

SYNTACTIC DOMAIN OR PROSODIC DOMAIN ?

----- Notes on Chongming Tone Sandhi

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0. INTRODUCTION

The purpose of this paper is to study the disyllabic tone sandhi (hereafter TS) phenomena of Chongming Chinese, a northern Wu dialect spoken by about 700,000 inhabitants on the island of Chongming located at the mouth of the Yangtze River. The data used here are drawn from the published reports of H-Y Zhang (1979, 1980) and from the results of Matthew Chen's fieldwork in China in 1986.¹

A considerable part of current phonological theory centers around phonological levels and relations among these levels, the nature of the syntax-phonology interface. The second issue is of crucial importance to prosodic phonology, as it involves two fundamental problems: a) how accessible is syntactic information to phonological processes; and b) what grammatical properties are relevant to phonology? The Chongming dialect presents tests for phonological theory in all of these areas.

Section 1 of this paper discusses the status of word-hood in Chinese. We discuss this problem first simply because it is a key to differentiating TS on different levels in our analysis of Chongming TS. Section 2 describes disyllabic TS on two different levels: lexical and postlexical; and proposes a hypothesis concerning the procedure of Chongming disyllabic TS. Section 3 highlights the theoretical significance of Chongming disyllabic TS and suggests that Chongming TS poses a challenge to current phonological theory for it poses two questions: a) what must phonology know about syntax (Kaisse, 1985; Selkirk, 1984)?; b) must any rule that applies across words be a postlexical rule (Kiparsky, 1982; Mohanan, 1986)?

1. ON APPROACHES TO WORD-HOOD IN CHINESE

Like many other Wu dialects, Chongming has two types of tone sandhi: a) lexical tone sandhi (hereafter LTS); and b) postlexical tone sandhi (PTS). Basically speaking, LTS is the TS that occurs within syntactic words and PTS is the TS that occurs within non-words. Thus, the differentiation of words (here mainly lexical compounds) from non-words (syntactic phrases) is a key problem for Chongming TS. So we first have to argue on independent grounds for the distinction between compounds and phrases on which our analysis of TS in Chongming depends.

To differentiate lexical compounds from phrases, Chinese grammarians (Lu, 1957; Chao, 1968; Huang, 1984) have proposed several (semantic, phonetic and

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syntactic) criteria. For detailed critiques of these criteria, cf. Zhang (1988). For brevity, the discussion here is confined to the most recent work by Huang (1984). Huang suggests the following principles:

(1) (a) Phrase Structure Condition (PSC):

Within a given sentence in Chinese, the head (the verb or verb phrase) may branch to the left only once, and only on the lowest level of expansion.

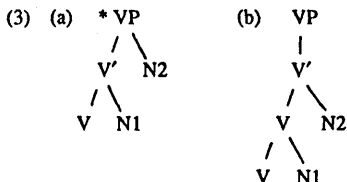
(b) Lexical Integrity Hypothesis (LIH):

No phrase-level rule may affect a proper subpart of a word.

According to their different internal structures, Chinese compound words can be divided into modifier-head (MH), subject-predicate (SP), verb-noun (VN), and coordinate-construction (CC).² Huang, however, did not work out a complete set of approaches for all structures, since his focus was on the verb-noun structure. Based on his PSC (1a) and LIH (1b), Huang has proposed the following two tests for determining whether a verb-noun structure is a compound or phrase:

(2) (a) ability to take an outer object; and (b) inseparability.

According to (2a), if a verb-noun structure is a phrase, the verb cannot be followed by an outer object (i.e. N2). This is because the resulting structure would involve a verb phrase branching to the left at two different levels, as shown in (3a), contrary to (1a) above.



On the other hand, if a verb-noun is a compound, it can take an 'outer' object (N2 in (3b)), because N1 is part of the verb rather than part of a syntactic phrasal projection from verb.

