

# SOME COMMENTS ON THE DIRECT SYNTACTIC INFLUENCES UPON PHONOLOGY

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## 摘 要

本文討論目前語言學界相當熱門的一個主題：「語法與語音的直接連繫理論」。韻律語音學者認為語法結構必須透過某種仲介結構才能間接地影響到語音現象。這個仲介結構即是所謂的韻律結構。本文則從另一個角度分析發現，在不少語料之中，包括非洲的斑圖語言以及幾個中國境內的方言，語法結構往往可以直接牽動連讀變調或者重音變化。也就是說，在這些現象裡，韻律結構不覆存在，而語法與語音之間嚴然呈現一個直接的接觸面。

## Introduction

One of the current linguistics issues widely debated is the connection between syntax and phonology. Arguments have been formed on the question of direct/indirect syntactic effects on phonological processes (cf. Bickmore 1989; Chen 1987,1990; Hayes 1989; Hsiao 1990a,c,1991a,b,c,f,1992; Hung 1987; Inkelas 1989; Ladd 1990; Nespor & Vogel 1986; Selkirk 1984,1986; Shih 1986,1990; Zec 1988, among others). This paper addresses various issues surrounding the notions of the **direct syntactic reference**. I will re-examine the recent literatures in regard to this approach and set forth evidence from African languages and Chinese dialects.

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**Max-Command Condition**

Kaisse's (1985) posits the Max-Command Condition as a direct factor of forming tonal domains, rejecting the possibility of an intermediate level between the syntax component and the phonology component:

- (1) In the structure  $[X^{\max} \dots a \dots]$ ,  $X^{\max}$  is defined as the domain of  $\underline{a}$ . Then  $\underline{a}$  c-commands [max-commands] any  $\underline{b}$  in its domain. (Kaisse, 1985: 159)

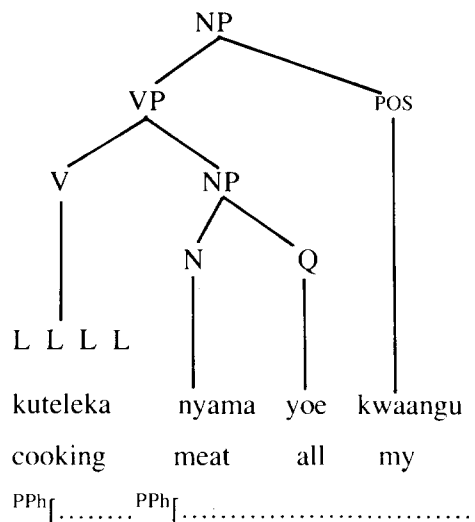
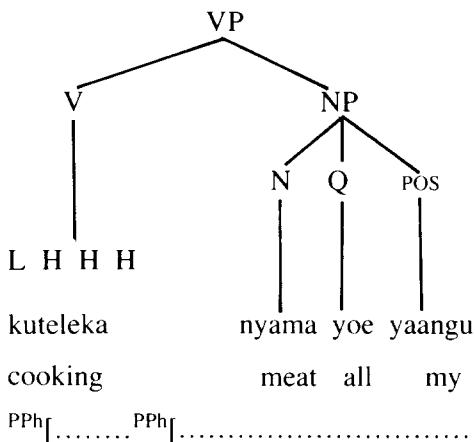
Odden (1990) elaborates Kaisse's idea quite clearly, as he refers to the rules of Makonde tone lowering, which would be respectively formulated in terms of the direct and indirect approaches:

- (2)  $H \rightarrow \phi / [\dots \underline{\quad} \dots POS]^{PPh}$  where  $PPh = \{Left, XP\}$   
 (3)  $H \rightarrow \phi / [[\dots \underline{\quad}]^a \dots POS]^{XP}$  where  $\underline{POS}$  max-commands  $\underline{a}$

(2) is rule of the prosodic mapping (i.e., the indirect syntactic reference). It suggests that within a phonological phrase (PPh), the lowering of a high tone is triggered by the presence of a following possessive pronoun (POS). The PPh is marked at the left edge of a maximal projection ( $X^{\max}$ ). This rule accounts for (4), but fails to derive (5):

(4) 'to cook all my meat'

(5) 'my cooking all the meat.'



