

The Spreading of Tonal Nodes and Tonal Features in Chinese Dialects

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The Spreading of Tonal Nodes and Tonal Features
in Chinese Dialects

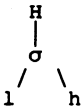
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In this paper I shall be concerned with the feature geometry of tonal features. There is some consensus that representing the range of level and contour contrasts found in natural language requires at least two binary features, which I will refer to as Register, or upper-case H/L, and Pitch, or lower-case h/l. There is less consensus on the relationship between these two features - that is, how they are arranged hierarchically with respect to each other within a model of feature geometry like that of Clements (1985), Sagey (1986) and McCarthy (1988). Two very interesting recent works (Bao 1990, Duanmu 1990) have studied a rich array of Chinese tonal systems and reawakened my interest in this topic. Much of the data in this thesis was brought to my attention by one or other of them.¹

I will use as a diagnostic for constituency in feature geometry whether a group of features spreads together as a unit. By this criterion, I will conclude that we need a model that allows the entire tone to spread as a unit, and terminal Pitch features to spread, but nothing else. In particular, I will argue that there are no clear cases in East Asian languages of Register spreading independently of Pitch, and no clear cases of the shape of a contour (the property of being rising or falling) spreading independently of Register. The discussion in this paper is restricted to Chinese languages, and as a consequence certain of the conclusions may also only be valid for those languages. One conclusion seems reasonably robust cross-linguistically: clear instances of contour spreading without Register have not been reported in any language family. On the other hand, Hyman (1986, 1989), Inkelas, Leben and Cobler (1987) have found instances of Register spreading in African languages, so it may be necessary to allow for limited cross-linguistic variation in feature geometry, as suggested by Mester (1986), Selkirk (1988), Piggott (1988) and others.²

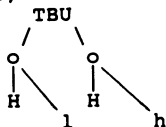
1.1 Tonal Feature Models: A variety of models have been proposed in recent years, and I have grouped them below into three categories according to the relationship between the two features: roughly, independence, sister-hood, or dominance. Some earlier models, notably those of Wang (1967), and Woo (1969), are not included here because their translation into autosegmental terms is non-obvious. I have represented a high rising (or 35) tone in each system.³ In all models, 35 is a H Register, lh Pitch tone.

- (1)
a. Independence (Yip 1980)



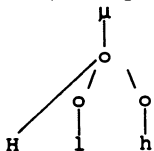
- b. "Sister-hood" (Bao 1990, Duanmu 1990, Clements 1989, Hyman 1989, Snider 1990) Note that for Clements, Snider and Hyman, H=h and L=l.

Clements, Snider:



Tonal Nodes

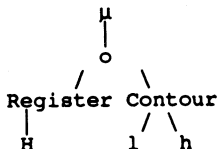
Hyman: (extrapolating from his fn 3 on EA contours)



Tonal Root Node

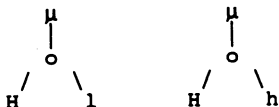
Tonal Node

Bao:



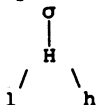
Tonal Node

Duanmu:



Laryngeal Node

c. Dominance (Yip 1989)



1.2 Spreading Predictions made by these Models:

All models allow terminal tones to spread, and I will have nothing to say on this topic. They differ as to which other features may spread as a unit, and the differences are summarized below:

(2)	Whole Contour Tone	Register only	Contour as a whole, w/out Register
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Yip 80		x	
Clements		x	
Hyman	x	x	
Yip 89	x		
Bao	x	x	x
Duanmu		x	

2.1 In Favor of Whole Tone Spreading: Changzhi:

Of the models in (1), three can represent rules which spread an entire contour tone as a unit. As can be seen in (2), these are the models of Hyman, Yip 1989, and Bao. I will argue that there are

indeed rules that spread whole tones, so that one of these three models is required. Bao offers data from Changzhi as a case of whole tone spreading, but Duanmu has argued against this analysis. The data come from Hou 1983, Davison 1989, Bao 1990, Duanmu 1990.

