An Analysis of Tone Sandhi in Jieyáng Hakka Using Optimality Theory

การวิเคราะห์วรรณยุกต์สนธิตามทฤษฎีสัทวิทยาอุตมผลในภาษาจีนแคะถิ่นเจียหยาง

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ABSTRACT

This paper re-analyzes the Tone Sandhi of Jieyáng Hakka, a language spoken in Thailand, as originally described by Shiwaruangrote (2008). Regarding tone sandhi in Jieyáng Hakka, Shiwaruangrote states the change is regressive (2008, p. 148), and the citation tones are lowered and never raised (2008, p. 146). However, there are some inconsistencies in Shiwaruangrote's interpretation of the sandhi and an explanation for why certain tones do not change is not given. Using Optimality Theory (OT), an explanation may be given for the variation in tone sandhi by naming certain constraints on Jieyáng Hakka's tone sandhi. These seven proposed constraints favor faithfulness of register and tone between the input and output, few contour tones in the output but no adjacent tones (Obligatory Contour Principle), and no High or Low tones preceding a Mid tone.

Keywords: Hakka Chinese, Optimality Theory, Tone Sandhi

บทคัดย่อ

งานวิจัยฉบับนี้ได้นำบทวิเคราะห์เรื่องวรรณยุกต์สนธิในภาษาจีนแคะถิ่นเจียหยางของนิทัศกร ชีวเรืองโรจน์ (2551) มาวิเคราะห์อีกครั้ง ในบทวิเคราะห์ของนิทัศกรได้กล่าวว่า วรรณยุกต์สนธิจะมีการเปลี่ยนแปลงของเสียงวรรณยุกต์ตามเสียง ที่ตามมาข้างหลัง (2551, p. 148) และ วรรณยุกต์จะมีเสียงต่ำ ไม่มีเสียงสูง (2551, p. 146) อย่างไรก็ตามยังมีความ ไม่สอดคล้องกันในบทวิเคราะห์นั้น ๆ ว่าด้วยเรื่องการสนธิของเสียงวรรณยุกต์ อีกทั้งการอธิบายเสียงวรรณยุกต์บางเสียงที่ไม่มีการเปลี่ยนแปลงใด ๆ ทฤษฎีสัทวิทยาอุตมผลเป็นการอธิบายความน่าจะเป็นในการเปลี่ยนแปลงของเสียงวรรณยุกต์สนธิ โดยมีการตั้งข้อจำกัด 7 ประการ ซึ่งในข้อจำกัดนั้นทำให้เกิดความน่าเชื่อถือในเรื่องกระบวนการของเสียงระหว่างหน่วยรับกับหน่วยแสดง อีกทั้งยังมีวรรณยุกต์เปลี่ยนระดับที่อยู่ในส่วนของหน่วยแสดง และไม่มีเสียงประกบ (ทฤษฎีวรรณยุกต์พันธะ) และไม่มีวรรณยุกต์เสียงสูงหรือวรรณยุกต์เสียงต่ำ อยู่หน้าวรรณยุกต์เสียงกลาง

คำสำคัญ: ภาษาจีนแคะ ทฤษฎีสัทวิทยาอุตมผล วรรณยุกต์สนธิ

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INTRODUCTION

1.1 The Language

The language observed in this term paper is Jiēyáng Hakka, a variety of Hakka spoken in Thailand. According to Shiwaruangrote, "they migrated from Jiēyáng 揭阳 prefecture in northeastern Guǎngdōng 广东 province, the People's Republic of China (see Figure 1.1), before 1927 A.D" (Shiwaruangrote, 2008, p. 1).

1.2 The Source

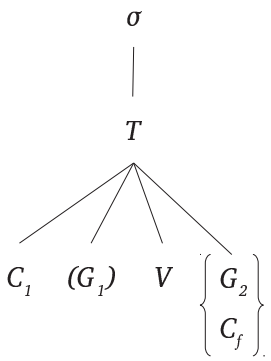
The source of these data is the PhD in Linguistics Dissertation by Nitasakorn SHIWARUANGROTE, entitled, ***A Phonological Description of Jiēyáng Hakka Dialect as Spoken in Thailand*** (2008). In the abstract, it is stated that the dissertation is written using Tagmemic theory, with the full objective being:

> to present the phonological system of Jiēyáng Hakka as spoken in Thailand in a Tagmemic theory within the organization of the phoneme, the syllable, and the phonological word, with special focus on tone and tone sandhi (2008, p. iv).

The conclusion reached regarding the tone system is: "It has been found that tone change is non-productive, while grammatical tone is still productive" (2008, p. 260).