Tone lowering in (4) is blocked by the phonological phrase boundary between the POS and the preceding high tones. The high tones therefore remain invariant as predicted. In (5), however, in spite of the presence of this PPh boundary, tone lowering must apply, in violation of (2), so that the correct output can be derived. It thus appears that the prosodic rule in (2) is inadequate.

A rule of direct-syntactic mapping like (3), on the other hand, predicts that a high tone of category a, followed by a possessive pronoun b, is lowered if b max-commands a. The POS max-commands the VP in (5), but not the V in

(4). Therefore, tone lowering applies to the syntactic structure in (5) rather than (4). In other words, tone lowering is determined by the presence or absence of the max-command relation in term of syntactic tree geometry.

### The Hierarchy of XP

From the perspective of the direct syntactic reference, it has been observed earlier from another African language, Kimatuumbi, that the hierarchical relations among maximal projections (XPs) may directly construct the domain for tone insertion.<sup>11</sup> Namely, when two XPs (of certain types) are adjacent and both are daughters of a higher XP, a phrasal high tone is inserted on the rightmost vowel in the first daughter (Odden 1987):

(6) Mmboondo



(7) 'Mamboondo died.'

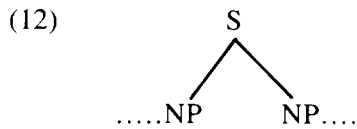
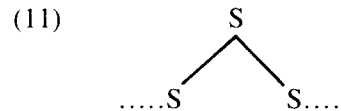
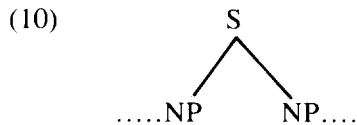
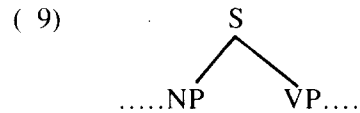
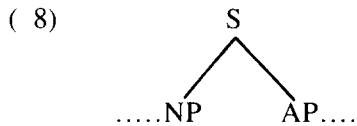
[[Mamboondo]<sup>NP</sup> [aawiile]<sup>VP</sup>]<sup>S</sup>

Mamboondo      die



<sup>11</sup> While the domain of the maximal projection (XP) is variously defined by syntacticians, the essential concept made use of by phonologists stems from the 'head-complement' relationship. An XP can be defined in terms of a head, X, and the elements which are governed by X. For more information, Cf. Chomsky (1981) and Hsiao (1986).

In (6), a lexical high tone is assigned to the first *o* of *Mamboondo*. When a VP follows, as in (7), the phrasal tone insertion prevails over the lexical tone assignment and inserts a high tone on the final *o* in the NP. (8-12) show the relevant tree structures where this tone insertion applies:



Whereas many recent works on prosodic phonology (Seil Kirk 1986; Chen 1987; Hsiao 1990b, 1991d,e,f) suggest that XPs usually construct prosodic domains which serve as an intermediate level to constrain phonological rules, Odden (1987) rejects the need of a prosodic level in Kimatuumbi, where the formation of tonal domains is structure-selective, as shown in (8-12) above, and the derived domain is by nature a syntactic construction.

### Syntactic Branching

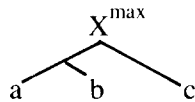
Chinese dialects are rich with evidence for the direct syntactic reference. In Danyang and Huajia, for example, syntactic branching asymmetry (Zhang 1990, 1991) plays an indispensable role in determining tonal behavior. It may directly affect the phrasing of the domains to which the rules apply, the presence or absence of the tone sandhi rules, or the ways that the rules operate.