Changzhi has two toneless suffixes, one of which attaches to nouns, and one to adjectives to form nouns. These suffixes surface with a complete copy of the root tone:

(3) Putative Spreading Before Nominal Suffixes:

suaŋ213	suaŋ213 ti213	'sour ones'
xuaŋ24	xuaŋ24 ti24	'yellow ones'
yaŋ535	yaŋ535 ti535	'soft ones'
laŋ53	laŋ53 ti53	'rotten ones'
aŋ44	aŋ44 ti535	'dark ones'

For the /44/ tone, I follow Bao in assuming this is the unmarked tone, and that after a toneless root these suffixes surface with an underlying /535/ tone (their reading pronunciation). Duanmu suggests that the data in (3) are not the result of tone spreading but rather tone copying or reduplication. However, this cannot be correct. If these tones were copied, we would expect to find tone sandhi changes affecting one of the tones, since in all other instances of two tones coming together Changzhi has tone sandhi rules. First, consider overt segmental reduplication:

(4) Verb Reduplication:

/213/	səŋ213 səŋ35	'fan'
/53/	tʉŋ35 tʉŋ53	'move'
/535/	tsʉ535 ts'ʉ35	'fry'
/24/	tɕ'ieʉ24 tɕ'ieʉ53	'ask for, beg'
/44/	k'ɑŋ31 k'ɑŋ53	'look'

The tone of the second syllable is not fixed by the reduplicative template, since it varies depending on the root tone. The simplest assumption (although not the only possible one) is that the root tone has been reduplicated along with the segments, and yet it contrasts strongly with the tone patterns in (3). (3) can therefore not be tonal reduplication.

Another set of tonal changes are found if two different syllables each with the same underlying tone are concatenated. The data are given below; for some tones, the patterns are different for modifier-noun constructions versus verb-object constructions.

(5) Bisyllables with Underlyingly identical tone sequences:

/213 213/	-> 213 53 (N)	ɕi kua	'Western melon'
	or 35 213 (V-O)	k'æ ts'ə	'drive a car'
/53 53/	-> 53 53	ta tiaŋ	'big palace'
/535 535/	-> 35 53 (N)	mu ma	'mare'
	or 35 535 (V-O)	suə tɕieʉ	'count nine'
/24 24/	-> 24 24	xu tɕ'ieŋ	'foreign celery'
/44 44/	-> 53 44	iŋ tɕ'i	'(lit) swallow breath'

If the data in (3) were the result of tone copying or reduplication, one might expect to find tonal changes like those in the underlying sequences of two identical tones in (5), and yet we do not.

On the other hand, if we follow Bao and take (3) to be tone spreading, there is only one tonal root node in the representation. Tonally, then, such cases are identical to single monosyllables,

with one tone, and no sandhi are to be expected - indeed no sandhi are possible, since sandhi in Changzhi require the presence of two tones.⁴

I conclude that Changzhi requires us to admit whole tone spreading as a possibility, and thus to discard those tonal models which do not permit it.

2.2 Against Contour Spreading: Zhenjiang Phrases:

Of the three models which permit whole tone spreading, only one model allows contours to spread as a unit without Register: that of Bao 1990. He gives two cases that he claims involve such spreading. One of them, Zhenjiang, is discussed here; the other, Wenzhou, is discussed in Yip (1992). For both languages, I argue that no contour spreading is involved and that we should thus choose a more restricted model without the possibility of contour spreading. Zhenjiang is a Mandarin dialect, spoken in Jiangsu province. My data comes from Zhang 1985, Bao 1990, and Duanmu 1990.

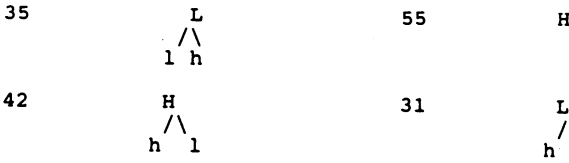
In domains of two or three syllables, the following tonal changes take place: (i) final syllables are unchanged (ii) penultimate syllables change according to the chart below (iii) antepenultimate syllables, if present, bear only level tones: /55, 5/ are unchanged, and all others become [33]. The chart should be read as follows: σ_1 is the penult, σ_2 is the final syllable, and the penult changes to the values shown in the body of the chart. For example, a 42 tone becomes 35 before 31, and 33 before 55.

(6)	$\sigma_1 \backslash \sigma_2$	42	31	35	55	5
	42					33
	31		35			
	35				22	
	55		55			
	5		5			

Bao observes that the contour tones 42, 31 and 35 all level out to 33 or 22 before 55, and analyzes this as spreading the property of being level leftwards from the final syllable. There are several problems with this analysis. First, the levelling is also found before the rising tone in some cases. Second, Bao does not analyze the rest of the changes in the penult, nor the changes in the antepenult, so the changes are seen in isolation from the system as a whole.

Looking at the complete system, what we observe is progressively more neutralization as one moves away from the end of the word. Antepenultimate syllables are all level, penultimate ones allow level or rising, and only final syllables allow the full range of contrasts (probably because they are stressed, although Zhang does not say). This observation suggests the following analysis: (i) Neutralization to level is general in non-final syllables (ii) The 35 rise on some penults is the result of a later rule spreading /h/ left from a following /hl/ fall. (iii) 55 is the default H Register tone, with no specification for h/l, and thus does not spread, or change. The tonal representations are shown below, using the model of Yip (1989). I follow Bao in taking 35 to be L Register; the reason will become clear below. On the surface all rising tones, whether H or L Register, surface as 35.