1.3 The Syllable

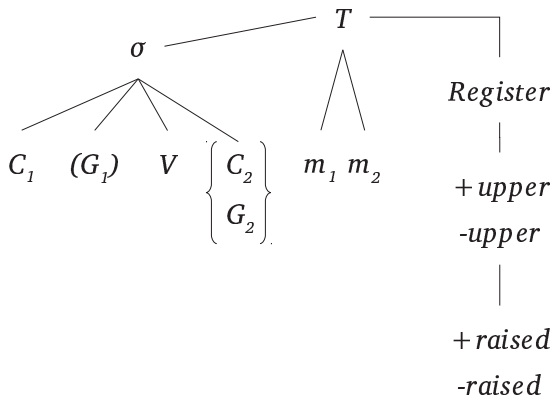
Before the tone sandhi in Jiēyáng Hakka is discussed, a brief review of the syllable in Jiēyáng Hakka is presented, as my interpretation of the syllable differs from Shiwaruangrote's original analysis, as shown in this diagram (2008, p. 102):



Underneath the syllable (which is the Tone-Bearing Unit (TBU), according to Shiwaruangrote, p. 77), is T (Tone), which may contain tonemes /1/-/8/. Underneath tone, from left-to-right, is C_1, the initial consonant, which contains any of the 18 consonant phonemes; optional G_1, on-glide, which contains the on-glide vowel tonemes /i/ or /u/; V, the nuclear vowel, which contains any of the six monophthong[1] phonemes; G_2, the off-glide, which contains /i/ or /u/;

[1]Shiwaruangrote originally said "vowel" and appears to not separate monophthongs from diphthongs and triphthongs anymore

and on the same level as G_2, C_f, the final consonant, which contains /p, t, k, m, n, ŋ/ (2008, p. 102).The nterpretation of Jiēyáng Hakka's syllable structure used here differs from that of Shiwaruangrote only by the placement of the Tone (T) in the syllable. While the author interprets T to be a parent of the C, G, and V elements, I interpret T to be a separate segment, independent of those elements[1]:



Beneath the T element, are two Melody (m) units. Each m unit may contain a tone (H, L), but in the case of m_2, it may remain empty, which produces a level tone. To simplify the analysis, however, I've also included an M tone. Register (see Yip (1992)) also affects the realization of pitch, and in East Asian languages, Register is divided into [+/– upper] and a [+/– raised] subsidiary feature (for level tones only). My tonal values are compared to Shiwaruangrote's values in the table below:

Tone #	Value	My Value	Register	Subsidiary	Actual Value
/1/	52	HL	[+upper]		HL
/2/	35	MH	[+upper]		LH
/3/	14	LH	[-upper]		LH
/5/	31	ML	[-upper]		HL
/6/	11	LL	[-upper]	[-raised]	L
/7/	35	MH	[+upper]		LH
/8/	55	HH	[+upper]	[+raised]	H

[1]There may be some evidence, however, for the final consonant to affect the tone. Because the data is inconsistent, however, this possibility is not explored in this paper.

2 TONE SANDHI

2.1 Introduction

This section discusses the interpretation of tone sandhi in Jiēyáng Hakka. In section 2.2 , Shiwaruangrote's analysis are reviewed and any issues in his analysis are stated. In section 2.3 , my analysis of tone sandhi in Jiēyáng Hakka using Optimality Theory (OT) is presented, with constraints 2.3.3 and results 2.3.4 given. A conclusion is then given, with a comparison of the two methodologies in section 3 .

2.2 Shiwaruangrote's Interpretation of Sandhi

Regarding the type of sandhi in Jiēyáng Hakka Shiwaruangrote states the change is *regressive* (preceding syllable is influenced by the immediately-proceeding syllable) (2008, p. 148), and that the citation tones (namely 52, 35, 14, 31, 11, 35, and 55) are lowered and *never raised* (146). Shiwaruangrote postulates five generative rules for the change in tone sandhi:

1. Tone /1/: [52 → 33] / __ [52] , [55]
2. Tone /2/: [35 → 33] / __ [52] , [35] live or dead, [14] , [55]
3. Tone /3/: [14 → 11] / __ all tones
4. Tone /7/: [35 → 11] / __ all tones
5. Tone /8/: [55 → 33] / __ [52] , [55]

There are several issues with these rules. Firstly, Shiwaruangrote does not explain that the difference between tonemes /2/ and /4/, besides their sandhi patterns, is that tone /2/ occurs only in live syllables and tone /4/ occurs only in dead syllables. Secondly, there are some inconsistencies regarding the sandhi patterns and Shiwaruangrote's interpretation of the sandhi. For example, if it is true that the citation tone is always lowered by cause of regressive assimilation, then an explanation should be provided for why tone /1/ [52] is not lowered to [33] when it proceeds tone /6/ [11] , while tone /3/ is always lowered.