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Zhang (1991) suggests that in the Danyang dialect of Chinese, tone sandhi applies to elements bearing a c-command relation in a left-branching tree like (13), while it applies to those bearing a max-command relation in a right-branching tree like (14). In the following discussions, however, I will show that this syntactic branching discrepancy can in fact be captured by the single idea of the c-command relation, as illustrated in (13-14): (L = left-branching; R = right-branching)

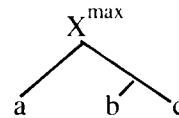
(13) Danyang. L:

a c-commands b but not c



(14) Danyang. R:

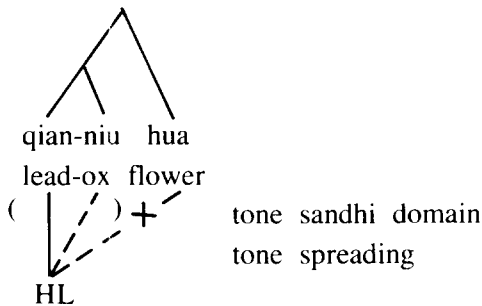
a c-commands b and c



In other words, in (13), a does not c-command c but b, and thus a and b form a relevant tone sandhi domain; whereas in (14) the entire tree consists of a single tone sandhi domain, since a c-commands both b and c. (13) and (14) are instantiated by (15) and (16) respectively.<sup>121</sup>

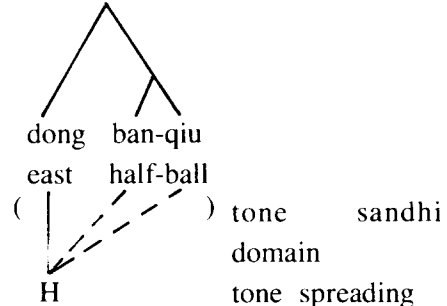
(15) Danyang.

'morning glory (flower)'



(16) Danyang.

'eastern hemisphere'

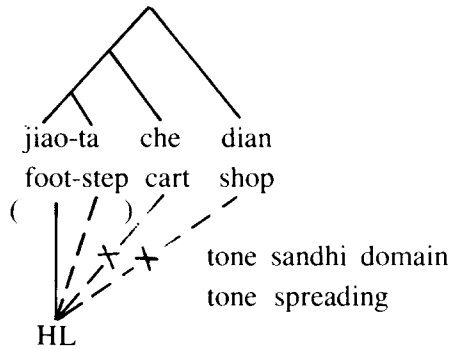


In a left-branching structure like (15), the spreading of L, the rightmost toneme in the HL contour, cannot apply across niu and hua, since neither qian nor niu

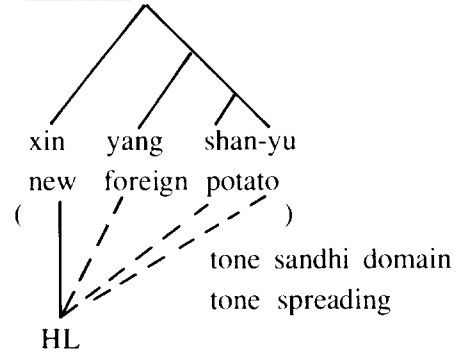
<sup>2</sup> The details of the exact tonal processes involved are omitted here in order to eliminate unnecessary distractions.

c-command hua. (16) is a right-branching structure, in which dong c-commands both ban and qio — with the result that the entire trisyllabic string constitutes a single tonal domain, and the H level tone spreads throughout. For the same reason, the tonal behavior of the quadrisyllabic string in (17-18) can be expected:

(17) Danyang. 'bike shop'



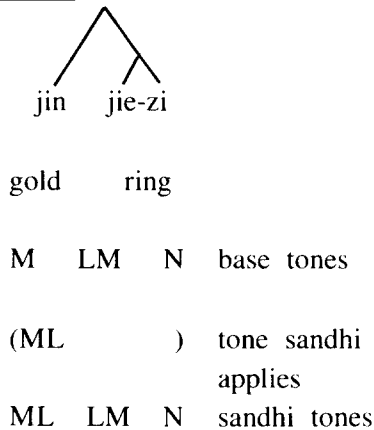
(18) Danyang. 'fresh potato'



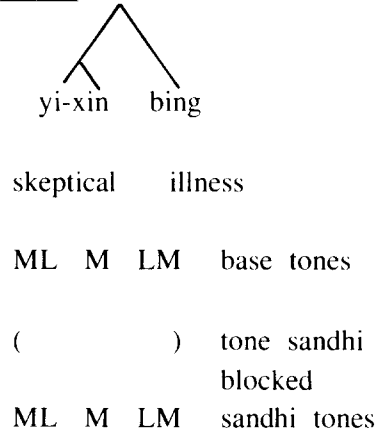
The L toneme of the HL in (18), but not in (17), can spread to the rest of the syllables due to the fact that xin c-commands yang, shan and yu in (18) while jiao c-commands only ta in (17).

