

The Bangkok Hakka Phonology^{*}

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Abstract

The purpose of this paper is to describe the Bangkok Hakka phonology especially the tone system using articulatory phonetics supported by acoustic phonetics.

The results show that there are 18 onsets or initial consonants / p, p^h, t, t^h, k, k^h, ʔ, ts, ts^h, f, s, h, m, n, ŋ, l, w, j /; six single vowels / i, e, ɨ, a, o, u / and 66 rimes. The syllable structures include three types on open syllables and six types on closed syllables. The Hakka tone system as spoken in Bangkok, Thailand, is divided into four tones on live syllables, i.e., open syllables or syllables closed with a sonorant and two tones on dead syllables, i.e., syllables closed with an obstruent. The phonological system demonstrates four contrastive tones of which two tones have allotones, that is, tone value 44 and tone value 31, each has an allotone with tone values 4 and tone value 32 respectively. Tone value 4 and 32 only occur on dead syllables whereas tone value 44 and 31 occur elsewhere. Tone sandhi can be observed in Hakka disyllabic and trisyllabic words:

(1) Yin Ping Mid Level ˩33 → Rising ˩325/____ ˩21, ˩31, ˩32
(that is, before the lower tones).

(2) Qu Sheng Mid-high Level ˩44 → High Falling ˩53/____ Yin
Ping Mid Level ˩33 and Yang Ru Mid-high Level Stopped ˩4.

This paper also concludes with an Autosegmental treatment of the Hakka tone system and correlates with the average contour of each tone plotted onto the line graph by acoustic measurements.

1. Introduction

The Hakka language is a regional variety of southern Chinese mostly spoken in the provinces of Guangdong, Southern Fujian, Jiangxi, Taiwan, Guangxi, Hunan and Sichuan (Egerod 1967; Ramsey 1987; Wang 2003). Some Hakka immigrated to Southeast Asia including Thailand more than 100 years ago.

The exonym 客家 *Hakka* or *Kejia* in Mandarin Chinese can be translated as ‘guest families’ (Hashimoto 1973; Kiang 1991; Constable 1996). Hashimoto (1973:1-2) explained that “the Hakka people call themselves the

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Hak-nin (*hak* ‘guest’ plus *nin* ‘person’), and call their language *Hak-fa* (*hak* ‘guest’ plus *fa* ‘speech, language’). The meaning of Hakka reflects their migration from Central to Southern China beginning from about the ninth century into the early twentieth century (Ooi Giok Ling and David Levinson 2002:477).

The number of Hakka speakers in China has been declining every year because of the language policy there, but the Hakka language situation in Taiwan seems more stable, leaving Hakka speakers less prone to language shift than in other areas. Hakka people in Taiwan have been supported in their maintenance of language and culture by President Chen Shui-bian, and this support has now led to fruitful results.

Hakka speakers came to Thailand from several districts of Guangdong. Most of them moved from Meixian and the area around the city of Shantou (an area from where the Teochiu of the Southern Min form of Chinese came). The number of Hakka speakers in Thailand cannot be stated exactly, because nowadays the descendants of Chinese immigrants have become indistinguishable from the indigenous population. However, some estimates suggest the Hakka population in percentage terms makes them the third largest group (16%) of Chinese dialects after the Teochiu (40%) and the Hainanese (18%) (cf. Vatikiotis 1998:219-220).

Despite the declining use of Hakka in Thailand, there is no Hakka dictionary in Thailand or other documents except three theses on Hakka phonology in Thailand, viz. Pratoom 1984; Jurairat 2001 and Wandee 2003. However, the explanation of the tone system of Hakka as spoken in Thailand has been until now unclear. A number of Hakka varieties spoken in Thailand can be traced back to some cities and towns in China, such as Xingning, Jieyang, Fengshun, Wuhua, Dapu, and Meixian. The Hakka descendants from Meixian are regarded as representative in this investigation of the Hakka tone system because Meixian Hakka is considered to be the standard form of Hakka. For the purposes of this study these speakers are termed speakers of Bangkok Hakka.

Bangkok Hakka is the variety spoken by Hakka speakers who live in the Bangkok area, Thailand and are descended from Meixian Hakka in China. This study identifies them as Bangkok Hakka speakers since they live in the capital city of Thailand.

Data based on articulatory and acoustic studies have been used to analyze the six Hakka tones, so that the tone system and the tonal characteristics can now be described clearly. At first, wordlists of about 3,000 words used in daily life composed of the basic wordlists adapted from Hashimoto (1972) and Lau (2000) were elicited from the main informant for phonological analysis. Then, a set of words with six Hakka tones, selected from the wordlists for phonological analysis, were used for acoustic analysis. For example, pa^{33} 疤 ‘scar’, $p^h\alpha^{21}$ 爬 ‘crawl’, pa^{31} 把 ‘hold, grasp’, pa^{44} 坝 ‘dam’, p^hat^{32} 拨 ‘to blow’, p^hat^4 拔 ‘pull out’ is represented for tone 1 to tone 6, respectively. The correlation between phonetic and phonological values can be

clearly confirmed from the perception analysis and the acoustic data presented below.

2. Syllable structures

In this study, Hakka syllables can be divided into two main parts: (1) the *initial* or *onset*, and (2) the *rime*. The rime is divided into two elements: (1) the *nucleus* and (2) the *coda* in which tone overrides the entire length of the syllable.

The maximal Hakka syllable structure consists of Initial consonant + Onglide + Nuclear vowel + Final consonant + Tone (C_i V_o V C_f \ T), whereas the minimal syllable needs only Nuclear vowel + Tone (V \ T) or a syllabic consonant + Tone (C_{syl} \ T). In this study, a syllable with a consonant cluster is not found. The structural components of the Hakka syllable are shown in Table 1.

Table 1. The components of the Hakka syllable (adapted from Bauer and Benedict 1997:9 and Howie 1976:19).

Tone			
Onset (C _i)	Rime		
p, p ^h , t, t ^h , k, k ^h , ʔ, ts, ts ^h , f, s, h, m, n, ŋ, l, w, j	Nucleus		Coda (C _f)
	Onglide vowel (V _o)	Nuclear vowel (V)	p, t, k, m, n, ŋ, w, j
	i, u	i, ɨ, u, e, o, a	

Table 1 displays four components of the Hakka syllable with Tone; Initial or Onset are p, p^h, t, t^h, k, k^h, ʔ, ts, ts^h, f, s, h, m, n, ŋ, l, w, j; two Onglide vowels are i and u; six Nuclear vowels are i, ɨ, u, e, o, a; and eight Final consonants are p, t, k, m, n, ŋ, w, j.

Type of syllable

The initial consonants combined with at least one nuclear vowel without final consonant are called open syllables. Combinations of initial consonants (C_i), vowel (V) and ending with final consonant (C_f) are called closed syllables. The syllables are of two types: live which are either open or closed with a sonorant, and dead, i.e., closed with a stop. The possible syllable structures are as follows:

C_i V (V) C_f ; where C_f = {m, n, ŋ, w, j, p, t, k}

With an exception of a syllabic nasal

Examples of live syllables: open syllables

- | | | | |
|----------------------|--------------------|-----------------------------|------------------------|
| 1. C _i V | fa33 花 ‘flower’ | sa21 蛇 | ‘snake’ |
| | li44 利 ‘sharp’ | ŋo21 鹅 | ‘goose’ |
| 2. C _i VV | sie31 写 ‘to write’ | k ^h ie44 pa21 祛把 | ‘hard broom’ |
| | kui33 龟 ‘turtle’ | kuo44 过 | ‘go through a process’ |
| 3. C | m21 唔 ‘not’ | ŋ21 鱼 | ‘fish’ |

Examples of live syllables: closed with a sonorant

- | | | | |
|------------------------------------|--------------------------------|------------------------|--------------|
| 4. C _i VC _f | hoj31 海 ‘sea’ | t ^h oj44 袋 | ‘bag’ |
| | jaw33 腰 ‘waist’ | saw44 扫 | ‘to sweep’ |
| 5. C _i VVC _f | kiaj44 戒 ‘give up, stop’ | k ^h iew21 桥 | ‘bridge’ |
| | miew44 庙 ‘shrine’ | piew33 錶 | ‘a watch’ |
| 6. C _i VC _f | t ^h am33 贪 ‘greedy’ | jun21 熊 | ‘bear’ |
| | fan44 饭 ‘cooked rice’ | ts ^h on33 苍 | ‘dark green’ |
| 7. C _i VVC _f | ŋiem33 拈 ‘pick with fingers’ | | |
| | sien44 线 ‘thread’ | kiun33 弓 | ‘a bow’ |

Examples of dead syllables: closed with a stop

- | | | | |
|------------------------------------|---|----------|------------|
| 1. C _i VC _f | ?ap32 鸭 ‘a duck’ | mak32 脉 | ‘pulse’ |
| | tot32 掇 ‘hold in both hands’ | jok4 药 | ‘medicine’ |
| 2. C _i VVC _f | t ^h iep4 碟 ‘a saucer in which
a cup is set’ | | |
| | hiet32 血 ‘blood’ | ŋiuk32 肉 | ‘meat’ |

3. Consonants

Bangkok Hakka has eighteen initial consonants and eight final consonants.

The Formational statement of the initial consonants

1. /p/ is a voiceless unaspirated bilabial plosive. It can occur in the initial and final positions. It is realized as [p] as in pet32 北 ‘north’, pien44 柄 ‘handle’. It is realized as voiceless unaspirated and unreleased bilabial plosive [p̚] as in ŋip4 入 ‘to enter’, sap4 炆 ‘cook in boiling water’.

2. /p^h/ is a voiceless aspirated bilabial plosive. It occurs only in the initial position. It is realized as [p^h] as in p^hak4 白 ‘white’, p^hien21 平 ‘flat’, p^huk4 扑 ‘to stumble’, p^hu21 扶 ‘support with the hand’.

3. /t/ is a voiceless unaspirated (apico-dental lamino alveolar) denti-alveolar plosive in the initial positions. It is realized as [t̚] as in ta21 打 ‘to hit’. It is realized as voiceless unaspirated and unreleased apico-alveolar plosive [t̚] in the final position as in pit32 笔 ‘pen’, ts^hat32 擦 ‘to rub’.

4. /t^h/ is a voiceless aspirated alveolar plosive. It occurs only in the initial position. It is realized as [t^h] as in t^hen21 藤 ‘rattan, vines’, t^hiep32 帖 ‘note, card’, t^hak4 笛 ‘flute’.