According to (2b), if the noun of a verb-noun structure admits modification by a determiner, possessor or number-measure phrase, it is a phrase, as shown in (4a); otherwise, it is a word as shown in (4b).³

(4) (a) V [X N] (b) *V [X N]

Based on (2a) and (2b), which are derived from (1a) and (1b) respectively, Huang classifies verb-object structures into three groups:

² This classification follows the traditions of Chinese grammarians. Here modifier-head includes both modifier plus noun and modifier plus verb; subject-predicate refers to noun plus verb or adjective (Lu, 1957; Huang, 1984).

³ V = verb; N = noun; X = nominal modification.

(5)	Type	A	B	C
	Ability to take outer object	+	+	-
	Inseparability	+	-	-

According to Huang, Type A is a word because it is able to take an outer object (i.e. N2) and at the same time is inseparable. Some examples provided by Huang are:

- (6) (a) ta yi-jing chu-ban le yi-ben shu (b) *ta chu shen-me ban
 he already publish LE⁴ one book he issue what edition
 'He has already published a book.' 'He publishes what?'

At issue here is the status of *chu-ban*, which is literally 'to issue an edition of' and can be translated as 'to publish'. *chu-ban* can take an N2, as in (6a); furthermore, it cannot be broken up by a modifier of the N1 *ban* 'edition', as shown in (6b). Therefore, the entire verb-noun expression *chu-ban* constitutes a single word.

Huang considers Type C elements phrases because they do not take an N2 (cf. 3a) and are able to be separated (cf. 4a). Consider the following examples:

- (7) (a) *ta bo-pi le ju-zi (b) ta bo shen-me pi
 he peel-skin LE tangerine he peel what skin
 'He has peeled the tangerine.' 'What has he peeled?'
- (8) (a) *ta sheng-qi le wo (b) ta sheng shen-me qi
 he bear-gas LE me he bear what gas
 'He is angry with me.' 'What is he angry at?'

Both (7) and (8) are structures containing an N1 (i.e. *pi*, 'skin' in *bo-pi* --which is translatable as 'to peel'--and *qi*, 'gas' in *sheng-qi* --which is translatable as 'be angry'). The (a)-sentences show that these structures cannot take an outer object (i.e. N2); the (b)-sentences show that they can both be separated by the wh-phrases *shen-me* 'what'. By Huang's criteria, both *bo-pi* and *sheng-qi* are phrases.

Type B elements are best described, in Huang's opinion, as phrases which function as compounds under certain syntactic conditions, as they are able to take an N2, and are separable, as shown in (9).

- (9) (a) ta dan-xin shen-me (b) ta dan shen-me xin
 he carry heart what he carry what heart
 'What is he worried about?' 'What is he worried about?'

In general, it is very difficult for Chinese grammarians to determine in practice whether a verb-noun structure is a compound or phrase. Although Huang's two tests (2) can explain quite a lot of examples, applying his tests to other cases like the following give intuitively unacceptable results:

⁴ LE = aspect marker.

- (10) nu li ----> *nu li shi-qing ----> nu yi-ba li
 exert power exert power matter exert one power
 'to try hard' 'to make an extra effort'
- (11) ju gong ----> *ju gong wo ----> ju yi-ge gong
 bend person bend person I bend one person
 'to bow' 'to make a bow'

(10-11) are very commonly used compounds that can be found in ordinary Chinese dictionaries.⁵ On Huang's tests, they should be typical phrases because they are unable to take an N2 (cf. 3a) and they are separable (cf. 4a); but according to Chinese speakers' intuitions and lexicographic tradition, they are words.

We would like to suggest that a more reliable test of word-hood for verb-noun structures is the BA-construction.⁶

(12) BA-construction: [V N]_p ---> [[BA N] V LE]

Generally speaking, phrasal instantiations of verb-noun structure can have their nouns fronted, in which case BA is prefixed as the noun marker. In the case of lexical compounds with the internal structure of verb-noun, such transposition is impossible. Consider the following examples.

- (13) = (7) (a) ni gua mao, ta bo pi
 you scrape hair, he peel skin
 'You scrape the hair and he peels the skin'.
 (b) ni ba mao gua-le, he ba pi bo-le
 you BA hair scrape-LE, he BA skin peel-LE
 'You scrape the hair and he peels the skin'.
- (14) = (6) (a) zhe-ben shu zai shanghai chu-ban
 this book in Shanghai publish
 'This book was published in Shanghai'.
 (b) *zhe-ben shu zai shanghai ba ban chu-le
 this book in Shanghai BA edition publish-LE

(13) shows that *bo-pi*, which is clearly a phrase by Huang's criteria, can undergo (12); (14) shows that *chu-ban*, which is a compound by Huang's criteria, cannot.