A similar pattern can be found in Huajia Chinese. Consider the data in (19) and (20), which are taken from Zhang (1990) but reanalyzed here based on the c-command relation:

(19) Huajia. 'gold ring'



(20) Huajia. 'a skeptical mind'



Notice that tone sandhi operates on the right-branching tree in (19) because jin c-commands both jie and zi. In (20), per contra, it is absent in that yi only c-commands xin but not bing. In other words, syntactic branching decides whether a tone sandhi rule is to be blocked.

### Head /Non-Head Discrepancy

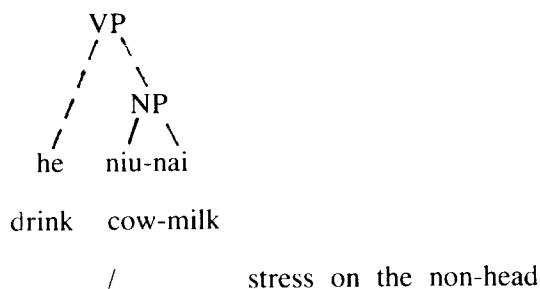
In addition to tree geometry, the direct syntactic reference has also been viewed from the head/non-head status of syntactic constituents. Duanmu (1990) observes that Chengdu Chinese displays a case where stress assignment is keyed to the head/non-head discrepancy. His rule is summarized in (21):

- (21) In  $X^{n+1}$  stress the non-head
- $$\begin{array}{c} X^{n+1} \\ \swarrow \quad \searrow \\ \text{(non-head) } Y \quad X^n \text{ (head)} \end{array}$$

Duanmu (1990: 174)

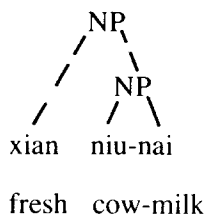
The rule in (21) says that given a branching structure of any phrase, it is the non-head that receives the stress. For example, in (22), the syllable niu meaning 'cow' is considered a non-head component, and thus receive the stress: (/ = stress)

- (22) 'to drink milk'



In (23) the syllable xian meaning 'fresh' is the non-head of the whole phrase, so it is stressed:

(23) 'fresh milk'



/ stress on the non-head

Problems, however, arise from phrases like *re niu-nai*. That is, *re* can either be a V meaning 'to heat' or be an A meaning 'hot'. It is unlikely that stress assignment would vary in this way, and thus Duanmu's rule deserves a second thought.

### Categorial Relations

Pingyao Chinese, like Mokonde, is a language that arouses arguments of both the direct syntactic reference and the indirect syntactic reference. A very interesting tendency in this Chinese dialect (Shen 1988; Chen 1990; Hsiao 1991f,1992) is that the choice between tone sandhi rules is determined by structures of different categorial relations, basically two types of which are distinguished, as shown below:

(24) Structure A: SP (subject-predicate) or VO (verb-object)

(25) Structure B: any structures which are not SP nor VO

A certain set of tone sandhi rules (hereafter, TSR-A) are exclusively applied to structure A, while another set (hereafter, TSR-B1 and TSR-B2) can only operate on structure B.<sup>3</sup>

The significance of this variance refers to that tone sandhi rules are directly selected based on syntactic (grammatical) information, which will be assumed in the following discussions.

