rising tone, whose ending point is at the same level as the high-level tone.

Its rise begins from pitch 4 instead of 3. That is, the 1st tone derived from a 2nd tone may be considered a "raised 2nd tone". The duration of this modified 2nd tone is shorter than that of the normal 2nd, but is still longer than that of the neutral tone. The raised 2nd tone may be illustrated as:



I will treat the change as a shortening process, assuming that further phonetic details about pitch height can be built into the rule if necessary.

Rule (7) (optional)

$\begin{bmatrix} +\text{high} \\ +\text{rise} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{short} \end{bmatrix} / \# \begin{bmatrix} -\text{low} \end{bmatrix} \text{ ——— } \begin{bmatrix} -\text{short} \end{bmatrix} \#$

F. Unstable neutral tone

T.H. Tung (1964:110) states: "If a component in a phrase loses its inherent stress in the sandhi changes, it becomes a neutral tone." Bodman and Stimson (1961:viii) think: "syllables of weak stress occur only after a loud stress, as the last syllable(s) in a polysyllabic word or as the 'neutrally toned' final particles." In general, the neutral tone is regarded as a weak stress. And Chao (1968:35) claims that "most cases of

weak stress occur enclitically, that is, closely following a stressed syllable, whose tone determines the pitch of the weakly stressed syllable." As was mentioned in the second chapter (p. 8), a syllable in any of the four tones can be neutral in tone under certain conditions. Further, it may be pointed out that generally all particles, interjections, pronouns following verbs, and other words which in themselves do not possess any important lexical meaning are pronounced as neutral tone syllables. "Most literary expressions, new terms about modern life, and scientific terms do not contain the neutral tone. Of what remains, namely colloquial expressions of old standing, one would like to be able to say that they all have neutral tones, but actually some do and some don't, and the facts about the neutral tones are purely lexical data that have to be recorded individually in the dictionary. In some cases there is alternation between a form with and the same without the neutral tone. Such forms are said to have an optional neutral tone." (Chao 1968:38-39) Hence, the occurrence of the lexical neutral tone is unpredictable. But generally speaking, Chi (1961:28) suggests that the lexical tone may lose its stress when it is the second syllable of a phrase which is used very often. Lin (1956:32) also states that in most cases the neutral tone occurs at the end of dissyllabic phrase, such as [t^hā-tə̌] 'his', [mù-t^how] 'wood', or [pà-pà] 'daddy'. Additionally the syllable which precedes the lexical neutral tone gets stronger stress than it is supposed to be. It may be explained that the lost

stress of a lexical neutral syllable is absorbed by the preceding syllable. I therefore formulate the partial predictable neutral tone as a minor rule (8).

Rule (8)

$$V \rightarrow [-\text{stress}] / \# C_0 \quad [+ \text{stress}] C_0 \text{ ———}$$

However, when will this minor partial rule be suitably applied is still a problem. I would like to leave it to the later studies for further and deeper investigation.

Ladefoged (1975:225) and others define tone as "pitch variations that affect the meaning of a word", so some linguists consider the neutral tone as "toneless". The duration of the neutral tone is relatively short, and I will count it as one beat only. According to Chao, at the end of an utterance the pitch of the neutral tone is high after a 3rd tone and (relatively) low after the other tones. These changes may be specified as follows:

Rule (9)

$$\left[\begin{array}{c} V \\ - \text{stress} \end{array} \right] \rightarrow \left[\begin{array}{c} + \text{ short} \\ - \text{ fall} \\ - \text{ rise} \\ \alpha \text{ low} \\ - \alpha \text{ high} \end{array} \right] / [\alpha \text{ high}] \text{ ——— } \#$$

We may get a general fact from rule (9), that is, the pitch of the neutral tone is by dissimilation from the tone of the preceding syllable. This is true whether the final syllable had one of the four lexical tones or was inherently unmarked for tone. There is some degree of variation in the pitch of the neutral syllable, which I will not account for in further

detail here.