Although Huang's tests and the BA-test yield the same results in most cases, they sometimes diverge. For example, Huang has taken 'sheng qi' (be angry) to be a phrase, because it falls into Type C (cf. 5) with 'bo pi'. As it is separable and takes no object, it is naturally classified in this way. But if we apply the BA-test to 'sheng qi', we get the opposite result:

⁵ It is generally accepted that while unlisted expressions may or may not be 'words', all dictionary entries, except idioms, must be 'words'.

⁶ BA = preposed noun marker.

- (15) = (8) wo sheng-qi le -----> *wo ba qi sheng le
 I bear-gas LE I BA gas bear LE
 'I am angry.' 'I am angry.'

It is obvious in (15) that the BA-test is in conflict with Huang's tests. It is our view that the BA-test is correct not only because the outcome of (15) agrees with the language feeling of the majority of Chinese speakers but also because there is an important difference between the BA-test and Huang's tests: the test of the ability to take an outer object (i.e. N2) is applicable only if the verb-noun structure is semantically capable of taking another noun, whereas the BA-test can be used to test all VN structures. Furthermore, Huang's tests, theoretically, are not rigorous enough because Huang does not point out which one of these two tests is more decisive in case they themselves are in conflict with each other in application. The BA-test, on the contrary, can avoid this possible confusion.

We are now in a position to explain the recalcitrant examples (10-11), which are shown to be compounds instead of phrases by the BA-test:

- (16) (a) = (10) nu-li -----> *ba li nu-le
 exert-power BA power exert-LE
 'to try hard' 'to try hard'
 (b) = (11) ju-gong -----> *ba gong ju-le
 bend-person BA person bend-LE
 'to bow' 'to bow'

We account for this fact by assuming that they are compounds. Moreover, we affirm native speaker intuitions with regard to the matter.

We also have a way of determining whether a SP structure is a compound or a clause.⁷

- (17) Test for the subject-predicate structure: *Adv. + SP, if SP is a clause.

(17) shows that if a degree adverbial can occur before a subject-predicate structure, that structure must be a compound and not a clause. Here are some examples.

- (18) (a) jiao tong -----> *hen jiao tong
 foot ache very foot ache
 'foot aches' 'foot aches very much'
 (b) tou-teng -----> hen tou-teng
 head-ache very head-ache
 'troublesome' 'very troublesome'

(18a) is a clause because it cannot take a degree adverbial; (18b) is a compound because it can.

In sum, focusing on verb-object and subject-predicate structures, we have shown that there are syntactic grounds for differentiating compounds from phrases, a

⁷ Adv. = degree adverbials; S = subject; P = predicate.

distinction that is crucial for the application of lexical vs. postlexical TS. In the following section, our discussion starts with the description of TS in Chongming and ends with our hypothesis about the procedure of Chongming TS.

2. CHONGMING TONE SANDHI

Chongming has an eight-tone system. We shall refer to it simply as 1-8, as shown in the following table.⁸

(19)	Register	High				Low			
	Tone Code	1	3	5	7	2	4	6	8
	Tone shape	H	HMH	M	H?	LM	LML	MLM	L?

A historical note is in order. Middle Chinese distinguished four tones as shown in table (20). These split into eight according to the high/low register distinction, which is reflected in the traditional numbering used for the tone code. The four Middle Chinese tones were classified as Even (E) and Oblique (O). The phonetic properties that originally justified the Even vs. Oblique dichotomy have been obscured by historical changes. Nevertheless, we will need to refer to this Even vs. Oblique contrast in stating the synchronic tone sandhi rules.⁹

(20)	middle chinese tones					
		A	B	C	D	
		E	O	O	E	
	chongming tones	high register	1	3	5	7
		low register	2	4	6	8

2.1 DISYLLABIC TONE SANDHI IN CHONGMING

As mentioned before, Chongming has two types of tone sandhi: a) lexical tone sandhi; and b) postlexical tone sandhi. Basically speaking, LTS is the TS that occurs within syntactic words and PTS is the TS that occurs within non-words. We have justified the distinction between words and non-words in detail in section 1.