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<sup>3</sup> The tonal system of Pingyao consists of six citation tones: i.e., !LM LM HM MH ?LM ?HM. Notice that !LM, LM and ?LM manifest the same phonetic realizations in citation form; the symbols '!' and '?' are used to indicate that they are variants with different diachronic developments as well as distinctive properties in sandhi processes. It is worth mentioning that Pingyao exhibits tone sandhi phenomena of exceptional complexity. For as short as trisyllabic strings, Shen (1988) ambitiously adduces eleven rules, which are classified into three groups:



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Trisyllabic tone sandhi in Pingyao may take all three syllables as a domain for application, or it may form the domain with only two of the syllables. Chen (1990) and Shen (1990) consider that the relevant tonal domains are prosodic; their rules are given in (26) and (27), respectively:

- (26) (a) P1: TS applies to two to three syllable feet.  
 (b) P2: TS scans A constructions right to left; TS scans B constructions left to right.  
 (c) P3: TS applies between ICs.  
 (d) P4: TSR-A/B apply to A/B constructions respectively.  
 (e) P5: When TS fails on account of IC, try the next larger construction (erasing inner structures in the process)  
 (Chen, 1990: 23-24)

- (27) (a) Scanning SP and VO from right to left, elsewhere left to right.  
 (b) Scanning the largest construction in accordance to (a). If the first two syllables constitute a morpho-syntactic unit, then they constitute the minimal prosodic domain; otherwise, the whole trisyllabic string is the minimal prosodic domain.

(Shen, 1990: 11)

In general, what these principles suggest is that i) rule selection is sensitive to categorical relations on syntactic structures; ii) syllables of structure A are scanned from right to left, while those of structure B are scanned from left to right, in terms of phrasing the tonal domain; iii) if the first two syllables which are

TSR-A

- (a) LM ---- > ML / \_\_\_ MH  
 MH  
 (b) LM ---- > ML / \_\_\_ LM  
 (c) T ---- > MH / \_\_\_ HM

TSR-B2

- (a) LM ---- > MH / ML \_\_\_  
 (b) MH ---- > LM / LM \_\_\_  
 (c) T ---- > HM / MH \_\_\_

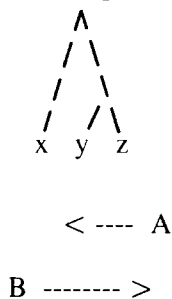
TSR-B1

- (a) ?LM ---- > ML / \_\_\_ ?LM  
 !LM ?ML !LM  
 LM  
 HM  
 ?HM  
 (b) LM ---- > ML / \_\_\_ MH  
 (c) LM ---- > MH / \_\_\_ ?HM  
 HM  
 (d) ?HM ---- > ?MH / \_\_\_ HM

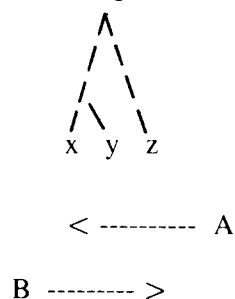
For further discussions, cf. Shen (1988, 1990), Chen (1990), and Hsiao (1991f, 1992).

scanned are ICs, they form a prosodic domain to which tone sandhi is applied. (28) and (29) serve to illustrate:

(28) right-branching



(29) left-branching



The arrows show the scanning directions. Chen (1990) suggests that the embedded ICs or the higher node can be interpreted as the domain of **foot**. Shen (1990: 11) considers such syntactic structures as the motivation for the variety of **minimal prosodic phrasing**. Both Chen's and Shen's analyses are very elegantly developed, though the derived tonal domains, either the embedded ICs or the larger constituents, constantly coincide with syntactic constituents. It is therefore redundant to posit the prosodic domains since they always match the syntactic ones.

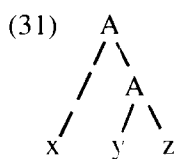
I would like to hypothesize that the phrasing of the tonal domain is based on the concept of a 'local window' in which a minimum number of syllables are scanned from the designated end. The principle in (30)(a) can serve to better portray the trisyllabic tonal processes, and the relevant scanning can be summarized as in (30)(b):

(30) (a) ITP (Initial Tonal Phrasing): Scan structure A from right to left, or scan structure B from left to right, and stop scanning when the minimum number of syllables are scanned which constitute a syntactic constituent, thereby forming the initial tonal domain (ITD).

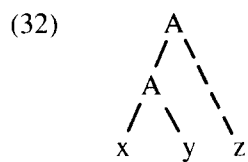
(b) DA (Directional Application): Tone sandhi applies to structure A from right to left, and to structure B from left to right.