5. /k/ is a voiceless unaspirated velar plosive. It can occur in the initial and final positions. It is realized as [k] in the initial position as in ke33 鸡 ‘chicken’, kew44 够 ‘sufficient, enough’. It is realized as voiceless unaspirated and unreleased velar plosive [k̚] as in suk4 熟 ‘ripe’, pak32 百 ‘one hundred’.

6. /k^h/ is a voiceless aspirated velar plosive. It occurs only in the initial position. It is realized as [k^h] as in k^haw31 考 ‘to take an examination’, k^hiun33 菌 ‘mushroom’, k^hi21 旗 ‘a flag’.

7. /ʔ/ is a voiceless glottal stop. It is realized as [ʔ] as in ʔam44 暗 ‘dark’, ʔew31 呕 ‘to vomit’, ʔoj33 哀 ‘to regret’.

8. /ts/ is a voiceless unaspirated alveolar affricate. It is realized as [ts] as in tsaj44 债 ‘debt’, tson33 砖 ‘brick’, tsu33 猪 ‘a pig’.

9. /ts^h/ is a voiceless aspirated alveolar affricate. It is realized as [ts^h] as in ts^ha21 茶 ‘tea’, ts^hien21 晴 ‘clear sky’, ts^hiet32 切 ‘to slice’.

10. /f/ is a voiceless labiodental fricative. It is realized as [f] as in fun21 红 ‘red’, fon33 方 ‘square’, fat32 (C.) 阔 ‘wide’.

11. /s/ is a voiceless alveolar fricative. It is realized as [s] as in sak4 石 ‘stone’, su44 输 ‘be defeated’, suj31 水 ‘water’.

12. /h/ is a voiceless glottal fricative. It is realized as [h] as in ham21 咸 ‘salty’, han21 闲 ‘to be free’, hap4 盒 ‘box, case’.

13. /m/ is a voiced bilabial nasal. It can occur in the initial and final positions. It is realized as [m] as in mien21 名 ‘name’, t^ham21 痰 ‘sputum, phlegm’, ts^hiem33 签 ‘to sign’, mun21 门 ‘a door’.

14. /n/ is a voiced alveolar nasal. It can occur in the initial and final positions. It is realized as [n] as in nam21 南 ‘south’, t^hien21 田 ‘farmland’, mun44 问 ‘to ask’, nak4 纳 ‘catch by hand’.

15. /ŋ/ is a voiced velar nasal. It can occur in the initial and final positions. It is realized as [ŋ] as in ŋin21 人 ‘person’, t^hun21 铜 ‘copper’, lan44 另 ‘another’, ŋoj44 外 ‘outside’.

16. /l/ is a voiced alveolar lateral. It is realized as [l] as in lion21 凉 ‘cold’, liw21 流 ‘to flow’, liuk32 六 ‘six’.

17. /w/ is a voiced bilabial approximant. It can occur in the initial and final positions. It is realized as [w] as in wat4 滑 ‘to slip, to slide’, liw21 留 ‘remaining’, sew44 瘦 ‘thin, lean’, won21 黄 ‘yellow’.

18. /j/ is a voiced palatal approximant. It can occur in the initial and final positions. It is realized as [j] as in jiw21 油 ‘oil’, woj33 煨 ‘roast over a slow fire such as sweet potatoes, etc. in fresh cinders’, t^hoj44 袋 ‘a bag’.

4. Vowels

The Bangkok Hakka vowel system has six contrastive single vowel phonemes.

Realization of Single vowels in Bangkok Hakka

1. /i/ is a high front unrounded vowel. It can occur in the position of onglide vowel or nuclear vowel. It is realized as [i] as in ji21 姨 ‘mother’s sister (younger or older)’, pi33 杯 ‘a cup’, si33 西 ‘west’, kiɔk32 脚 ‘leg’, hioŋ31 响 ‘noisy’.
2. /ɨ/ is a high central unrounded vowel. It is realized as [ɨ] as in ts^hi33 粗 ‘rough’, tsi44 痣 ‘a mole, nevus’, si33 梳 ‘a comb’.
3. /e/ is a mid front unrounded vowel. It is realized as [e] as in se21 洗 ‘to wash’, ts^hen21 层 ‘a layer’, t^hew33 偷 ‘to steal’.
4. /a/ is a low central unrounded vowel. It is realized as [a] as in pa33 疤 ‘scar’, wat32 滑 ‘to slip, to slide’, ts^han44 栈 ‘warehouse’.
5. /o/ is a mid back rounded vowel which has two allophones [o] and [ɔ]. It is realized as [ɔ] when it follows a high front unrounded vowel [i] as in k^hiɔ21 瘸 ‘lameness’, miɔŋ31 网 ‘net’. It is realized as [o] in elsewhere as in fo31 火 ‘fire, light’, kok32 角 ‘horn’, ts^ho33 坐 ‘to sit’.
6. /u/ is a high back rounded vowel. It can occur in the position of onglide vowel and nuclear vowel. It is realized as [u] as in su33 书 ‘a book’, kua32 括 ‘scrape off’, k^huaj44 块 ‘piece’.

5. The Hakka rimes

The 66 rimes of Bangkok Hakka are composed of (1) single vowels, (2) the onglide vowel plus nuclear vowel, and (3) the nuclear vowel plus the ending semi-vowels /w, j/, nasal consonants /m, n, ŋ/ and stop consonants /p, t, k/, as summarized in Table 2.

Table 2. The distribution of vowels on the rime system of Bangkok Hakka.

Composition of final part	Rime						
Nuclear vowel or single vowel	i	ɨ	e	a	o	(ɔ)	u
Onglide vowel + Nuclear vowel	ie ia io						ui ua uo
Nuclear vowel + Semi-vowel	iw		ew	aj aw	oj		uj
Onglide vowel + Nuclear vowel + Semi-vowel	iaj iew						uaj
Nuclear vowel + Nasal ending	im in	ɨm ɨn	em en	am an aŋ	on oŋ		un uŋ
Onglide vowel + Nuclear vowel + Nasal ending	iun iuŋ		iem ien ieŋ	uan uaŋ		ion ioŋ	uon uoŋ
Nuclear vowel + Stop ending	ip it	ɨp ɨt	ep et	ap at ak	ot ok		ut uk
Onglide vowel + Nuclear vowel + Stop ending			iep iet uet iek	uat		io̯k	iut iuk

Examples of rimes:

/ie/	sie31 写	‘to write’	ts ^h ie33 me33 且姆	‘mother of daughter-in-law’
	sie21 斜	‘oblique, slanted’	tsie44 借	‘to borrow’
/ia/	ŋia33 惹	‘to pick a quarrel with’		
/io̯/	k ^h io̯21 瘸	‘lameness’	k ^h io̯31 we21 茄子	‘tomato’
/ui/	kui33 龟	‘turtle’	k ^h ui21 跪	‘to knee’
	kui33 规	‘dividers, rule’		
/ua/	kua33 瓜	‘general name for plants of the family Cucurbitaceae, gourd, melon’		
	k ^h ua33 ¹ 夸	‘to boast’		
/uo/	kuo44 过	‘to cross over, exceed, pass time’		
/iw/	jiw33 有	‘to have’	tiw33 丢	‘throw away’
	ŋiw21 牛	‘ox, cattle’	liw21 流	‘to flow’

¹k^hua33 (R.= Reading pronunciation or Literary language), ts^ha33 t^hai 44 p^hau44 (C.= colloquial language)

/ew/	few21 浮	‘to float’	lew44 漏	‘to leak’
	kew33 钩	‘hook’	sew44 瘦	‘thin, lean’
/aj/	haj21 鞋	‘shoes’	saj21 ts ^h un21 豺虫	‘parasite’
	t ^h aj44 大	‘big, to grow’	?aj31 矮	‘short’
/aw/	naw44 闹	‘to quarrel’	ts ^h aw21 炒	‘to fry’
	p ^h aw44 炮	‘an artillery piece’	maw44 帽	‘hat, cap’
/oj/	moj44 妹	‘daughter’	?oj44 爱	‘to love’
	woj33 煨	‘roast over a slow fire such as sweet potatoes, etc. in fresh cinders’		
/uj/	suj31 水	‘water’	tsuj44 醉	‘drunk’
	suj44 碎	‘to shatter’	t ^h uj44 唾	‘to spit’
/iaj/	kiaj31 解	‘untie’	kiaj44 戒	‘give up, stop’
/uaj/	k ^h uaj44 块	‘piece (classifier)’	kuaj33 乖	‘well-behaved, to be obedient’
	k ^h uaj44	‘to enjoy’	k ^h uaj44 ki44 会计	‘accounting’
	lok4 快乐			
/iew/	ɲiew44 尿	‘urine’	ts ^h iew44 噍	‘to chew’
	t ^h iew44 跳	‘to jump’	piew33 錶	‘a watch’
/im/	kim33 金	‘gold’	sim33 kon33 心肝	‘heart’
	ts ^h im21 寻	‘to find’	jim33 荫	‘shady’
/in/	ɲin21 人	‘person’	t ^h in44 定	‘to reserve’
	sin33 新	‘new’	p ^h in21 ?on33 平安	‘safe and sound’
/im/	tsim33 针	‘needle’	sim31 慎	‘careful’
	ts ^h im21 沉	‘to sink’	sim21 ts ^h a21 审查	‘to examine, check up’
	ts ^h im33 深	‘deep’	tsim33 t ^h eu21 枕头	‘pillow’
/in/	sin33 升	‘move upward’	sin21 min21 神明	‘gods, deities’
	ts ^h in21	‘dust’	tsin33 真	‘truth, real’
	foi33 尘灰			
/em/	kem21 ² 遮	‘to cover up’	sem33 参	‘ginseng’
	tsem44	‘cutting board’		
	t ^h eu21 砧头			
/en/	nen44 奶	‘milk, breast’	men21 tau21 恹倒	‘remind’
	p ^h en21	‘friend,	pen33 崩	‘collapse’
	jiu33 朋友	companion’		
/am/	nam31 揽	‘take somebody into one’s arms’	ham21 ts ^h oi44 咸菜	‘pickled vegetable’
	jam21 盐	‘salt’	kam33 柑	‘orange’
/an/	jan33 烟	‘tobacco’	p ^h an21 盘	‘tray, plate’
	pan44 半	‘half’	han21 闲	‘to be free’
/aŋ/	jaŋ31 映	‘reflect’	jaŋ31 影	‘shadow’
	kaŋ33 羹	‘a thick soup’	p ^h aŋ21 棚	‘upper storey’
/on/	k ^h on44 看	‘to see’	t ^h on33 断	‘to break’
	ts ^h on44	‘latched’	won31 碗	‘bowl’
	mun21 闷闷			

²kem21 (C.), tsa33 (R.)