Because a neutral tone weakly stressed syllable may occur at the end of an utterance, it needs to be added into the environment of the normal stress rule (4):

Rule (10)

$$\left[\begin{array}{c} \text{V} \\ 1 \text{ stress} \end{array} \right] \rightarrow [1 \text{ stress}] / \left\{ \begin{array}{l} \# [- \text{stress}]_0 \text{ —} \\ \text{—} [- \text{stress}]_0 \# \end{array} \right\} \quad \begin{array}{l} (a) \\ (b) \end{array}$$

Chao (1968:38) mentions that the neutral tone has a much heavier phonological load in the Peiping dialect than in the other dialects. In some dialects that have influenced Mandarin, such as Cantonese, there is no neutral tone. So although almost any morpheme in any of the four regular tones in today's Mandarin can occur with neutral tone (sometimes with a spread of variation in pitch), the frequency of its occurrence is lower than in the dialect of Chao's study. Only those morphemes (such as particles) which are always in the neutral tone regularly remain. For instance, one of Chao's examples is [ts̄ī-má-tà-tə̌] 'sesame-size (tiny, little)'. Besides the stressless particle [tə̌], /má/ with inherent 2nd tone is pronounced as neutral tone [má]. But instead of changing it to neutral tone, many modern Mandarin speakers pronounce [má] with inherent or raised 2nd tone. For these speakers the neutral tone usually occurs at the end of an utterance seldom in the other positions.

2. Morphophonemic variation

Hyman and Schuh (1974) note that frequently "when a syllable is in proximity with a syllable of identical tone, its tone changes". Pike (1972) points out that tonemes may cause neighboring tonemes sometimes to become like them (assimilation) and sometimes to become different from them (dissimilation). According to the dictionaries of Liang (1976) and Wen Hwa (1974), the Mandarin words [ī] 'one, a', [tɕ^hī] 'seven', [pā] 'eight', and [pù] 'no, not' have special tonal behavior. In general, their tones are affected by a dissimilation rule.

As a matter of terminology, Chao (1968:44) observes that "when a tonal variant is the same as an allophone of another phoneme, then a morphophonemic problem arises". While the tone sandhi mentioned in section 1 of this chapter may be treated as a matter of allophones, the tonal alternations of the four morphemes in this section are morphophonemic changes. In the following discussion, these tone changes will be examined.

A. The changes of the tone of /ī/ 'one, a'

Chung (1968:92) states that the word /ī/ 'one' is pronounced with 1st tone only when it is in isolation or before a pause. When it is included in a phrase, sometimes it is pronounced with 2nd tone, sometimes with 4th tone, depending

B. The change of the tone of /pù/ 'no, not'

Huang and Stimson (1976:3) mention that the word [pù] 'no, not' is usually pronounced with 4th tone except when followed by another 4th tone word.

32. [pù-tsī] 'don't know' 4th + 1st

33. [pù-xě] 'unsuitable' 4th + 2nd

34. [pù-xǎw] 'not good' 4th + 3rd

35. [pú-tsàj] 'absent' 4th + 4th --> 2nd + 4th

Other homophonic words, such as (布) 'cloth', (部) 'a section', (步) 'a step, to walk', ...etc., do not undergo this change. Again, /pù/ 'no' will be lexically marked to undergo the following minor rule.

Rule (12)

$$\begin{bmatrix} + \text{ fall} \\ + \text{ low} \end{bmatrix} \rightarrow \begin{bmatrix} - \text{ fall} \\ - \text{ low} \\ + \text{ rise} \end{bmatrix} \quad / \quad \text{---} \quad \begin{bmatrix} + \text{ fall} \\ + \text{ low} \end{bmatrix}$$

Here we may compare rule (12) with (6) since they both concern changes of the 4th tone.

$$(6) \quad [+ \text{ low}] \rightarrow [- \text{ low}] \quad / \quad \left[\begin{array}{c} + \text{ fall} \\ - \text{ 1 stress} \end{array} \right] \begin{bmatrix} + \text{ fall} \\ + \text{ low} \end{bmatrix}$$

When two high-falling tones come together in Mandarin the preceding one regularly tends to raise its ending point, which is inherently low, to be dissimilar to the following one. But only the exceptional word /pù/ 'no' goes so far as to reverse the direction of its glide, from falling to rising, weak support for what has been claimed as a universal tendency (Hyman and

Schuh 1974:101).

Because [ī] 'one' and [pù] 'no' are extremely frequent words, the changes affecting them are as important as the changes of 3rd tone considered earlier. Language learners certainly need to master these changes.