(7) Underlying Representations:

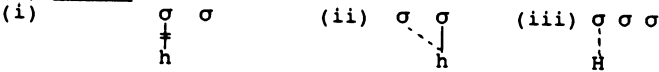


(8) Surface:

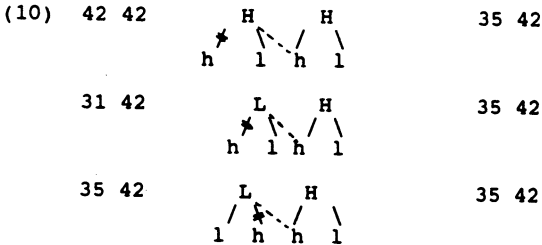


The rules are simple. (9i) shows delinking of /h/ from non-final syllables; this results in levelling. (9ii) shows /h/ spreading, which causes some level tones to become rising. (9iii) inserts H Register on antepenultimate syllables, resulting in even more neutralization. This last rule is feature-changing, since no syllable may have more than one value for Register.

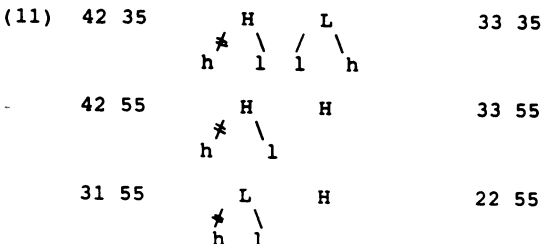
(9) Rules:

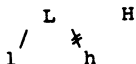


Some derivations are given below. In (10), in all cases a /h/ delinks from the penult, and a /h/ spreads left from the final syllable, resulting in a surface rise, realized as 35 irrespective of Register.

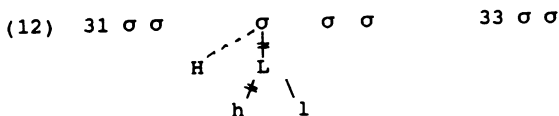


In (11), the /h/ still delinks, but there is no following /h/ to spread, so these surface as level, with the pitch depending on the Register (H gives 33, L gives 22); note that we now see why 35 is analyzed as L Register: its level allophone is 22, not 33.





In (12), the antepenult loses its /h/; there is never any following /h/ to spread, since the penult has already been neutralized to /l/, and H Register is then inserted on the antepenult, forcing delinking of the L Register. Note that it is necessary to assume that the /l/ relinks left-to-right to the new Register, although it is not clear why this should be.



This proposal has several advantages. First, it situates the changes within the context of the system as a whole, and explains the entire system. Specifically, it is viewed as increasing neutralization further to the left, first of /h/ Pitch, by the delinking rule in (9i), then of Register, by H-Register insertion in (9iii). The observed levelling before 35 is no longer a problem, and the change to rise is explained as the result of simple spreading of a /h/ from the final syllable, by rule (9ii).

Since this analysis seems preferable, I conclude that the Zhenjiang data cannot be used as evidence supporting the need for spreading of a contour node, and that in the absence of any such cases the contour node should be eliminated from the feature geometry. We are thus left with two models powerful enough to deal with whole tone spreading, but restricted enough to eliminate contour node spreading: those of Hyman and Yip 1989.

3. Against Register Spread in Pingyao:

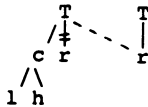
The primary difference between the models of Hyman and Yip 1989 is that Hyman's model permits spreading of Register independent of the other features, whereas Yip 1989 does not. In fact, all the models except Yip 1989 can spread just Register. I shall argue that there are no clear cases in East Asian languages of Register spreading on its own, and so we should opt for a model which does not permit such spreading. Bao gives two cases which he analyses as involving Register spreading. I will discuss one here, Pingyao. The other, Wuyi, is discussed in Yip 1992, where it is shown that Wuyi can equally well be analyzed as whole tone spreading. The argument in this section is due to Chen (1991). The data are from Hou 1980, Bao 1990, and Duanmu 1990.⁶

In bisyllabic phrases, the three underlying tones found on sonorant-final syllables in Pingyao change according to the following table. Apart from a change in final /53/ tones to [423], the changes are all on the first syllable.