/oŋ/	mon21 茫	‘dim’	pon21 fan44 榜饭	‘eat together with rice’
	son33	‘get a cold’	t ^h on21 糖	‘sugar’
	fun33 伤风			
/un/	lun21 轮	‘wheel’	wun21 suj31 浑水	‘muddy’
	tsun33 颤	‘shiver’	sun33 se44 孙婿	‘granddaughter’s husband’
/uŋ/	kun33 工	‘work, job’	sun44 送	‘deliver’
	nun21 脓	‘pus’	fun33 san44 风扇	‘electric fan’
/iem/	kiem31 捡	‘to pick up’	ŋiem33 拈	‘pick with fingers’
	t ^h iem33 添	‘to increase’	tsiem33 尖	‘pointed’
/ien/	hien21 显	‘obvious’	kien33 间	‘classifier for houses’
	lien21 连	‘to embroider’	mien44 tsoi44 面嘴	‘appearance’
/ienj/	k ^h ien33 轻	‘light in weight’	pieŋ44 柄	‘handle’
	sien44 姓	‘surname’	ts ^h ien21 晴	‘clear sky’
/uan/	kuan44 惯	‘to be used to’	k ^h uan44 t ^h ai44	‘pregnant’
			tu21 □ ³ 大肚	
	kuan33	‘relation, relationship’	kuan33 鰥	‘widower’
	hi44 关系			
/uaŋ/	kuaŋ31 矿	‘ore’		
/uon/	kuon44 灌	‘to irrigate’	kuon33 ts ^h oj21 棺材	‘coffin’
/uoŋ/	kuoŋ21 港	‘canal’	kuoŋ44 t ^h ew21 光头	‘bald’
/ion/	ŋion33 软	‘soft, flexible’	ts ^h ion33 nen44 吮乳	‘suck milk, to nurse’
/ioŋ/	mioŋ31 网	‘net’	sioŋ44 象	‘elephant’
	sioŋ33 箱	‘a big box’	hioŋ31 响	‘noisy’
	pioŋ44	‘square wood column’	hioŋ44 向	‘direction’
	?e21 枋仔			
/iun/	ŋiun21 银	‘silver’	ŋiun33 忍	‘to endure’
	k ^h iun21 裙	‘skirt’	k ^h iun33 菌	‘mushroom’
/iuŋ/	hiuŋ33 凶	‘fierce’	k ^h iun21 ŋin21 穷人	‘poor people’
	kiuŋ33 弓	‘a bow’	ts ^h iun21 su44 松树	‘pine tree, cypress’
/ip/	kip32 急	‘be impatient’	ŋip4 入	‘to enter’
	k ^h ip4	‘to be in time’	hip32 烱 or 熿	‘fiery, very hot’
	si21 及时			
/it/	pit32 笔	‘a pen’	tit32 滴	‘drip’
	sit32	‘cricket’	pit32 碧	‘emerald color, green jade’
	sut32 蟋蟀			
/ip/	sip4 十	‘ten’	sip32 湿	‘wet’
/it/	sit32 适	‘suitable’	ts ^h it4 直	‘straight, direct, upright’
	tsit32 织	‘weave’	ts ^h it4 ŋ21 侄女	‘niece’

³It means that no Chinese character is associated with the syllable in the colloquial language, so it is represented with an empty box .

/et/	set4 食	‘to eat’	ts ^h et4 ku31 贼古	‘thief, robber’
	t ^h et32 踢	‘to kick’	set32 色	‘color’
/ap/	tap32 搭	‘to erect, to take (a car)’	sap4 焯	‘cook in boiling water’
	lap4	‘candle’	hap4 ⁴ 窄	‘narrow’
	tsuk32 蜡烛			
/at/	pat32 八	‘eight’	fat32 fuk32 发福	‘good fortune’
	lat4	‘lemon grass’	ŋat32 咬	‘to bite’
	mieu21 辣茅 ⁵			
/ak/	t ^h ak4 笛	‘flute’	nak4 纳	‘catch by hand’
	pak32 百	‘one hundred’	p ^h ak4 白	‘white’
/ot/	t ^h ot32 脱	‘to take off’	ts ^h ot32 撮	‘deceive’
	tot32 掇	‘hold in both hands’	sot32 刷	‘brush’
/ok/	kok32 角	‘horn’	p ^h ok4 薄	‘thin, flimsy’
	sok32	‘string, thick rope’	ts ^h ok4 锥	‘chisel’
	ma21 索嫵			
/ut/	ts ^h ut32 出	‘go out’	kut32 t ^h eu21 骨头	‘bone’
	fut4 佛	‘Buddha image’	fut32 ⁶ 窟	‘pitted’
/uat/	kuat32 括	‘scrape off’.		
/uet/	kuet32	‘country’		
	ka33 国家			
/uk/	kuk32 谷	‘rice husk’	tsuk32 竹	‘bamboo’
	tuk32 啄	‘to peck at’	wuk32 tan31 屋顶	‘roof’
/iep/	kiep32 涩	‘astringent’	t ^h iep4 叠	‘pile up, overlap’
	kiep4 ⁷ 镊	‘clamp, tongs’	kiep32 挟	‘to nip, grip’
/iet/	ŋiet4 热	‘hot’	ŋiet4 月	‘month’
	kiet32	‘determine’	k ^h iet32 缺	‘chipped, nicked’
	sim33 决心			
/iek/	piek32 壁	‘wall’	k ^h iek32 liet4 剧烈	‘violent’
	ŋiek32	‘forehead’	siek32 惜	‘to love’
	kok32 t ^h ew21 额角头			
/io̯k/	kiok32 脚	‘leg’	tsio̯k32 爵	‘the rank of nobility’
	liok4 略	‘brief account’	ŋio̯k4 弱	‘weak’
/iut/	fu21	‘pool’		
	k ^h iut32 ⁸ 湖窟			
/iuk/	ŋiuk32 肉	‘meat’	liuk32 六	‘six’
	liuk4	‘green bean’	siuk32 粟	‘millet’
	t ^h ew44 绿豆			

⁴hap4 (C.), tsat32 (R.)⁵Literary language is 香茅⁶fut32 (C.), k^hiut32 (R.)⁷kiep4 (C.), ŋiep32 (R.)⁸fu21 k^hiut32 (R.), fu21 fut32 (C.)

6. Tones

6.1 System of tones

The phonological tone system of Bangkok Hakka can be summarized as in Figure 1.

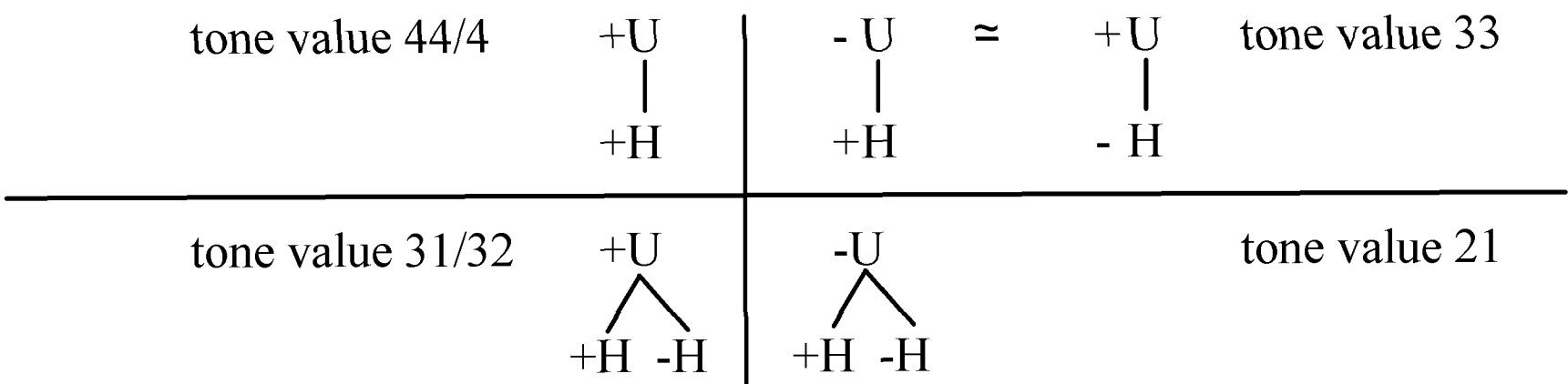


Figure 1. A symmetrical phonological tone system, Bangkok Hakka.

Figure 1 shows four contrastive tones in the Bangkok Hakka phonological system. Two tones have allotones, namely: tone value 44 and 31. The allotones 4 and 32 are in complementary distribution with tones 44 and 31, respectively. Tone values 4 and 32 only occur on syllables closed with a stop whereas tone values 44 and 31 occur on live syllables.

Tone contours on live syllable

In this study, the tones of Bangkok Hakka can be divided into two categories according to syllable types: *live* and *dead* syllables. The tones which occur on open syllables and syllables closed with nasal endings -m, -n, -ŋ are live syllables, and the tones which occur on syllables closed with stop endings -p, -t, -k are dead syllables. There are four tones which occur on the live syllables.

Description of four tones on live syllable

1. Tone 1 Mid Level tone. It starts at the mid point of 3 and remains relatively level throughout to its end. The tone contour is represented as 133 as in *foŋ33* 方 ‘square’, *ka33* 家 ‘family’, *jaw33* 腰 ‘waist’. It is separated into several tiers by autosegmental representation as shown in Figure 2.