C. The change of the tone of /tɕ^hī/ 'seven' and /pā/ 'eight'

The two words [tɕ^hī] 'seven' and [pā] 'eight' also having a special tone change. They are usually pronounced with 1st tone, but are changed to 2nd tone when followed by a 4th tone word.

36. [tì-tɕ^hī] 'the seventh' 4th + 1st

37. [tɕ^hī-njān] 'seven years' 1st + 2nd

38. [pá-tɕjān] 'eight pieces' 1st + 4th --> 2nd + 4th

39. [tɕ^hī-tà#pā-ɕjǎw] 'seven big ones and eight small ones
(objects of various sizes thrown together)'

1st + 4th # 1st + 3rd --> 2nd + 4th # 1st + 3rd

40. [tɕ^hī-kāw#pā-tī] 'seven highs and eight lows (bumpy road)'
1st + 1st # 1st + 1st

Some words homophonic with [tɕ^hī] 'seven' are (妻) 'wife', (欺) 'to cheat', (凄) 'chilly', (戚) 'relatives', ...etc. And (巴) 'to expect', (叭) 'a trumpet', (笆) 'bamboo fence', ...etc. are homophonic with [pā] 'eight'. Again, these words are pronounced with 1st tone and do not change as 'seven' or 'eight'

do. This change may be formulated as minor rule (13):

Rule (13) (optional)

$$\begin{bmatrix} - & \text{fall} \\ - & \text{rise} \end{bmatrix} \rightarrow [+ \text{rise}] \quad / \quad \text{---} \quad \begin{bmatrix} + & \text{fall} \\ - & \text{rise} \end{bmatrix}$$

Chao (1968:45) points out that a substantial minority of speakers use the 1st tone for /tə^{hī}/ 'seven' and /pā/ 'eight' in all positions. As a matter of fact, this latter use tends to be more popular today. Besides the influence of southern speakers, I think many speakers use the inherent 1st tone when they are speaking of any of these two numerals in order to identify the number they refer to. Therefore (13) can be regarded as another optional rule alongside (7).

CHAPTER FOUR

CONCLUSION

In the previous chapters we have discussed Mandarin tone changes under the various conditions. There is one more point that needs to be explained here. That is how the rules are applied when their structural descriptions are met at several points. Briefly, when a form meets the structural description of a rule at two or more points, the rule is applied simultaneously at all these points. Left-to-right iterative application (see Sommerstein 1977:172) will get the same correct output, but right-to-left iterative application will give incorrect results. The ordering relations between these rules are simple. It is obvious that the main stress rule (10) has to apply before rules depending on stress. And the optional rule of 2nd tone being raised (7) may be better applied after minor rule (11) affecting /i/ 'one, a'. So the phrase /i-t^hwán-tsāw/ 'a mess' (1st + 2nd + 1st) has the output as 4th + 2nd + 1st instead of * 4th + 1st + 1st (1st + 2nd + 1st --> * 1st + 1st + 1st --> * 4th + 1st + 1st).

The rules concerning the changes are therefore arranged as below:

- 1) Main Stress Rule (10)
- 2) Minor Partial Predictable Neutral Tone Rule (8)
- 3) Predictable Neutral Tone Pitch Rule (9)

4) Falling-Rising Tone Raised Rule }
 Falling-Rising Tone Lowered Rule } (5)

5) Minor Level Tone Glided Rule (11)

6) Minor Falling Tone Raised Rule (12)

7) Falling Tone Raised Rule (6)

8) Rising Tone Raised Rule (optional) (7)

9) Minor Level Tone Rising-Glided Rule (optional) (13)

Hence sentence (41) will have several outputs, such as (42) or (43) depending on location of pauses.

41a. /#wǒ - ǐ - tǐŋ # pǔ - jaŋ # tsə - jaŋ - ɕjaŋ - nǐ#/

'I must not miss you so much!'