2.1.1 DISYLLABIC LEXICAL TONE SANDHI

Chongming disyllabic LTS operates according to the schema shown in (21). The leftmost column and the top row represent the base tones (of the first and second syllables respectively); the output sandhi patterns are indicated in the boxes.¹⁰

⁸ 1) Tones 7 & 8 cooccur only on 'checked' syllables (i.e. syllables ending in an obstruent, which is represented here by //). 2) Tone shapes are symbolized by means of tone letters (H,M,L = High, Mid, Low). 3) High register tones occur only on syllables with voiceless initial consonants while low register tones occur with voiced initial consonants.

⁹ E = Even (including tone 1,2,7,8), O = Oblique (including tone 3,4,5,6). The Even/Oblique distinction is pervasive, coming up time and again for rule statement.

¹⁰ 1) \$ = base tone form is kept in TS. 2) n = neutral tone. 3) HR = high register; LR = low register.

		2nd				oblique (O)			
		even (E)				oblique (O)			
		1	2	7	8	3	4	5	6
1st		H	LM	H?	L?	HMH	LML	M	MLM
E	1 H					\$-n			
	2 LM								
	7 H?	\$-H							
	8 L?					\$-M			
O	3 HMH	HMH-H							
	H								
	R	5 M							
	L	4 LML				\$-n			
	R	6 MLM				MLM-H			
							\$-M		

Based on (21), we propose the following rules for disyllabic LTS:¹¹

(22) Disyllabic LTS rules:

(a)	$\begin{array}{c} \text{O} - \text{E} \\ \swarrow \quad \searrow \\ \text{HR} \quad \text{LR} \\ \downarrow \quad \downarrow \\ \text{HMH} \quad \text{MLM} \end{array}$	(b)	$\begin{array}{c} \text{T} - \text{E} \\ \downarrow \quad \downarrow \\ \$ \quad \text{H} \end{array}$	(c)	$\begin{array}{c} \text{T} - \text{O} \\ \downarrow \quad \downarrow \\ \$ \quad \text{M, if T = H?, L?, HMH or MLM} \\ \text{n, elsewhere} \end{array}$
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If the second syllable carries an even (E) tone and the first syllable carries an oblique (O) tone, the tone of the first syllable changes into HMH if it is in high register (HR); otherwise it changes into MLM (cf. 22a). If the second syllable is an even tone, it changes into H (cf. 22b). If the second syllable is an oblique tone, it changes into M when the preceding syllable is H?, L?, HMH, or MLM; otherwise it changes into a neutral tone (cf. 22c). In all other cases, base tones, which are the same as monosyllabic tones, are maintained. Some examples are shown in (23).¹²

¹¹ 1) T = any tone. 2) Yip's set of symbol notation for Chinese tones (cf. Yip, 1980) is not adopted here. The notations used in this paper are more convenient for Chongming TS.

¹² 1) Due to typographical considerations, the Pin-yin system, instead of the IPA, is adopted here for transcription. 2) BT = base tone; ok / * = attested form / ungrammatical form.

(23) (a) tian-qi sky air 'weather' BT H - M E - O HR-HR H - n (by 3c) ok H - n	(b) ri-wen 'Japanese' BT L?-LM E - E LR-LR L?-H (by 3b & 3d) ok L?-H	(c) tai-ping 'peace' BT M-LM O - E HR-LR HMH-H (by 3a & 3b) ok HMH-H
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2.1.2 DISYLLABIC POSTLEXICAL TONE SANDHI

Chongming disyllabic postlexical TS (PTS) is sensitive to syntactic domain. It can be divided into four different types according to the syntactic domain it applies to, as shown by (24). In (24), the leftmost column and the top row represent the base tones (of the first and second syllables respectively); the output sandhi patterns are indicated in the boxes.¹³