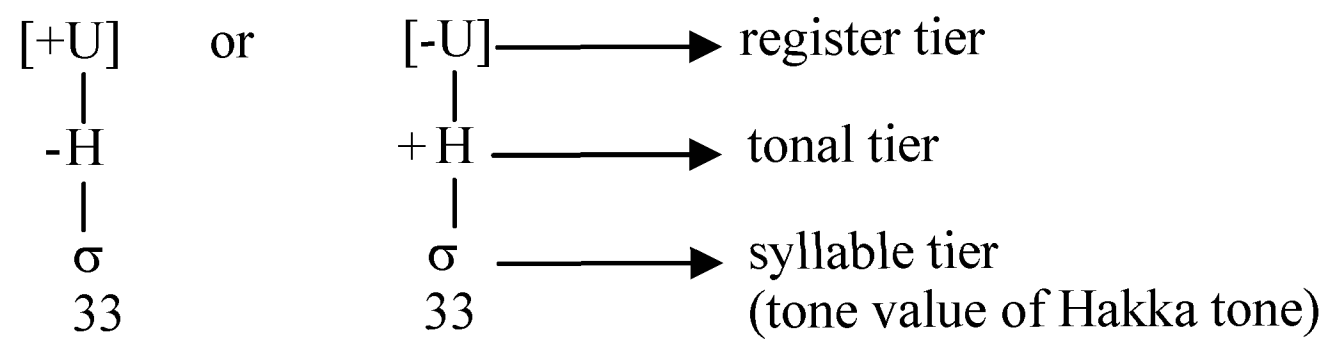


Figure 2. Autosegmental representation of Tone 1.

Tone 1 can be represented as two tiers, with the feature [+Upper] on the register tier and the feature [-H] for low tone on the tonal tier.

2. Tone 2 Mid-Low Falling tone. It starts at the mid-low point and gradually falls toward its end. The tone contour is represented as ↓21 as in *jun21* 熊 ‘a bear’, *lo21* 锣 ‘gong’, *m21 sɿ21* 唔使 ‘do not want’, with the autosegmental representation as shown in Figure 3.

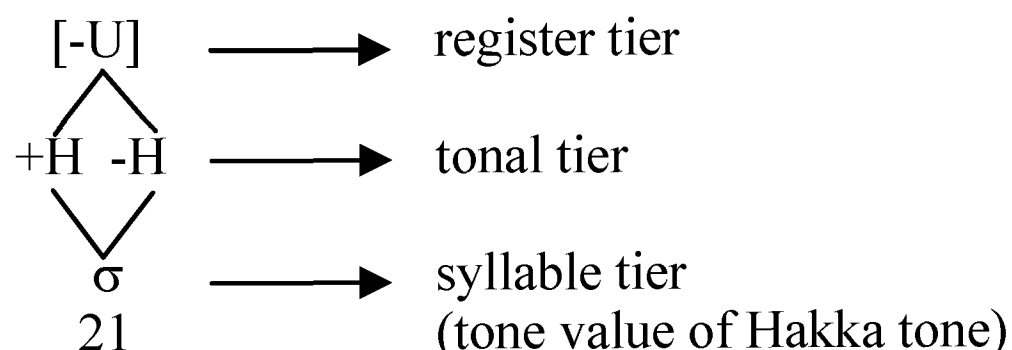


Figure 3. Autosegmental representation of Tone 2.

Figure 3 is an example of a syllable associated with two tone features; [+H] for high tone and [-H] for low tone on the tonal tier. Both are associated with the feature [-Upper] on the register tier.

3. Tone 3 Mid Falling tone contour. It starts at the mid point of 3 and falls sharply to the low point. The tone contour is represented as ↓31 as in *mi31* 米 ‘rice’, *nam31* 抱 ‘to hug, embrace’, *miɔŋ31* 网 ‘a net’.

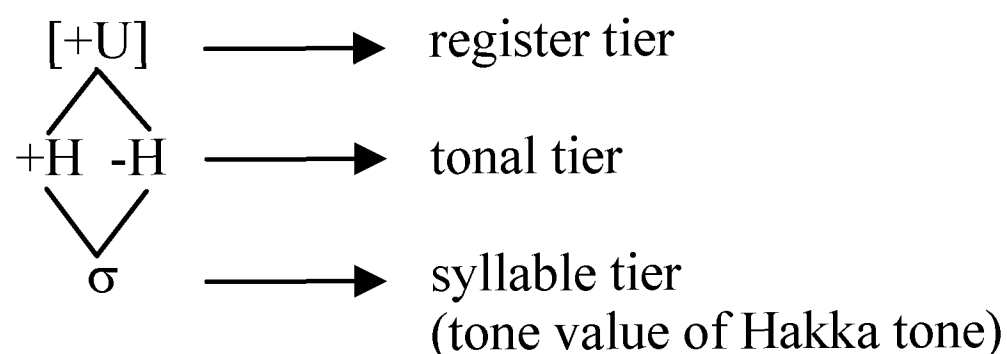


Figure 4. Autosegmental representation of Tone 3.

Figure 4 shows the autosegmental representation of Tone 3 for the value 31, with the feature [+Upper] on the register tier and sequence of tone features [+H] and [-H] on the tonal tier.

4. Tone 4 Mid-High Level tone contour. It starts at mid-high point and remains fairly level throughout to its end. The tone contour is represented as ˥44 as in *nen44* 奶 ‘milk, breast’, *se44* 细 ‘slender, a little’, *mien44 tsoj44* 面嘴 ‘appearance’. The autosegmental representation of Tone 4 combines the register feature [+Upper] and the tone feature [+H] as shown in Figure 5.

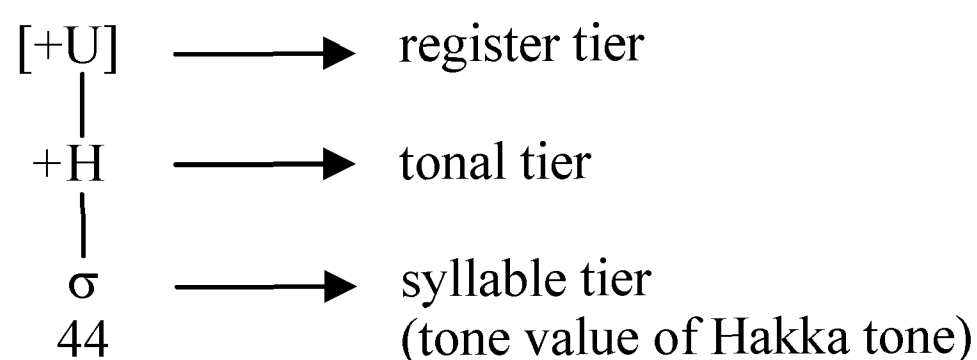


Figure 5. Autosegmental representation of Tone 4.

Contrastive tones on open syllables are:

Tone 1	mi33	每	‘every’	ts ^h a33	车	‘car’
Tone 2	mi21	眉	‘eyebrow’	ts ^h a21	茶	‘tea’
Tone 3	mi31	米	‘rice’	ts ^h a31	撕	‘to separate, depart’
Tone 4	mi44	味	‘odor, smell’	ts ^h a44	sun21 岔笋	‘bud out’
Tone 1	saw33	烧	‘to burn’	tsaw33	糟	‘dregs from making liquor’
Tone 2	saw21	窠	‘burrow’	tsaw21		‘in the past’
				ha33	早下	
Tone 3	saw31	少	‘few, little’	tsaw31	找	‘to give change’
Tone 4	saw44	扫	‘to sweep’	tsaw44		‘sieve’
				lew21	灶镗	

Contrastive tones on closed syllables with nasal endings are:

Tone 1	ts ^h oŋ33	苍	‘dark green’	koŋ44	缸	‘jar, vat’
Tone 2	ts ^h oŋ21	床	‘bed’	k ^h oŋ21	狂	‘mad’
Tone 3	ts ^h oŋ31	厂	‘factory’	koŋ31	讲	‘speak, talk’
Tone 4	ts ^h oŋ44	撞	‘to crush’	koŋ44		‘a fountain
				pit3	钢笔	pen’
Tone 1	wan33	弯	‘curved’	sien33	先	‘earlier, before’
Tone 2	wan21		‘thank	sien21	旋	‘to spin, to circle’
	sin21	还神	the gods’			
Tone 3	wan31	挽	‘to hang on the wall’	sien31	选	‘be elected’
Tone 4	wan44	万	‘ten thousand	sien44	线	‘thread’

Tones on dead syllable

The tones of Bangkok Hakka which occur on dead syllables are restricted to the allotones⁹ of tones 3 and 4, which are the short Mid Falling tone (tone value 31) and the Short High Level tone (tone value 4) respectively.

Description of four tones on dead syllables

1. The Short Mid Falling tone contour, tone value 32. It starts at the mid point 3 and falls sharply to the mid-low point. It is similar to the Mid Falling tone on the live syllable but it ends faster than the Mid Falling tone because of the stop final consonants -p, -t, -k. The tone contour is represented as ʌ32 as in fak32 法 ‘law’, fat32 阔 ‘width’, and their autosegmental representations as shown in Figure 6.

⁹In terms of phonology it is called allotone because of the final condition. Indeed, 32 tones in CVS syllables come from different sources than 31 tones in CV or CVN syllables, so in phonetic terms it should be separated to another tone.

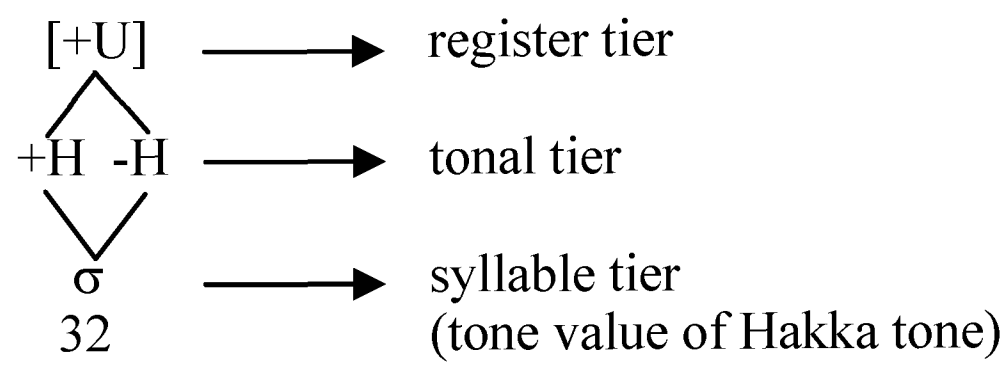


Figure 6. Autosegmental representation of Tone 5.

This tone, called “Tone 5” has tone features similar to those of Tone 3 ([+Upper] register and sequence of tone features [+H] and [-H]), but they are different in tone value because the total duration of the syllable is cut off by the effect of the stop final consonant. Two numbers, 32, are needed for this tone to indicate the direction of the falling contour.