As (30)(a) implies, what matters is the local window which is scanned. The scanning in (31-34) is expected:

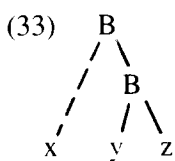
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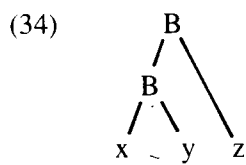
< ---- ITP (right to left)



< ----- ITP (right to left)



----- > ITP (left to right)

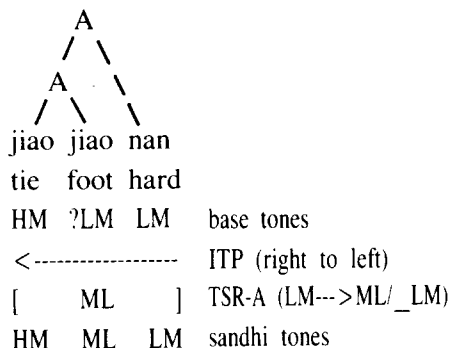
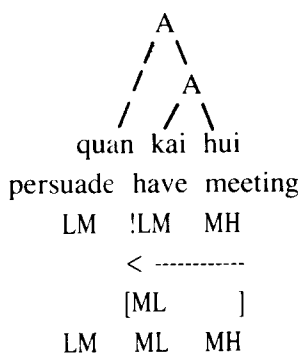


---- > ITP (left to right)

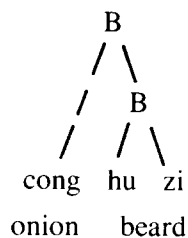
In (31) and (34), the first two syllables scanned constitute a syntactic unit, and are scoped as the relevant local window. The embedded constituent therefore stands out as the initial tonal domain to which tone sandhi applies. Conversely, the syllables in (32) and (33) are not built into a syntactic unit until the third syllable is scanned, with the result that the ITD is the main syntactic constituent, but not the embedded one. Chen (1990) suggests that the scanning direction related to his rules is determined by the main syntactic constituents, and this is also the case in light of the ITP proposed in (30)(a). The structure in (31-34) therefore yield (35-38):

(35) 'persuade to announce a meeting'

(36) 'entangled difficulties'



(37) 'root of green onion'



!LM LM ?MH base tones

----- > ITP (left to right)

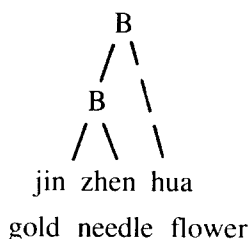
[ ML ] TSR-B1 (!LM-->ML/\_LM)

[ MH ] TSR-B2 (LM-->MH/ML\_)

[ HM ] TSR-B2 (?LM-->HM/MH\_)

ML MH HM sandhi tones

(38) 'day lily'



!LM !LM !MH base tones

----- > ITP (left to right)

[ ML ] TSR-B1 (!LM-->ML/\_!LM)

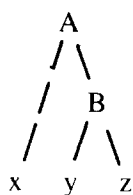
[ MH ] TSR-B2 (!LM-->MH/ML\_)

[ HM ] TSR-B2 (!LM-->HM/MH\_)

ML .MH HM sandhi tones

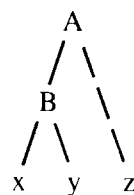
Consider now the scanning in (39-42), where structures A and B intersect:

(39)



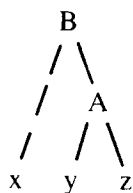
< ----- ITP (right to left)

(40)



< ----- ITP (right to left)

(41)



< ----- ITP (right to left)

(42)

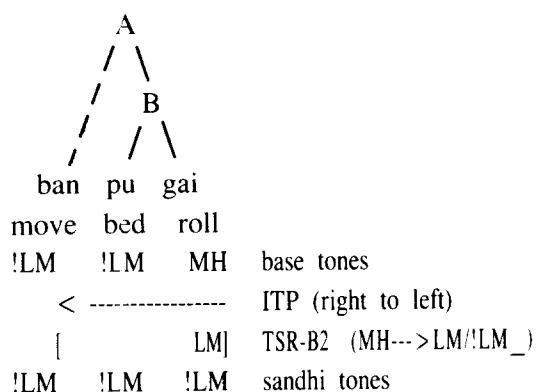


< ----- ITP (right to left)