(24) PTS type		PTS-A	PTS-B	PTS-C	PTS-D
syntactic structure		NM,VR	MR	VPr	VD
1st	2nd	E	O	E	O
E	1 H	\$-n	\$-n	\$-H	\$-H
	2 LM				
	7 H?	\$-M	\$-M		
	8 L?				
O	5 M	HMH-M	\$-M	HMH-H	
	R 3 HMH				
	L 4 LML	LML-n			LML-H
	R 6 MLM				

PTS-A applies to two syntactic structures: number-measure phrases (NM) and verb-resultative complement phrases (VR). The rules we propose for disyllabic PTS-A are:

(25) Rules for disyllabic PTS, Type A (number-measure, verb-resultative complement):

¹³ 1) PTS-A = postlexical tone sandhi type A (similarly for PTS-B, PTS-C and PTS-D). 2) NM = number-measure/classifier; VR = verb-resultative complement; MR = reduplicated measure; VPr = verb-pronoun; VD = verb-directional complement.

(a) T - E ↓ H, if T = H, LM, H?, L?, M M, otherwise	(b) T - O ↓ n, if T = H, LM H, if T = M M, otherwise
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(25) indicates that the first syllables always keep their base tones. If the second syllable is an even tone, there are two possibilities. It changes into H when the preceding syllable is H, LM, H?, L?, or M; otherwise it becomes M (cf. 25). If the second syllable is an oblique tone, there are three possibilities. It changes into a neutral tone when the preceding syllable is either H or LM; it changes into H when the preceding syllable is M; otherwise it becomes M (cf. 25). This rule is illustrated in the following examples:¹⁴

(26) (a) si-dun 'four meals' BT M - M O - O * M - n (LTS, by 22) ok M - H (PTS-A, by 25)	(b) zuo-wan do finish 'have done' BT M - LM O - E * HMH - H (LTS, by 22) ok M - H (PTS-A, by 25)
---	--

(26a) is a number-measure structure. Since the second tone is oblique, it is subject to (25b). The first tone being M, the TS form is MH. Note that application of (22) would lead to an ungrammatical result. (26b) shows a verb-resultative complement, to which (25a) applies, since the tone of the second syllable is even.

Disyllabic PTS-B is applicable only to reduplicated measure words (MR). We propose the following rules for disyllabic PTS-B:

(27) Rules for disyllabic postlexical TS, Type B (reduplicated measure):

(a) O - T ↓ HMH, if O is high register LML, otherwise	(b) T - E ↓ H, if T = E M, if T = M, HMH n, otherwise
(c) T - O ↓ M, if T = H?, L?, M, HMH n, otherwise	

The TS rules (27a-27c) are interpreted in the same manner suggested for (22) and (25). An example is:

¹⁴ If the gloss and translation coincide, only the translation is given.

- (28) ci - ci
time time
'every time'
BT M - M
O - O
HR-HR
* M - n (LTS, by 22a & 22c)
* M - H (PTS-A, by 25b)
ok HMH - M (PTS-B, by 27a & 27c)

The only syntactic structure that undergoes PTS-C is the verb-pronoun (VPr). PTS-C is stated in (29) and illustrated by (30):

(29) Rule for disyllabic postlexical TS, Type C (verb-pronoun):

T - O
↓
| H, if T = H, LM, H?, L?, M |
| M, otherwise |

- (30) bang-ni
'help you'
BT H - LML
E - O
* H - n (LTS, by 22c; PTS-A, by 25b; PTS-B, by 27c)
ok H - H (PTS-C, by 29)

Disyllabic PTS-D is applicable only to the syntactic structure of verb plus directional complement (VD), as shown in (32):¹⁵

(31) Rules for disyllabic postlexical TS, Type D (verb-directional):

(a) O - T
↓
| HMH, if O is high register |
| LML, otherwise |

(b) T - T
↓
H

- (32) jin - qu
enter DIR
'enter'
BT M - M
O - O
HR-HR
* M - n (LTS, by 22c)
* M - H (PTS-A, by 25b; PTS-C, by 29)
* HMH - M (PTS-B, by 27a & by 27c)
ok HMH - H (PTS-D, by 31a & 31b)

¹⁵ DIR = directional particle.