2. The Short High Level tone, tone value 4. It starts at the rather high point and remains relatively level until its end. It is similar to the Mid-High Level on the live syllable but it has shorter duration. The tone contour is represented as 14 as in *hap4* 盒 ‘box, case’, *lat4* 辣 ‘be peppery hot’, *lok4* 落 ‘fall, drop’. The autosegmental representations of this tone are shown in Figure 7.

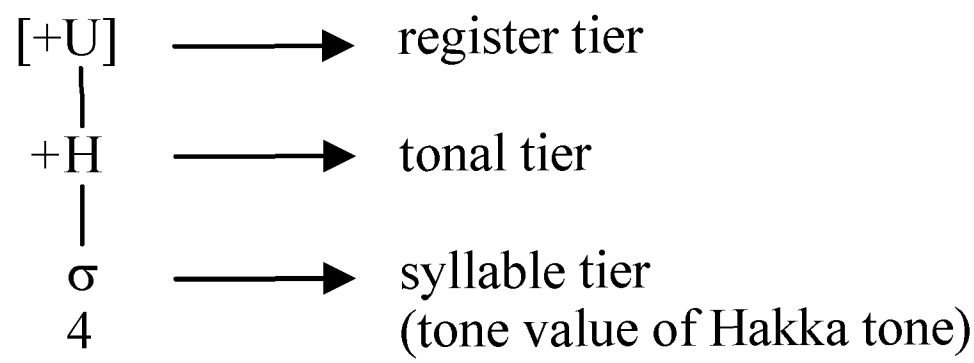


Figure 7. Autosegmental representation of Tone 6.

This tone, called “Tone 6” is represented autosegmentally with a combination of [+Upper] Register and a tone feature [+H]. It is similar to those of Tone 4, but the former has a shorter duration of the syllable than the latter. Its value is 14.

Contrastive tones on dead syllables:

Tone 5	p ^h at32 泼	‘to splash’	fut32 (C.) 窟	‘opening, cavity’
Tone 6	p ^h at4 (R.) 拔	‘pull out’	fut4 佛	‘Buddha’
Tone 5	luk32 禄	‘wealthy’	mak32 脉	‘pulse’
Tone 6	luk4 鹿	‘deer’	mak4 麦	‘wheat’
Tone 5	sap32 眨	‘blink (the eyes)’	sip32 湿	‘wet’
Tone 6	sap4 炆	‘cook in boiling water’	sip4 十	‘ten’

Contrastive tones on live syllables and dead syllables:

Tone 1	sa33 沙	‘sand’	ki33 居	‘reside, dwell’
Tone 2	sa21 蛇	‘snake’	ki21 佢	‘he/she’
Tone 3	sa31 舍	‘give alms’	ki31 举	‘lift, raise’

Tone 4	sa44 射	‘to shoot’	ki44 锯	‘a saw’
Tone 5	sat32 杀	‘to kill’	kip32 急	‘hurry, haste’
Tone 6	sat4 舌	‘tongue’	kip4 (C.) 噫 ¹⁰	‘clip’

Contrastive tones on live syllables and dead syllables:

Tone 1	sun33 孙	‘grandson’	t ^h un33 吞	‘to swallow’
Tone 2	sun21 存	‘keep, store’	t ^h un21 填	‘fill in’
Tone 3	sun31 损	‘damage’	t ^h un31 遁	‘escape, flee’
Tone 4	sun44 逊	‘inferior’	t ^h un44 钝	‘dull’
Tone 5	suk32 叔	‘father’s younger brother’	t ^h ut32 (C.) 凸	‘protruding’
Tone 6	suk4 熟	‘ripe’	t ^h ut4 (C.) 颓	‘to be disheartened’

6.2 Tone sandhi

Two cases of tone sandhi occur in the Hakka tones as spoken in Bangkok, as follows:

(1) Yinping Mid Level 433 becomes the Low rising tone 4325 when it precedes the lower tones 21 and 31, as well as their counterparts 32. Examples of data are given below.

- a.

33-21

→

325-21

wu jun 乌云

ke p^hi 鸡皮

t^ho haj 拖鞋

t^hien si 天时

tsu lan 猪栏

‘dark cloud’

‘chicken skin, goose bumps’

‘slippers’

‘weather’

‘sty’
- b.

33-31

→

325-31

wu suj 乌水

ke si 鸡屎

saw suj 烧水

saw tsiw 烧酒

‘black water’

‘chicken feces’

‘hot water’

‘white rice wine’
- c.

33-32

→

325-32

wu pit 乌笔

ke kut 鸡骨

t^ho kak 拖格

tsu ɲiuk 猪肉

paj kiok 跛脚

‘black pen’

‘chicken bone’

‘drawer’

‘pork’

‘lame in one leg’

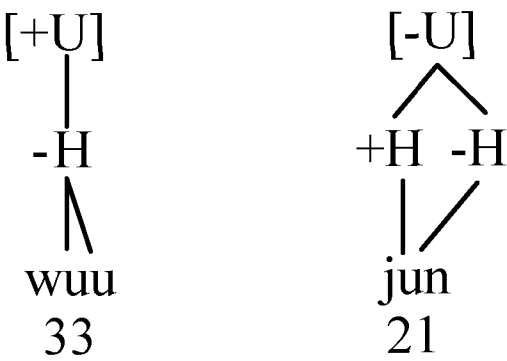
The conditions for (1) sandhi change 33→325 are stated informally as follows:

33→325/_21, 31, 32

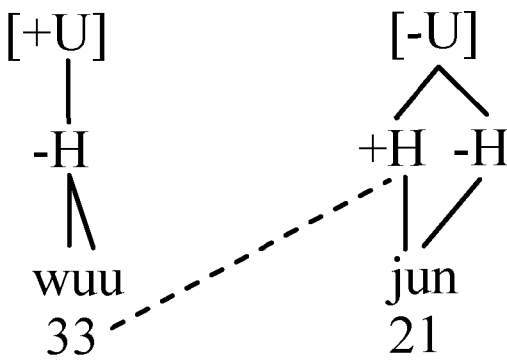
¹⁰This character may have been invented to represent this sound.

There are three phonological processes of tone sandhi for the condition 33 → 325/_ 21 illustrated in Figure 8.

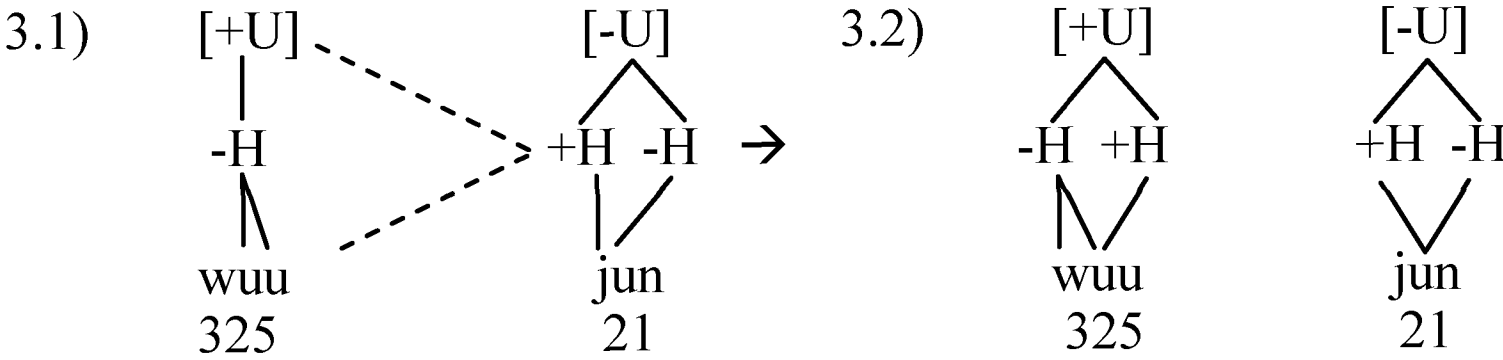
1) The underlying form of the tone pattern in (1) a is displayed below.



2) Leftward spreading of +H



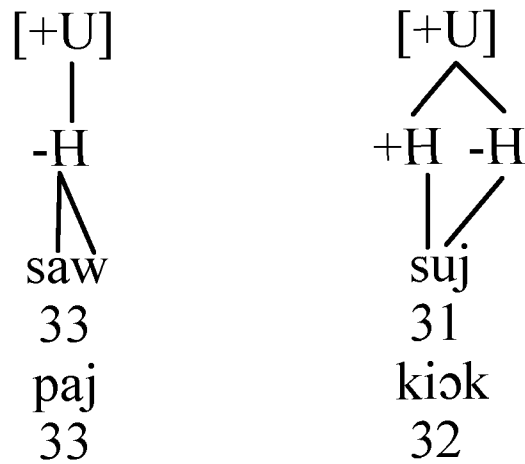
Association with [+U]



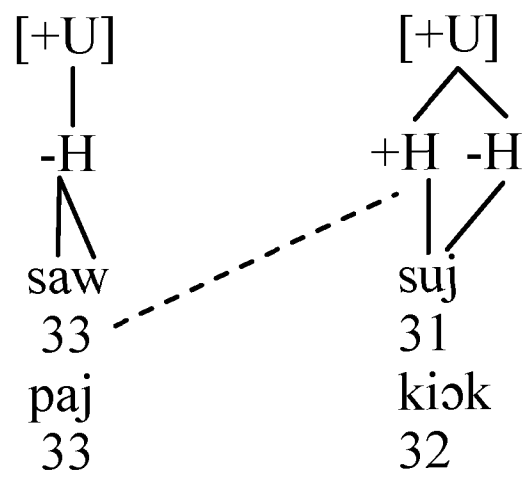
Figures 8. Three phonological processes for the condition 33→325/_ 21.

The sandhi processes for the condition 33→325/_ 31, 32 in (1) b and (1) c are illustrated in Figure 9. Tone values 31 and 32 have the same underlying representation.