3 1 4 4 4 4 4 3 3

↓

42. 3 1 4 # 4 4 # 4 4 3 3 #

stress
(10)

 \ ˘ ↓ \ ↓ \ ˘ ˘ ↓

(8)

↓
↓
↓

(9)

(5)

↓
L-3

↓
R-3

(11)

↓
2

(12)

↓
2

L-3 2 4 # 2 4 # 4 . | R-3 3 #

where / = 1 stress
 \ = 2 stress
 ˘ = 3 stress

41b. /#wǒ # ī - tīŋ # pù - jǎw - tsə̌ - jǎŋ # ɕjǎŋ - nǐ#/

↓

43. 3 # 1 4 # 4 4 4 4 # 3 3 #

stress
(10)

↓ \ ↓ \ \ \ ↓ \ ↓

(5)

↓
R-3

(11)

↓
2

(12)

↓
2

(6)

↓
R-4

↓
R-4

3 # 2 4 # 2 R-4 R-4 4 # R-3 3 #

where / = 1 stress
 \ = 2 stress
 \ = 3 stress

After reviewing all these Mandarin tone changes, we may say that dissimilation affects tones much more than other rules. And many tones tend to be raised during the sandhi changes. These changes may be distinguished as obligatory and optional changes. From another point of view, they may also be considered as regular and special changes. The changes of the four words in Section 2 of the previous chapter are special changes. Although the tone change of /pù/ 'no' and /ī/ 'one' is special, it is obligatory.

The history of Mandarin phonology is not long enough to offer a complete description of the language, and there are many areas that remain unfinished or even undiscussed.

Some traditional studies exist, but there are contradictions and ambiguities among them.

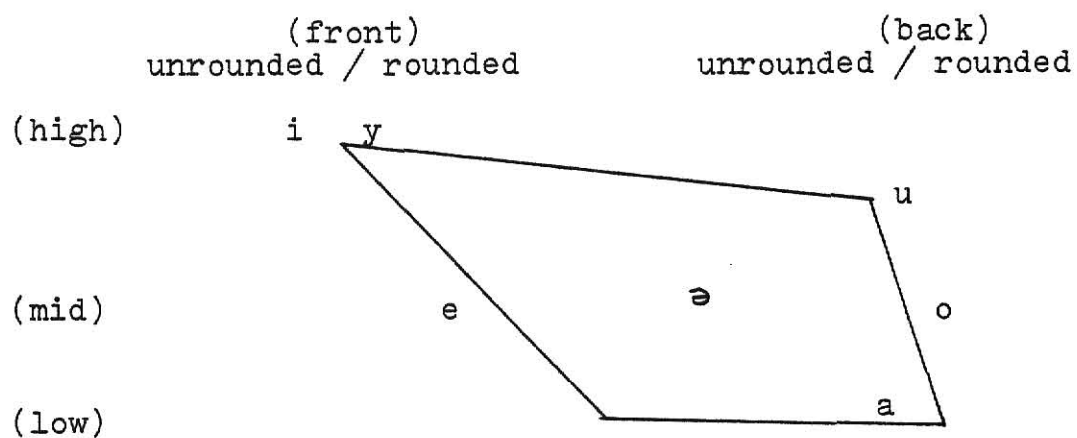
In this paper I have re-examined Mandarin tone changes in light of distinctive feature analysis, providing rules for all the important changes, whether allophonic or morphophonemic. This study is complete to the best of my knowledge, although analysis of the neutral tone is still a problem. This I leave to future work.

APPENDIX

Mandarin Consonant Phonemes

Place Manner	Bilabial	Labio- dental	Dental	Retro- flex	Palatal	Velar
Stops	p p ^h		t t ^h			k k ^h
Fricative		f	s	ʂ	ɕ	x
Affricate			ts ts ^h	tʂ tʂ ^h	tɕ tɕ ^h	
Nasal	m		n			ŋ
Liquid			l	r		
Glide	w				j	