3. DISCUSSION OF DISYLLABIC TONE SANDHI

3.2 ACCESSIBILITY OF SYNTACTIC INFORMATION

The study of the syntax-phonology interface has typically proceeded by asking the following question: are phonological rules sensitive to surface syntactic structure? Attempts to answer this question have given rise to conflicting results. On one leading view, exemplified by Selkirk (1984, 1986), phonological rules are held to be sensitive to prosodic structure but blind to the syntax. On another leading view, phonology is held to have direct access to the syntax (Kaisse, 1985).

The Chongming disyllabic TS phenomena described above at first *seem* to provide support for the latter view. Moreover, they shed interesting new light on the issue of how phonological rules may interact with the syntax. It has been shown that under certain syntactic circumstances, TS rules may or may not apply (Kaisse, 1985). The problem posed by the Chongming dialect is not whether or not TS rules apply but which TS rule is selected. The same tonal input forms undergo different TS rules, depending on their syntactic status. For instance, in Chongming disyllabic TS, an input form consisting of two M tones may have as many as four output forms based on different syntactic conditions:

(33) BASE FORM	SANDHI FORM
	M - H / in a number-measure & verb- resultative structures (e.g. 25)
M - M --->	H M H - M / in a reduplicated measure structure (e.g. 27)
	H M H - H / in a verb-directional structure (e.g. 29)

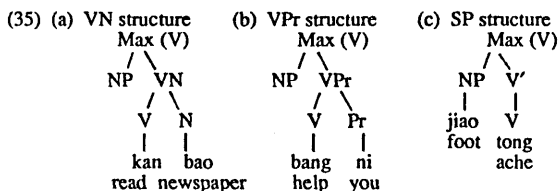
It can be seen from (33) that although the base tone form is M-M, the TS form for the number-measure structure will be M-H ('four meals', e.g. 25), for the reduplicated-measure it will be H M H - M ('every time', e.g. 27) and for the verb-directional structure it will be H M H - H ('enter', e.g. 29). So in spite of the same underlying phonological representation, we have different phonological outputs according to the syntactic structure. However, despite the above, we still argue that in Chongming, syntax and phonology must be linked by some prosodic structure.

According to Kaisse (1985), the phonology needs to refer to only two aspects of syntactic information:

- (34) (a) c-command condition; and (b) edge condition.

In Chongming, however, a verb followed by a noun (VN) shares the same c-command condition with a verb followed by a pronoun (VPr), and contrasts with that of subject-predicate (SP), as illustrated by (35):¹⁶

¹⁶ a) *kan* 'read' and *bao* 'newspaper' c-commands each other; b) *bang* 'help' and *ni* 'you' c-commands each other; c) *jiao* 'foot' does not c-command *tong* 'ache'.



Furthermore, both verb-noun (VN) and verb-pronoun (VPr) are head-initial structure, while subject-predicate (SP) is head-final structure. However, in Chongming TS, the TS of VN is grouped together with the TS of SP instead of VPr. Both VN and SP in Chongming undergo LTS, but VPr undergoes PTS-C. So it is clear that Chongming TS depends on more than just those aspects of syntactic structure given in the above two conditions.

In our opinion, the pronoun is being treated as a clitic in Chongming. On the other hand, neither of the verb-noun nor subject-predicate phrases involves a clitic. A reasonable suggestion, then, is that VPr and VN are distinct in that the former but not the latter is a clitic group, and VN and SP are grouped together, not by their syntactic characteristics, but by their status as phonological phrases. However, clitic group and phonological phrase are prosodic, not syntactic, domains. Hayes (1984) has suggested that there is a fixed number of prosodic domain available to all languages: phonological word, clitic group, phonological phrase, intonational phrase and utterance. Generally speaking, the word mainly refers to those lexical compounds, which may contain more than one stem plus affixes.¹⁷ The clitic group refers to structures consisting of a lexical nucleus plus some cliticized grammatical particles or function words. The phonological phrase may contain two or more major lexical items. The above discussion of the disyllabic TS examples suggests that Chongming has at least the following three domains: a) phonological word; b) clitic group; and c) phonological phrase. In Chongming, all the structures which undergo PTS-A, PTS-B, and PTS-D are to be classified into clitic group with those undergoing PTS-C. This is because number and measure words are all function words while directional and other complement words are not independent lexical heads. As for verb-noun, subject-predicate, coordinate-construction and modifier-head, they are either lexical compounds or phonological phrases, for they are all composed of content words.¹⁸ Although all the non-clitic groups undergo LTS, they can be divided into two types: a) obligatory with clear lexical compounds (cf. 36); and b) optional with syntactic phrases (cf. 37).¹⁹