2.3 My Interpretation of Sandhi

2.3.1 Preface

In this analysis, I use data from the Appendix of the dissertation and do not alter the data in any way. However, I still interpret the tones as follows:

Tone #	Value	My Value	Register	Subsidiary	Actual Value
/1/	52	HL	[+upper]		HL
/2/	35	MH	[+upper]		LH

Tone #	Value	My Value	Register	Subsidiary	Actual Value
/3/	14	LH	[-upper]		LH
/5/	31	ML	[-upper]		HL
/6/	11	LL	[-upper]	[-raised]	L
/7/	35	MH	[+upper]		LH
/8/	55	HH	[+upper]	[+raised]	H

While referring to the level tones as HH/MM/LL technically violates the Obligatory Contour Principle (OCP), I refer to them this way to illustrate that no other possible tone in the syllable is affects the tone and that spreading actually does not occur. In the following Table, *italics* indicate sandhi has occurred, where as non-italicized words indicate sandhi has not occurred. The orange colored cells show when a syllable of one tone is followed by a syllable of the same tone:

Proceeding		Following						
		Live					Dead	
		HL	MH	LH	ML	LL	MH	HH
Live	HL	*MM*	HL	HL	HL	HL	HL	*MM*
	MH	*MM*	*MM*	*MM*	MH	MH	*MM*	*MM*
	LH	*LL*	*LL*	*LL*	*LL*	*LL*	*LL*	*LL*
	ML	ML	ML	ML	ML	ML	ML	ML
	LL	LL	LL	LL	LL	LL	LL	LL
Dead	MH	*LL*	*LL*	*LL*	*LL*	*LL*	*LL*	*LL*
	HH	*MM*	HH	HH	HH	HH	HH	MM

As shown, tones /1/ (here HL) undergo sandhi only once, /2/ (MH) undergoes two out of seven instances, /3/ (MH, Live) always undergoes sandhi, /5/ (ML) never undergoes sandhi, nor does /6/ (LL), /7/ (MH, dead) always undergoes sandhi, and /8/ (HH) only undergoes sandhi twice. Therefore, the two maxims of Shiwaruangrote's interpretation:

1. Regressive change
2. Citation tones are lowered

are not always consistent within the data. Therefore, while Shiwaruangrote does attempt to explain why tone sandhi *does* occur, he does not offer an explanation as to why sandhi often *does not* occur.

2.3.2 Theory

Using Optimality Theory (OT), an explanation may be given for the variation in sandhi. Rather than relying upon rules which may cause "conspiracies", as Kisseberth called them (McCarthy, 2008, p. 2), OT allows certain constraints to be put on Jiēyáng Hakka tonology to generate favorable output.

2.3.3 Constraints (CON)

Each constraint used in the OT analysis of Jiēyáng Hakka tonology is briefly defined here, with a detailed explanation below:

Name	Description	Rank
*CDσ1	If the first syllable of a word is dead, contour is not allowed.	1
DEADDOWN	Non-HH tones in dead syllables are downstepped	2 Equal Rank
IDENT-REG	Register of output faithful to input.	
OCP	Adjacent identical elements are prohibited	
*C	No contour allowed in any syllable.	3 Equal Rank
IDENT-T	Tones of output faithful to input.	
*{H,L}M	High tones and Low tones may not precede a mid tone.	4

*CDσ1 deals with the possibility of a contour tone being one of the dead-syllable candidates given by the output of GEN. In Shiwaruangrote's data, the first dead syllable of a word which has undergone sandhi never has a contour tone.

Together, DEADDOWN, IDENT-REG, and the Obligatory Contour Principle (OCP) regulate the output tone of the first syllable. DEADDOWN for example, explains why HH is not downstepped after tone sandhi, which is why the following processes are valid:

- HH + MH > HH.MH
- HH + LH > HH.LH
- HH + LL > HH.LL

DEADDOWN is countered by OCP, which does not favor two H's colliding across syllable boundaries (e.g. HH.HL) or two contour tones of the same type colliding across syllables (MH.MH), thus producing:

- HH + HL > ***MM***.HL
- HH + HH > ***MM***.HH

The most complex constraint of this shared rank is IDENT-REG, which deals with situations like these:

> The proper phonetic realization of /lɔk˥⁵⁵/ + /khuːŋ⁵²/ 'go into a hole' is [lɔk˥³³.khuːŋ⁵²] , which can be proven through OCP. However, GEN may also give a candidate such as [lɔk˧¹¹.khuːŋ⁵²] , which does not violate OCP.

The reason that [lɔk˥³³.khuːŋ⁵²] is selected (☞) is because M is underlyingly L [+upper] shares the same register as H, which is underlyingly H [+upper] , which is favored by IDENT-REG. The register of L is [– upper] , which does not match that of the input.