(13) $\sigma_1 \setminus \sigma_2$	13	35	53
13	13-13	31-35	35-423
35	13-13	31-35	35-423
53	53-13	53-35	35-423

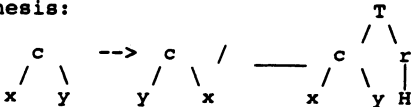
Bao observes that in the bolded examples in (13) a rising tone remains rising, but changes Register to match the Register of the second syllable: /35-13/ becomes [13-13], and /13-53/ becomes [35-423]. He formulates a rule of Register Spread, given below:

(14) R-Spread:



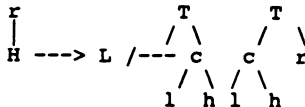
Two other rules complete his analysis. The first, Metathesis, deals with the change from rising to falling and vice-versa found in the underlined examples above. Here it is viewed as dissimilatory:

(15) Metathesis:



Secondly, there is a rule of Register Lowering to account for the lowering of 35 to 31 before 35:

(16) R-Lowering:



These rules are ordered as follows, with metathesis crucially preceding R-spread, since it may bleed it.

(17)	a.	13-35	b.	35-35	
		--		13-35	R-Lowering
		31-35		31-35	Metathesis
		n/a		n/a	R-Spread

Chen (1991) offers an alternative. He retains Metathesis, and precedes it by a single rule of Register Neutralization for rising tones. I state the rule in my words as follows:

(18) R-Neutralization (my wording):

For rising tones, if a following syllable begins h,(l), replace Register with H (L).

That is, a syllable assimilates its Register to the Pitch value of the following syllable. Intuitively this seems reasonable enough, but it is rather unexpected within a theory in which Register and Pitch are two different features, and might constitute an argument for taking the position of Clements, Snider, and Hyman that we are dealing with one and the same feature arranged differently in the geometry. Indeed, a rather similar relationship between Register and Pitch features has been noted in Hausa in work by Inkelas, Leben, Cobler (1987). With this caveat, let us see how the rule works. I give some derivations below:

(19)	Base Tone	R-Neutraliz.	Metathesis
	13-13	vacuous	n/a
	13-35	vacuous	31-35
	13-53	35-53	n/a (--> [35-423])

	35-13	13-13	n/a
	35-35	13-35	31-35
	35-53	vacuous	n/a (--> [35-423])

53-13	n/a	n/a
53-35	n/a	vacuous
53-53	n/a	35-53 (--> [35-423])

I conclude that Pingyao is not a clear case of Register Spreading, and that at least for East Asian languages we must adopt a model which does not admit this option, such as that of Yip (1989). Since, as I mentioned earlier, Hyman and Inkelas, Leben and Cobler (1987) give evidence of Register-spreading in African languages, there may be a typological difference here, perhaps whether Register is the Tonal Root Node, (Yip 1989) or hangs off it (Hyman), for East Asian and African-type languages respectively.

Conclusion

I have argued that no clear cases of Register spreading without tone, or of Contour spreading without Register, are known to us, so that we should prefer a model which excludes these operations. I have also argued that we must allow for the spreading of an entire contour tone, as in Changzhi (although why this is so rare is something of a mystery). The only model with these properties represents Register as the tonal root node, dominating one or more Pitch features, and I conclude that in our present state of knowledge this model should be adopted as a working model of tonal geometry, at least for East Asian tone languages.

Endnotes

I would like to thank many people for comments on earlier versions of this paper; their comments resulted in many improvements. They include my audience at B.L.S., also Bao Zhiming, Matthew Chen, Duanmu San, John McCarthy, and Larry Hyman. All errors of fact and flights of fancy are of course to be blamed on me alone.

1. Both Bao and Duanmu discuss in depth the relationship of tonal and laryngeal features, but such issues are beyond the scope of this paper.
2. I use the terms East Asian-type and African-type as convenient labels, but there are languages of the first type in Africa, such as Grebo (see Newman 1986) and of the second type in China (such as perhaps Shanghai (see Duanmu 1990)).
3. 5 denotes high pitch, 1 low pitch and so on.
4. The details of the tone sandhi rules in (4-5) are not central to the main argument here.
5. There is one unresolved problem: 35 35 should change to 22 35, but instead it surfaces unchanged.
6. I accept here Bao's distillation of Hou's facts. However, it should be noted that there are some mysterious complications to Pingyao sandhi which are not discussed here. In particular, Hou notes that syllables with a /13/ tone come from two historical sources (Yin Ping and Yang Ping), and still betray their origins in some different sandhi patterns. Table (13) in the main text represents only those cases in which the second syllable is unchanged (ignoring the quite general change of /53/ to /423/), and

the first syllable changes without reference to historical origins. Additional systematic patterns are as follows:

$\sigma_1 \backslash \sigma_2$	13	35	53
13	13-35	13-13	31-53
35	35-53	35-53	35-423

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