¹⁷ The crucial distinction between words and syntactic phrases was discussed in some detail in section one.

¹⁸ It is worth mentioning here that a kind of classification maintained by some of Chinese grammarians is to divide all the Chinese words into two types: a) open class word, and b) closed class word. The chief distinction between them is: there is no limit to the number of (a) but there is a limit to the number of (b). In Chongming, all those undergoing PTS usually belong to type (b) (cf. Lyu, 1979).

¹⁹ -TS = TS is blocked.

- | | |
|--|---|
| (36) ri-wen
'Japanese'
BT L?-LM
E - E
LR-LR
LTS L?-H (by 22b)
ok L?-H
~TS L?-LM
* L?-LM | (37) kan-bao
'read newspaper'
BT M - M
O - O
HR-HR
LTS M - n (by 22c)
ok M - n (allegro only)
~TS M - M
ok M - M (adagio only) |
|--|---|

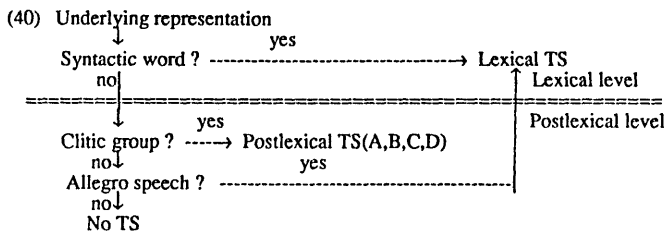
In Chongming, as a matter of fact, syntactic selection plays its part only in the domain of clitic groups. Before phonology has access to syntax, a mediating prosodic structure is needed. Two different levels of disyllabic TS are decided by prosodic structures: clitic groups undergo PTS while all other structures undergo LTS, as illustrated by the following.

(38)	Clitic group					All other structures	
	NM	VR	MR	VP _r	VD	VN, SP, CC, MH	
LTS	-	-	-	-	-	+	
PTS	PTS-A	+	+	-	-	-	
	PTS-B	-	-	+	-	-	
	PTS-C	-	-	-	+	-	
	PTS-D	-	-	-	-	+	-

It is clear that the process of Chongming TS is sensitive not only to prosodic domains but also syntactic categories. And its characteristic is: syntactic structures directly exert an influence within prosodic domain. Thus, neither Kaisse's Direct Reference Theory nor Selkirk's Prosodic theory allows for an adequate account of Chingming TS.

3.2 LEXICAL RULE vs. POSTLEXICAL RULE

The consensus among phonologists is that there are two types of phonological rules: lexical and postlexical, applying respectively in the word formation (including compounding) and phrase structure components of the grammar (Kiparsky, 1982; Pulleyblank, 1983; Mohanan, 1986). But TS in Chongming, discussed in the previous sections, obviously poses a problem for these principles. The following flow chart summarizes Chongming disyllabic TS.



As shown in (40) all the syntactic words like 'weather' in (23a) undergo lexical TS. Clitic groups, on the other hand, undergo postlexical TS. If they are genuine syntactic phrases instead of clitic groups, then there are two possibilities: in adagio speech, they resist TS altogether; in allegro speech, they can undergo *lexical*, not *postlexical*, tone sandhi, as illustrated by (41).