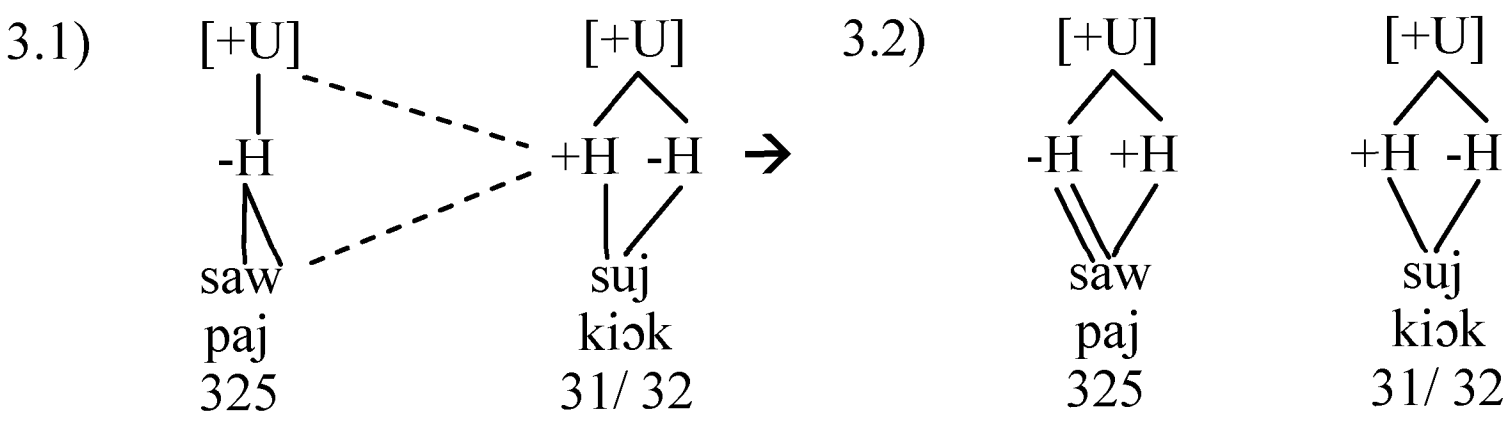
1) The underlying form of the tone pattern in (1) b. and (1) c is displayed below.



2) Leftward spreading of +H



Association with [+U]



Figures 9. Three phonological processes for the condition 33→325 / _31, 32.

(2) Qu Sheng Mid-High Level 144 becomes the High falling tone 153 when it precedes Yingping 133 or Yangru 14. Examples of data are given below.

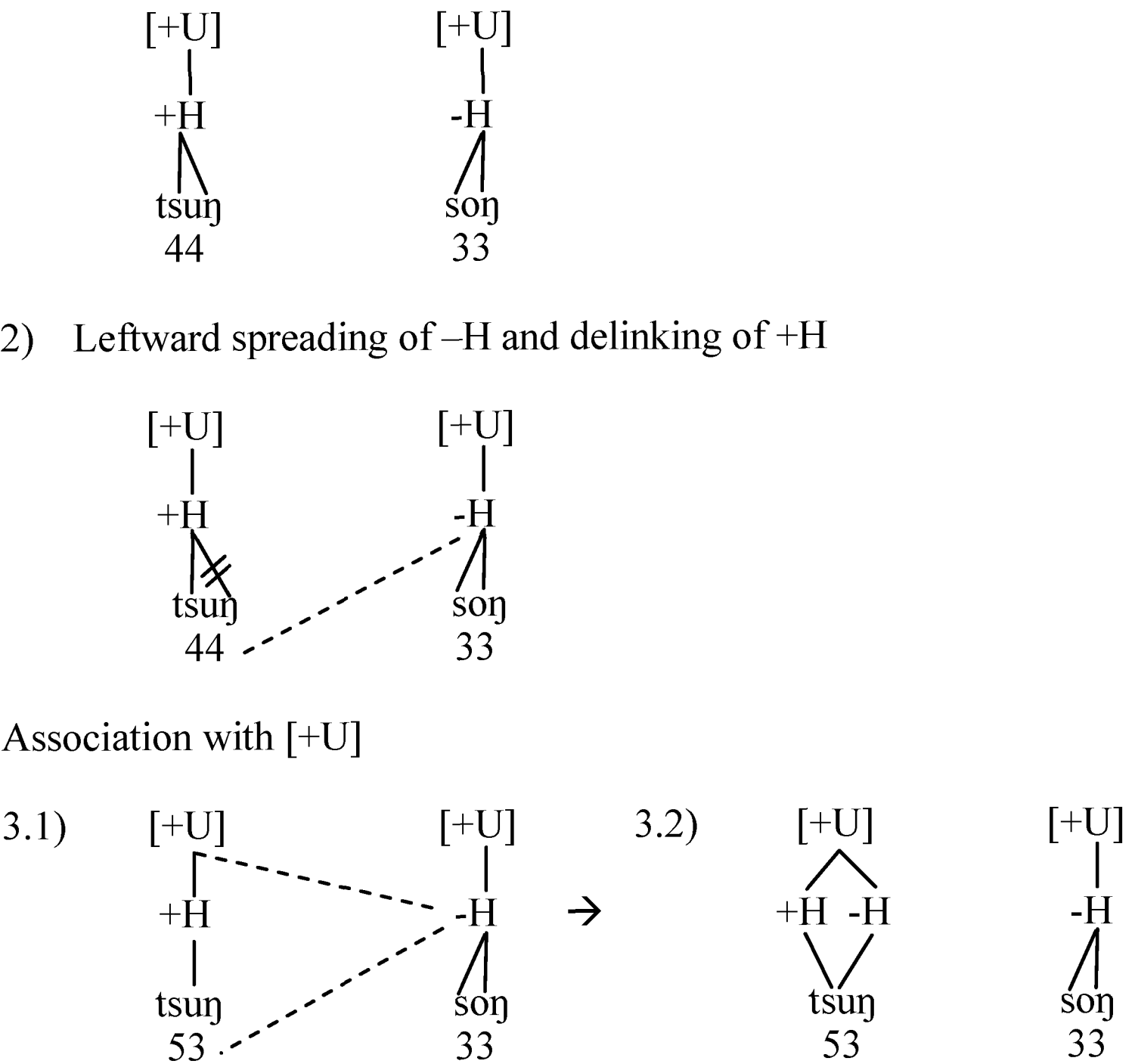
- a. 44-33 → 53-33
kon sin 钢身 'made of steel'
tsun son 中伤 'slander, get wounded'
tsie su 借书 'borrow a book'
- b. 44-4 → 53-4
kon ts^hap 钢栅 'fence made from steel'
tsun t^huk 中毒 'to be poisoned'
tsie wut 借物 'borrow things'
su jap 树叶 'leaf'

The conditions for (2) in which sandhi change 44→53 are stated informally as follows:

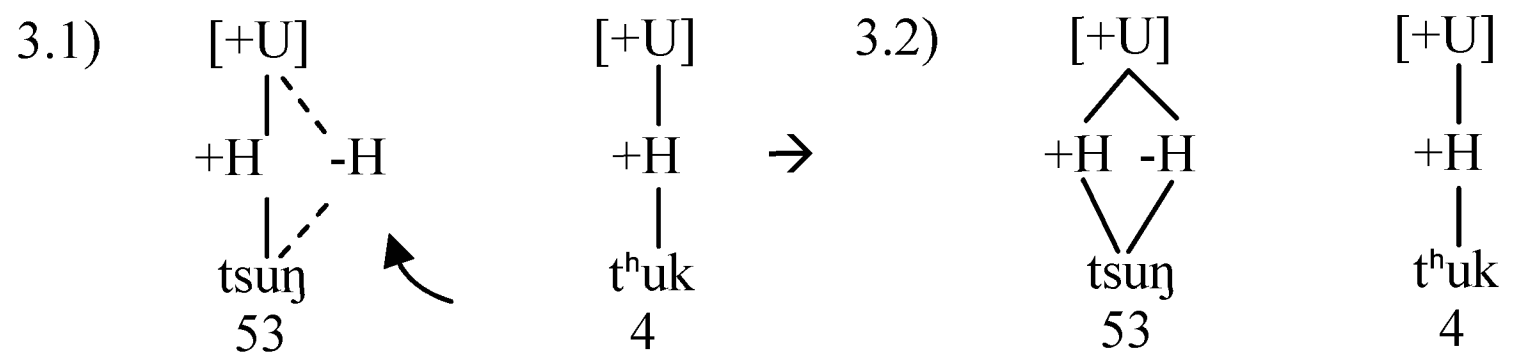
44→53 / _33, 4

There are three phonological processes of tone sandhi for the condition 44→53/ _33, illustrated in Figure 10.

1) The underlying form of the tone pattern in (2) a is displayed below.



Association [-H] with [+U]

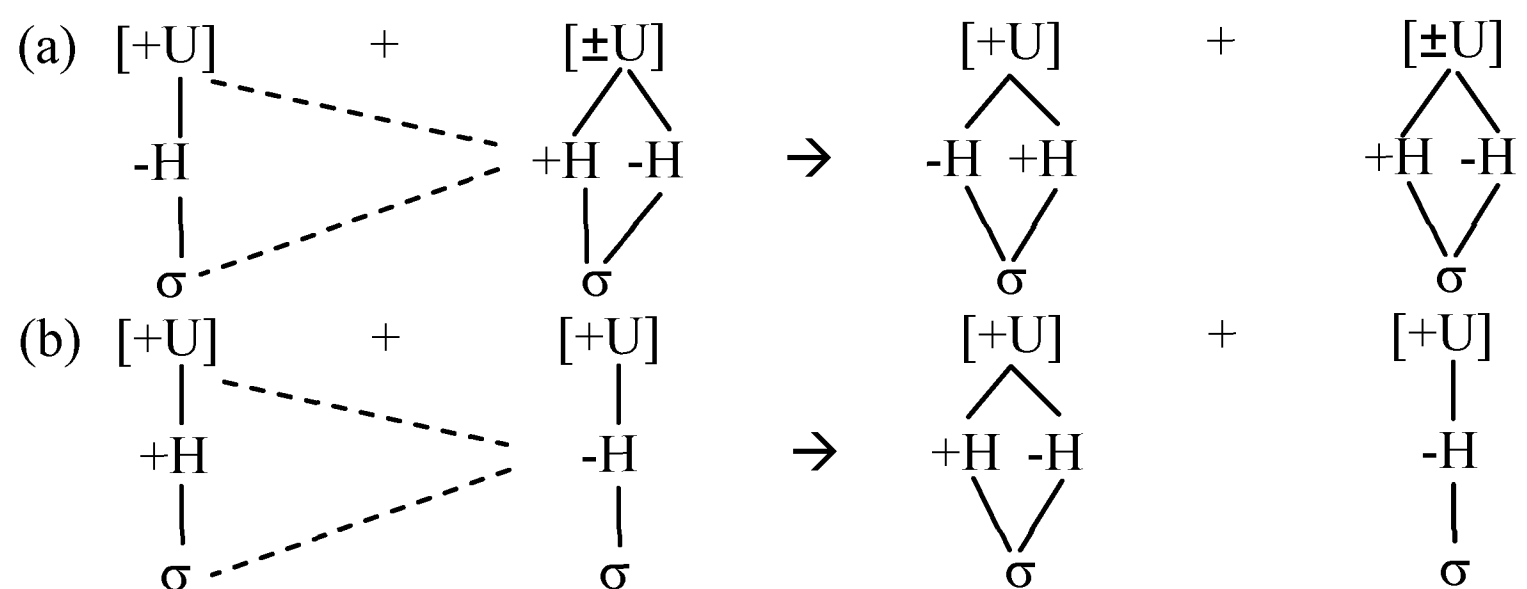


Figures 11. Three phonological processes for the condition 44→53/_4.