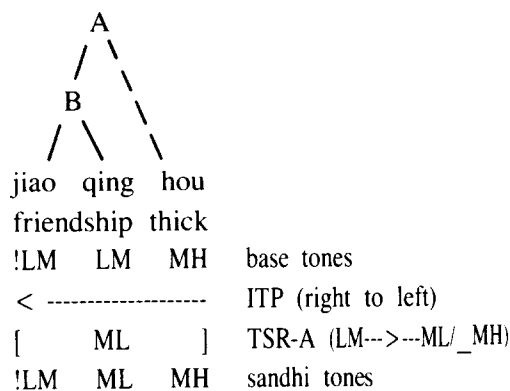
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The constructions above indicate that it is the topmost nodes, but not the embedded nodes, that decide the scanning directions for phrasing the ITD. (39-40) are scanned from right to left as (31-32) are, and (41-42) are scanned left to right as (33-34) are. (43-46) are instances of (39-42):

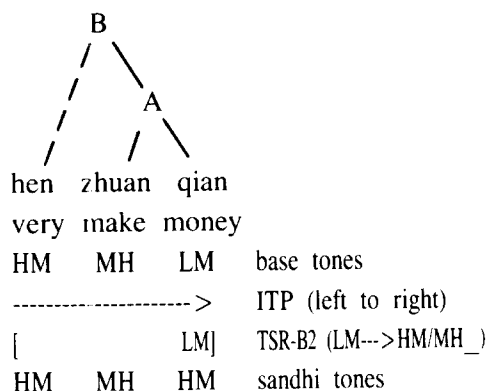
(43) 'to move bed-roll'



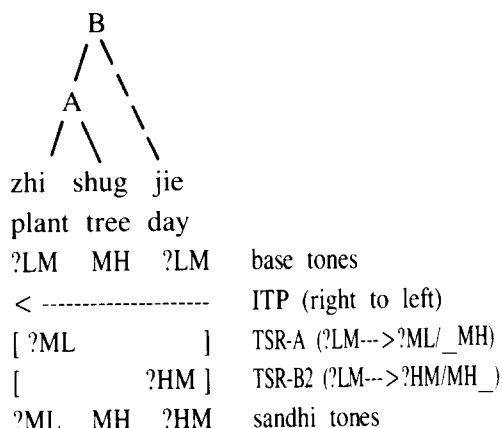
(44) 'Friendship's good'



(45) 'very lucrative'



(46) 'Arbor Day'



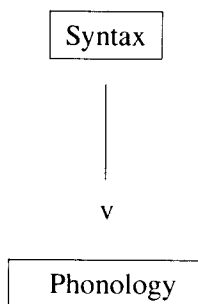
Note in particular that in cases like (44) and (45), the embedded A/B structure does not trigger TSR-A/B. To be precise, TSR-B is not applicable to the embedded B node in (44), nor is TSR-A to the embedded A node in (45). On the other hand,

in instances such as (43) and (46), the embedded node forms the ITD to which relevant tone sandhi rules are applied. Tone sandhi extends to a larger domain if possible. Take (46), for example, TSR-B2, following TSR-A applied to the embedded A, operates on the whole trisyllabic B constituent. In any case, Pingyao Chinese is better characterized as exhibiting direct syntactic influences upon tone sandhi.

### Closing Remarks

To sum up, we have drawn on evidence both from African languages and from Chinese dialects to argue for the validity of the direct syntactic influences upon phonology. The domain of Makonde tone lowering is formed based on the max-command relation, and that of Kimatuumbi tone insertion is phrased depending on the hierarchy of XP. Pingyao tone sandhi reveals very complex links to categorical relations. The grammatical structure types not only correlate to the formation of tonal domains but determines the directionality of rule scanning. Furthermore, tone spreading domains in Danyang, tone sandhi applicability in Huajia are consistently sensitive to the c-command relation. In brief, this paper has shown that the direct syntactic reference is necessary along the lines of the phonological processes in a variety of Chinese dialects (and African languages) (also cf. Hsiao 1990a,c, 1991f, 1992). The schema in (47) is therefore reconfirmed:

(47)



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