- | | |
|--|--|
| (41)=(37) kan-bao
'read newspaper'
BT M - M
* M - H (by PTS-A)
* HMH - M (by PTS-B)
* HMH - H (by PTS-D)
ok M - n (by LTS; allegro speech) | (42) wei-tong
'stomach ache'
BT M - M
* M - H (by PTS-A & PTS-C)
* HMH - M (by PTS-B)
* HMH - H (by PTS-D)
ok M - n (by LTS; allegro speech) |
|--|--|

Since (41) is a verb-noun structure, it is shown by the 'BA-test' (cf. 12) to be a true syntactic phrase instead of compound, seen as follows:

- (43)=(41) wo kan bao ----> wo ba bao kan le
 I see newspaper I BA newspaper see LE
 'I read newspapers' 'I read newspaper'

(42) is a subject-predicate structure. It turns out to be a phrase according to the test (17) discussed in section one, as shown by the following:

- (44)=(42) (a) wei tong (b) *hen wei tong (c) wei hen tong
 stomach ache very stomach ache stomach very ache
 'stomachache' 'stomach aches very much'

Syntactically, therefore, (41-42) are genuine *phrases*; phonologically, however, they behave like lexical *compounds* (in allegro speech). One might speculate that (41-42) are reanalyzed as compounds --- at least for phonological purposes. Notice, however, that phrases that undergo *lexical* TS retain all the syntactic properties that characterize genuine *phrasal* structures.

As the discussion above shows, Chongming disyllabic TS poses these paradoxes to current phonological theory: a) phonology does not operate directly on syntactic structure, as Kaisse claims, but nevertheless it is sensitive to a considerable amount of syntactic information, contrary to Selkirk's theory: in Chongming there is syntactically based selection of TS rules within prosodic domains, and b) not only postlexical but also lexical rules may apply across words.

REFERENCES

- Chen, M. Y. 1986a. An Overview of Tone Sandhi Phenomena across Chinese Dialects. Conference on the Languages and Dialects of China, Oakland, CA.
- 1988. What must Phonology Know about Syntax? Phonology-Syntax Connection Workshop, Stanford Univ.
- Chen, M. Y. & Zhang, H. M. 1990. Lexical and Postlexical Tone Sandhi in Chongming. Submitted to J. L. Wang & Norval Smith (eds.) *Study of Chinese Phonology*. Foris.
- Hayes, B. 1984. The Prosodic Hierarchy in Meter. To appear in P. Kiparsky & G. Youmans(eds), Proceedings of the 1984 Stanford Conference on Meter. MIT Press.
- Huang, J. C. T. 1984. Phrase Structure, Lexical Integrity, and Chinese Compounds. *Journal of Chinese Language Teachers Association V.4*.
- Kaisse, E. 1985. *Connected Speech: the Interaction between Syntax and Phonology* Academic Press.
- Kiparsky, P. 1982. From Cyclic Phonology to Lexical Phonology. In Harry van der Hulst & Norval Smith (eds.) *The Structure of Phonological Representations*, V.1. Foris.
- Lu, Z. W. 1957. *Han-yu Gou-ci fa* (Chinese Morphology). Peking.
- Mohanan, K. P. 1986. The Theory of Lexical Phonology. Reidel.
- Odden, D. 1987. Kimatuumbi Phrasal Phonology. *Phonology Yearbook V.4*.
- Pulleyblank, D. 1983. Tone in Lexical Phonology. Ph.D. dissertation, MIT.
- Selkirk, E. O. 1984. *Phonology and Syntax: the Relation between Sound and Structure* MIT Press.
- 1986. On Derived Domain in Sentence Phonology. *Phonology yearbook V.3*.
- Shih, C. L. 1986. The Prosodic Domain of Tone Sandhi in Chinese. Ph.D. dissertation, UCSD.
- Yip, M. J. W. 1980. The Tonal Phonology of Chinese. Ph.D. dissertation, MIT.
- Zhang, H. M. 1988. On the Boundary between Word and Non-word. Ms. UCSD.
- Zhang, H. Y. 1979. Chongming Fangyan de Liandu Biandiao (Tone Sandhi in Chongming). *Fangyan* (Dialect), V.4, Peking.
- 1980. Chongming Fangyan Sanzi Zu de Liaodu Biaodiao (Trisyllabic Tone Sandhi in Chongming). *Fangyan* V.1, Peking