In summary, there are two phenomena of tone sandhi in Hakka as spoken in Bangkok, Thailand. The first phenomenon is an assimilation which occurs on the Yin Ping tone. When the first syllable is followed by another lower tone, the Yin Ping tone changes from 133 to 41325. The sandhi can be written in Chao tone system as follows:

Yin Ping 133 → Yin Ping 1325/_ Lower tone 121, 131, 132
 Qu Sheng 144 → Qu Sheng 153/_ Yin Ping 133

In the autosegmental representation, involving a leftward spreading of a +H or -H for Yin Ping tone, both assimilation processes are summarized in Figure 12.



Figures 12. Summary of an assimilation process for Yin Ping and Qu Sheng.

The second phenomenon, a dissimilation occurs on the Qu Sheng tone. The tone value changes from 44 to 53 when it is followed by Yang Ru tones. The process can be summarized in Chao tone system as follows:

Qu Sheng 144 → Qu Sheng 153/ Yangru 14

In the autosegmental representation, the dissimilation involves an insertion -H for Qu Sheng tone as summarized in Figure 13.

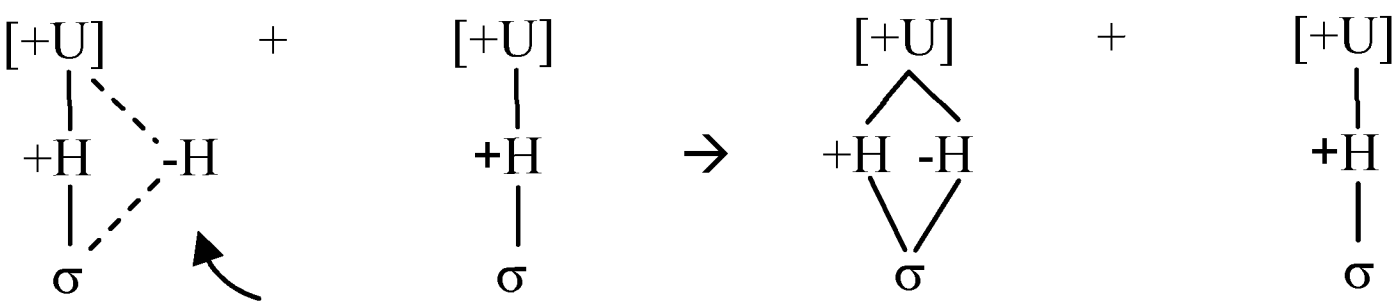


Figure 13. Summary of a dissimilation process for Qu Sheng.

7. Conclusion

Previous research on Hakka dialects in Thailand has described the number of Hakka tones differently from those in China because they used different methods of explanation. Disregarding the syllable types and the tonal development of Hakka tone in the middle Chinese period, the phonological tone system of Bangkok Hakka can be summarized by autosegmental theory as shown in Figure 14.

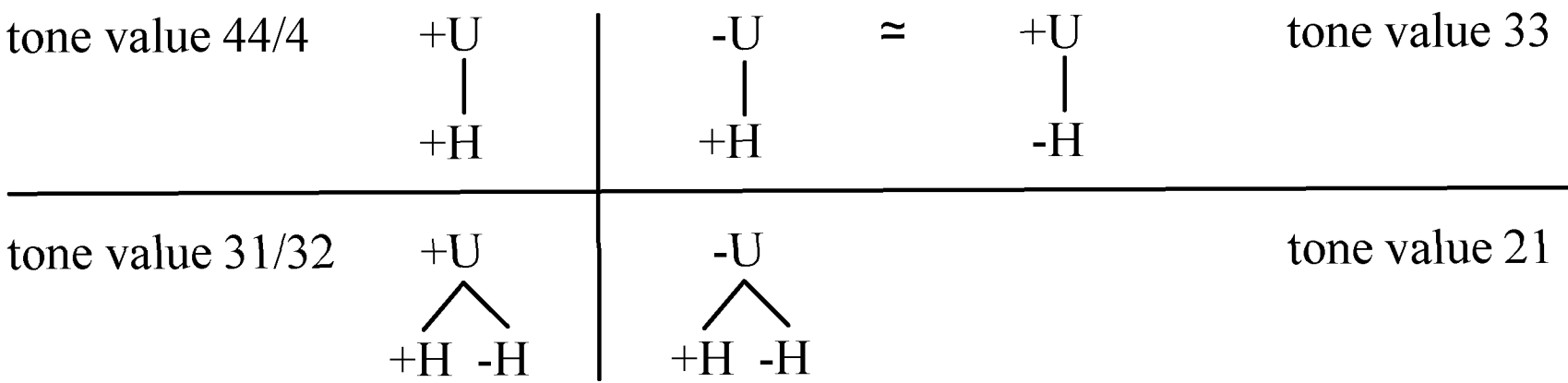
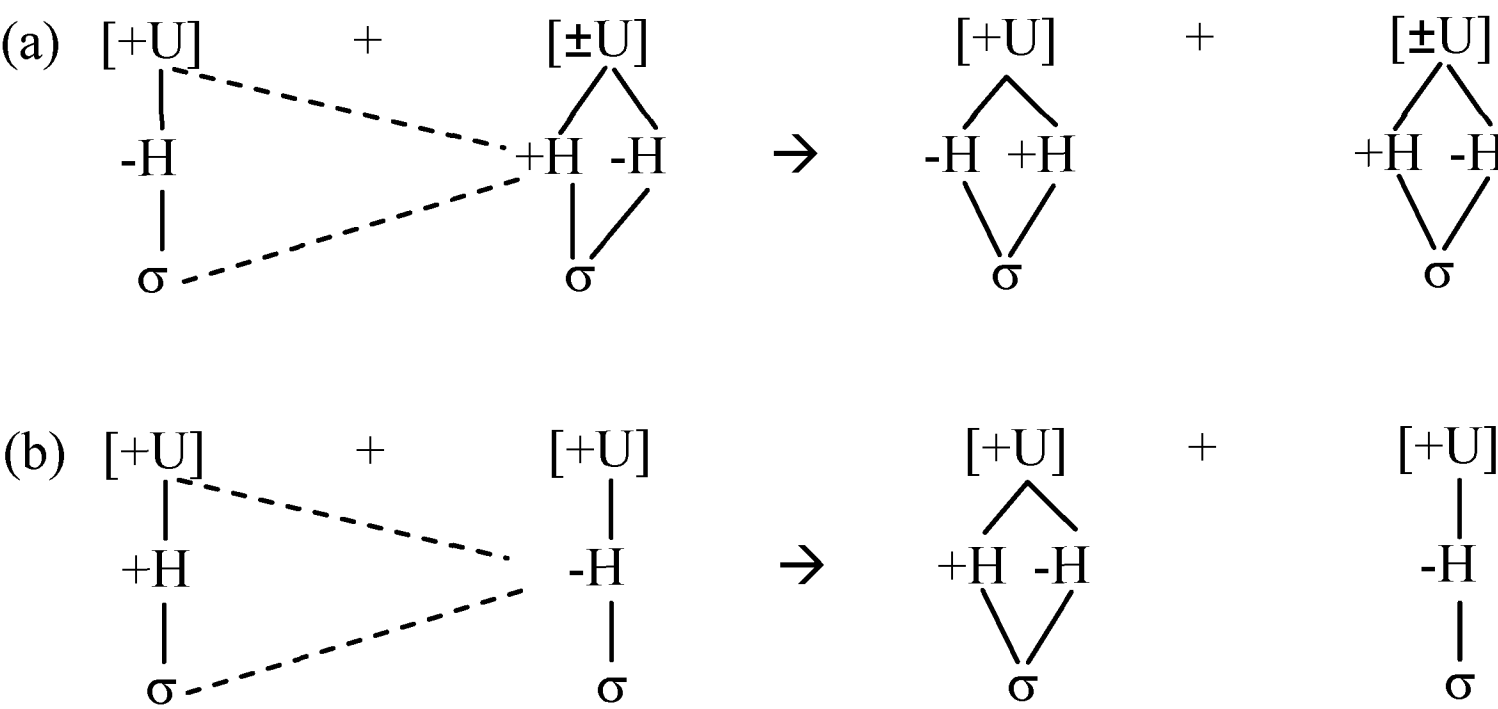


Figure 14. Symmetrical phonological tone system of Bangkok Hakka.

The two processes (assimilation and dissimilation) of tone sandhi are summarized by autosegmental representation as shown in Figure 15.



Figures 15. Summary of an assimilation process for Yin Ping and Qu Sheng.