Together, *C and IDENT-T regulate the output of the whole word. *C prefers syllables which have no contour.

> If GEN were to give the candidates:
> [tau³¹.kiːn⁵²] [tau¹¹.kiːn⁵²] and [tau³³.kiːn⁵²] ,
> [tau¹¹.kiːn⁵²] and [tau³³.kiːn⁵²] would be preferred, because each candidate would only receive one asterisk (*) on account of the second syllable having a contour tone. But they are still preferred over [tau³¹.kiːn⁵²] , which receives ** by having contour tones in both syllables.

IDENT-T prefers syllables whose tones (T and every element subjugated to T in the syllable structure) are the same in the output and input.

Lastly, *{H,L}M is a constraint because throughout the data, M is only preceded by another M, making any other output invalid.

2.3.4 Results

Using the constraints given in section (SECTION), samples from Shiwaruangrote's data is presented in Optimality Tableaux to demonstrate how these constraints satisfy the requirements of tone sandhi in Jiēyáng Hakka.

Tableau 1

/hiam⁵²/ + /tsiau⁵²/ 'pepper, chili'	IDENT-REG	OCP	*C	IDENT-T	*{H,L}M
a.☞ [hiam³³.tsiau⁵²]			*	*	
b. [hiam⁵².tsiau⁵²]		*!	**		

/hiam^{52}/ + /tsiau^{52}/ ‘pepper, chili’	IDENT-REG	OCP	*C	IDENT-T	*{H,L}M
c. [hiam^{31}.tsiau^{52}]	*!		**		
d. [hiam^{35}.tsiau^{52}]		*!	**		
e. [hiam^{13}.tsiau^{52}]	*!		**		*
f. [hiam^{53}.tsiau^{52}]			**!		*
g. [hiam^{33}.tsiau^{55}]				**!	

In Tableau 1, (a.) violates the least amount of constraints and is thus the optimal candidate. As discussed in section 2.3.3 , [33] is underlyingly LL [+upper] , which is the same register as [52] (HL [+upper]). Additionally, (a.) contains only one contour tone and retains the tone of the last syllable, thus proving to be a better candidate than (b.) – (g.).

Tableau 2

/khat$^{˥35}$/ + /khuː^{14}/ ‘to suffer’	*CDσ1	DEADDOWN	IDENT-REG	OCP	*C	IDENT-T
a. [khat$^{˥35}$.khuː^{14}]	*!				**	
b. [khat$^{˥33}$.khuː^{14}]		*!		*	*	*
c.☞ [khat$^{˥11}$.khuː^{14}]			*!	*	*	*

Tableau 2 shows an example of the constraints with a dead syllable. (b.) may be somewhat ambiguous in terms of whether the DEADDOWN constraint or the IDENT-REG constraint was broken, because according to Yip, [33] may be either [+upper]/[–raised] or [–upper]/[+raised] (1992, p. 246). However, to remain consistent in the analysis, I postulate that M is always [+upper]/[–raised] . This Tableau represents an odd scenario, however. Although DEADDOWN, IDENT-REG, and OCP are part of the same rank, making (c.) just as invalid a candidate as (b.), (c.) is still the preferred candidate, because DEADDOWN is not broken.

3 CONCLUSIONS

Examining, the two maxims of Shiwaruangrote's interpretation again:

1. Regressive change
2. Citation tones are lowered

It may be argued that the cause of the regressive change is not accurately demonstrated in Shiwaruangrote's dissertation (2008), because there are still instances of no change in his data, such as /lɔk˥⁵⁵/ + /siɛt˥³⁵/ 'it snows' > [lɔk˥⁵⁵.siɛt˥³⁵] . The lack of explanation is mostly linked to Shiwaruangrote not appealing to the OCP. Regarding his second maxim, citation tones are not always lowered, because of OCP and an underlying constraint of maintaining the citation tones.

This paper does not argue, however, that the analysis presented here is better than that of Shiwaruangrote, because his goal, which is to accurately display the processes of tone sandhi in Hakka, is attained. However, this analysis gives underlying reasons as to why there are apparent "inconsistencies" in Shiwaruangrote's data.

4 BIBLIOGRAPHY

McCarthy, J. J. (2008). *Doing Optimality Theory: Applying Theory to Data*. Malden, MA: Blackwell Publishing.

Shiwaruangrote, N. (2008, October 3). *A Phonological Description of Jiēyáng Hakka Dialect as Spoken in Thailand* (PhD dissertation in Linguistics). Mahidol University.

Yip, M. (1992). Tonal Register in East Asian Languages. In H. van der Hulst & K. Snider (Eds.), *The Phonology of Tone: The Representation of Tonal Register* (Vol. 17, pp. 245–266). Berlin: Mouton de Gruyter.