Mandarin Vowel Phonemes



BIBLIOGRAPHY

- Bodman, N.C., and Stimson H. 1961. Mandarin Chinese. Washington, D.C.: The Center for Applied Linguistics.
- Chan, Shau-wing. 1951. Elementary Chinese. Stanford: Stanford University Press.
- Chao, Y.R. 1948. Mandarin Primer. Cambridge: Harvard University Press.
- . 1968. A Grammar of Spoken Chinese. Berkeley: University of California Press.
- Chi, Tieh-hen. 1961. Aspects of Mandarin Phonetic Changes. (Kuo yü pien ying chu li.) Taipei: Taiwan Book Co.
- Chomsky, Noam, and Morris Halle. 1968. The Sound Pattern of English. New York: Harper & Row.
- Chung, Lu-sheng. 1968. Mandarin Chinese Phonology. (Kuo yü yü ying hsüen.) Taipei: Yu Wen Press.
- Hanyu Pinyin Cihui. 1964. [A Dictionary of Chinese Phonetic Alphabets.] Chinese Characters Revolution Committee, Shanghai: Wenzhi Gaige Press.
- Howie, John Marshall. 1976. Acoustical Studies of Mandarin Vowels and Tones. Cambridge: Cambridge University Press.
- Hsu, Shih-jung. 1959. Basic Knowledge of The Phonetics of Chinese Common Language. (P'u t'ung hua yü yin chi pen chih shih.) Peking: People's Education Press.
- Huang, Parker P., and Hugh Stimson. 1976. Spoken Standard Chinese. Yale University, New Haven: Far Eastern Publications.
- Huang, Raymond. 1969. Mandarin Pronunciation, Explained with Diagrams. Hong Kong: University Press.
- Hyman, Larry M., and Russell G. Schuh. 1974. Universals of Tone Rules: Evidence from West Africa. Linguistic Inquiry V:81-115.
- Karlgren, Bernhard. 1948. Etudes sur la phonologie chinoise, translated into Chinese by Y.R. Chao and F. Lee. Taipei: Commercial Press.

- _____. 1962. Sound and Symbol in Chinese. Hong Kong: Hong Kong University Press.
- Kratochvil, Paul. 1970. Review of A Grammar of Spoken Chinese, by Y.R. Chao. Language 46:513-24.
- Ladefoged, Peter. 1975. A Course in Phonetics. New York: Harcourt Brace Jovanovich.
- Lehmann, Winfred P. 1975. Language and Linguistics in the People's Republic of China. Austin: University of Texas Press.
- Liang, S.C. 1976. A New Practical Chinese-English Dictionary. Taipei: The Far East Book Co.
- Lin, Hee. 1956. Handbook of Phonetic Alphabets. Peking: Ton-Sue-Du-Wu Press.
- Lo, C.P. 1956. A Guide to Chinese Phonetics. (Hanyü ying yun hsüeh dau lun.) Peking: Chung Hwa Book Co.
- Pike, Kenneth L. 1972. Tone Languages. Ann Arbor: The University of Michigan Press.
- Shen, Pu-chou. 1969. Introduction to Linguistics. (Yen yü hsüeh kai lun.) Taipei: Taiwan Commercial Press.
- Sommerstein, Alan H. 1977. Modern Phonology. Baltimore: University Park Press.
- Tang, Lan. 1965. The Science of Chinese Words. (Chung-kuo wentzu hsüeh.) Hong Kong: Taipei Book Co.
- Tung, Torng-ho. 1964. An Outline of Linguistics. (Yü yen hsüeh ta kung.) Hong Kong: Hwei Ton Book Co.
- Wen Hwa Dictionary of the Standard National Language. 1974. Taipei: Wen Hwa Book Co.

TONE SANDHI IN MANDARIN CHINESE

by

JESSE BEING-JANG LIN

B.A. Providence College of Arts and Science, 1974

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the
requirement for the degree

MASTER OF ARTS

Department of Speech

KANSAS STATE UNIVERSITY

Manhattan, Kansas

1980

ABSTRACT

Because Chinese is largely monosyllabic and possesses many words with identical C and V sequences, tone plays an important role in the language. There are only four basic tones in Mandarin Chinese, but these tonemes undergo several changes when they are included in a phrase or a sentence. A few traditional studies of Mandarin tone changes have been made, but certain problems have remained.

This paper first, re-examines tone changes in today's Mandarin, and second, states the rules which determine these changes. Specifically, it deals with changes in (1) the 3rd tone when it is followed by another 3rd tone or by a non-3rd tone, and in sequences of three or more 3rd tone syllables, (2) in the 4th tone when followed by a 4th tone, (3) in the 2nd tone in certain three-syllable groups, and in the lexical items /ī/ 'one', /pū/ 'not', /tɕ^hī/ 'seven', and /pā/ 'eight'. It also discusses briefly the so-called neutral tone. Tone change rules are stated in distinctive features.