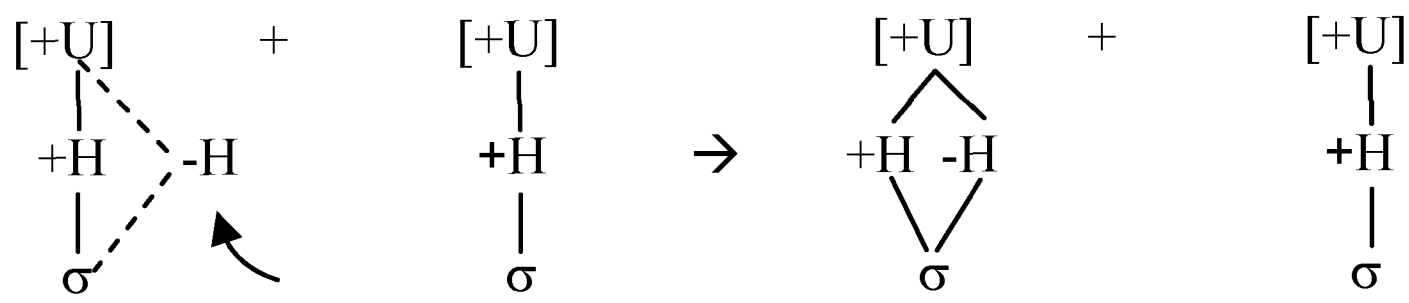


Figure 16. Summary of a dissimilation process for Qu Sheng.

The symmetrical phonological tone system and the sandhi processes of Yin Ping and Qu Sheng are made more conspicuous in the conventional autosegmental notation because they can be stated in phonological rules quite simply.

Another way to describe the Bangkok Hakka tone system according to the tonal splitting from a historical perspective is shown in figure 17.

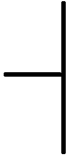







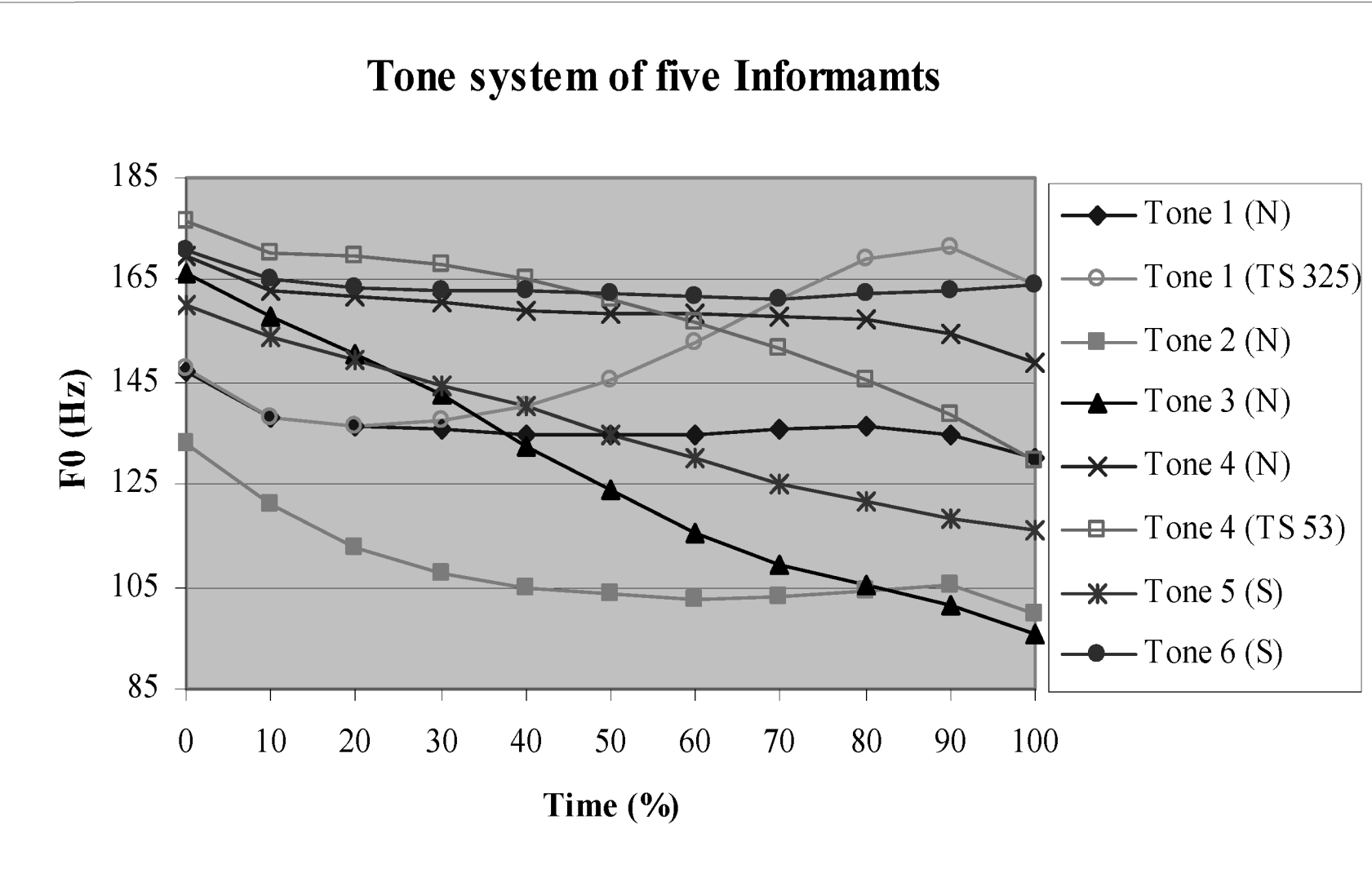
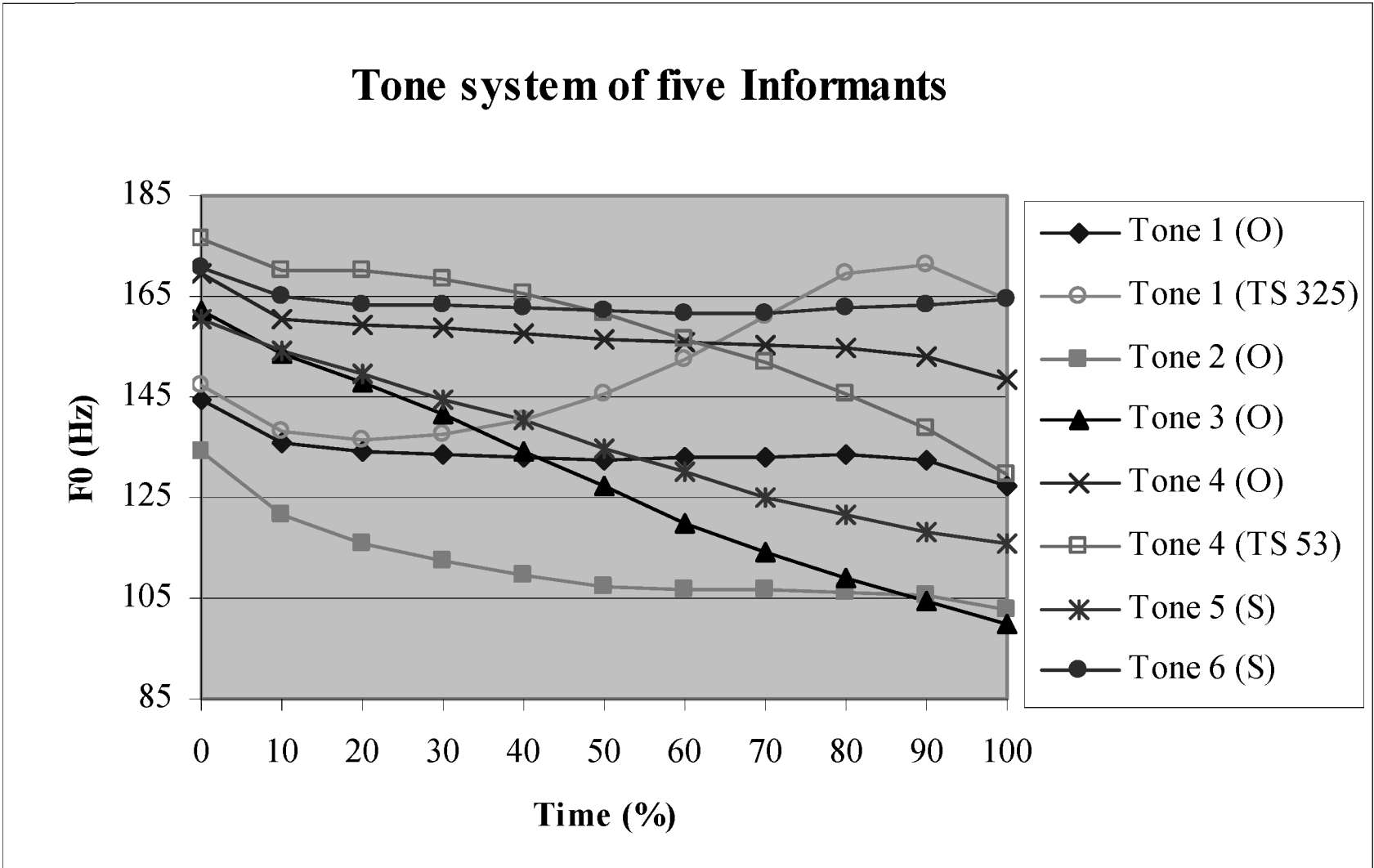
	平 Ping Level	上 Shang Rising	去 Qu Departing	入 Ru Entering
阴 Yin	<div>Tone 1</div> <div></div> <div>33</div> <div></div> <div>325</div> <div>(sandhi tone)</div> <div>1</div>	<div>Tone 3</div> <div></div> <div>31</div>	<div>Tone 4</div> <div></div> <div>44</div> <div></div> <div>53</div> <div>(sandhi tone)</div>	<div>Tone 5</div> <div></div> <div>32</div> <div>7</div>
阳 Yang	<div>Tone 2</div> <div></div> <div>21</div> <div>2</div>	<div>3</div>	<div>5</div>	<div>Tone 6</div> <div></div> <div>4</div> <div>8</div>

Figure 17. Tone categories and tone values of Bangkok Hakka in historical perspective.

The results are supported by acoustic measurements. The average contour of each tone is plotted onto the line graph which is divided into five intervals, level 1-5. Level 1, being the lowest level at the bottom, is determined by the lowest average Fo value of the entire Fo range, and level 5, the highest level at the top, is determined by the highest average Fo value of all the five speakers combined. The tone contours of Bangkok Hakka are shown in Figures 18-19.



Figures 18-19. Average Fo of the six contrastive tone contours and two allotones (tone sandhi of Tone 1 and Tone 4) of five informants carried by live syllables (Tone 1-4) and dead syllables (Tone 5-6).

This study of the tone system of Bangkok Hakka presented here is an example of acoustic and articulatory phonetics combined together in order to clarify the tonal characteristics which could lead to a more precise explanation of the Hakka tone system.

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