More Universals of Tone

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Contents

Abstract

This paper reviews some "tone universals" that were previously proposed, and proposes three additional cross-linguistic tonal tendencies: (a) floating tones migrate rightward, (b) words with all-Low tones are dispreferred, and (c) a HLH phonetic sequence is dispreferred. These are violated often enough so that the term "universal" is overly ambitious, but they occur across a wide areal and genetic variety of languages, so a complete typology of tone should include and account for these.

1. Universals proposed in the past[1]

The literature on tone, even in the 1970s, was extensive enough so that some cross-linguistic tendencies common enough to be labeled "universals" could be proposed by Maddieson (1978) and Hyman and Schuh (1974). The statements in these works are combined and listed below.

(1) Proposed tone universals (Maddieson 1978, Hyman and Schuh 1974).

a. A larger number of tone levels occupy a larger pitch range than a smaller number (~20 Hz for two tones, 50 Hz for four tones)

b. Systems in which high tones are marked are more frequent than systems in which low tones are marked.

c. If a language has contour tones, it also has level tones.

d. A language with complex contours also has simple contours.

e. Rules raising tones are more common than rules lowering them.

f. Perseverative rules are more common than anticipatory ones.

g. Tonal polarity is more common than polarity with other features.

h. Lower vowels tend to have lower tone.

i. Low-toned vowels tend to be longer than high-toned ones.

j. Vowels with rising tone tend to be longer than vowels with falling tone.

Some of the preceding universals are stated as tendencies (1b, e, f, g, h, i, j), some as implicatures (1c, d), while only (1a) is stated as an absolute.

In investigations of Kɔnni, a Gur language of northern Ghana (Cahill 1999), a few additional patterns have emerged. In researching other tone languages around the world, it became evident that these patterns were also found in unrelated languages, to the point that it is not unreasonable to talk of these as cross-linguistic tendencies – universals, in the same sense as above. The sections that follow show how these operate in Kɔnni and documents the existence of that particular pattern elsewhere in the world's languages. The tendency of floating tones to associate rightward is discussed in section 2. How words with all Low tones are dispreferred is discussed in section 3. Section 4 shows that a phonetic HLH sequence is

[1] This material was originally presented to colloquia at the summer sessions of SIL at the University of North Dakota and in Oregon; these audiences' feedback is appreciated.

dispreferred. Some connections with Optimality Theory and concluding remarks are made in section 5.

2. Floating tones migrate rightward

The most obvious floating tones in Kɔnni are those involved with the associative (i.e. genitive or possessive) construction. The possessor precedes the possessed (= head) noun, as it does in English *horse's leg*, where 'leg' is the head noun. When the possessor is third person, either a pronoun or a noun, the possessed noun always manifests a High tone on its first syllable. In the data below, (2a) contrasts possession with first and second person possessors as opposed to third person possessors. The data of (2b) shows additional cases of third person pronoun possessions of nouns, while the data of (2c) shows nouns (which are inherently third person) possessing other nouns.

(2) Associative construction in Kɔnni

a.

	1st person	2nd person	3rd person	3rd person non-human	
singular	ǹ dàáŋ	fǐ dàáŋ	ὺ dá!áŋ	kà dá!áŋ	'my, *etc*. stick'
plural	tǐ dàáŋ	nǐ dàáŋ	bà dá!áŋ	à dá!áŋ	

b.

tăŋ	ὺ tá!ŋ́	'stone, his/her stone'
kàgbá	ὺ kágbà	'hat, his/her hat'
dàmpàlá	ὺ dám!pálá	'bench, his/her bench'

c.

bὺàwá dá!áŋ	'child's stick'	(bὺàwá 'the child', dàáŋ 'stick')
bὺá kárέntìà	'child's cutlass'	(bὺá 'child', kàrέntìà 'cutlass')
chὺrύ dám!pálá	'husband's bench'	(chὺrύ 'husband', dàmpàlá 'bench')

The overarching generalization of the data above is that in Kɔnni associative constructions with third person possessors, the first syllable of the rightmost (possessed) noun is always High-toned. In autosegmental terms, this is readily explained with the hypothesis that the associative morpheme is a High tone, which docks to the noun on right, as illustrated below.

(3)

L H	L -H		L	H L H		
|	| |	→	|	\ /		
ʊ	zas -ŋ		ʊ	zasɪŋ	[ὺ zá!sɪ́ŋ]	'his/her fish'

In a cross-linguistic study of thirty languages which also have tonal associative morphemes, the associative tones dock either to the right or to the head noun, or both (Cahill 2000a). There are two constraints which can potentially oppose each other. One constraint forces the tonal morpheme to be realized on the head of the noun phrase, and the other simply moves the tone to the rightmost noun. What we do not find in any of these languages is an associative tone docking leftward to a non-head noun.

Other languages have floating tones which are not connected with a particular morpheme, as follows.

- In San Miguel El Grande Mixtec of Mexico (Goldsmith 1990, Pike 1948), some nouns have a suffixal High tone which is underlyingly unassociated. This tone shows its effects on the following word, if one is present.
- The same pattern occurs with Lango of Uganda (Clifton 1975).
- In Kalam Kohistani of Pakistan, some words cause a Low tone to occur on the following word (Baart 1999).
- In Usarufa of Papua New Guinea (Bee and Glasgow 1973), tones set afloat by vowel deletion in noun phrases manifest themselves on the following word.

No floating tones are known to me in East Asian languages. This pattern, among a wide variety of languages, leads to the following proposal:

(4) **Proposed universal**: floating tones tend to dock rightward.

This is a tendency and not an absolute universal. As mentioned above, the associative tone docks left to the head noun in some languages. Also, in other languages, the associative tone docks left to a toneless morpheme. This tendency, or constraint, is sometimes overridden by other factors.

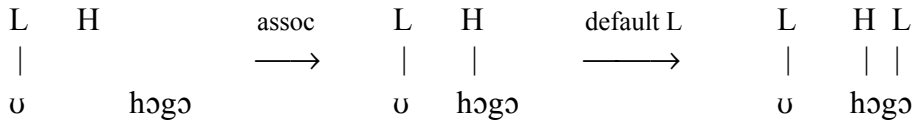
This pattern is likely part of a larger pattern of tones moving rightward, whether they are floating at some stage or not. Historically, we find a pattern of wholesale rightward tone shift, documented for Kikuyu in Kenya (Clements and Ford 1979, Clements 1984), as well as for some Mixtec languages in Mexico (McKendry 2002). Also, the widespread phenomenon of "tone doubling" in Bantu languages involves a spreading of a High tone one TBU in the *rightward* direction (Odden 1995). The non-floating tone behavior was also summed up in (1f), that "Perseverative rules are more common than anticipatory ones". Overall, whether floating tones, historical tone shift, or synchronic tone spreading, there is a greater tendency for tones to move rightward than leftward.

A possible explanation for this tendency of tones to move rightward is found in Hyman and Schuh (1974), who note that the laryngeal adjustments required to regulate pitch changes require more time than the articulatory adjustments required to produce successive segments. Silverman (1997) goes into more detail on research on the applicable physiological constraints and reaches the same conclusion.

3. All-Low words are dispreferred

In Kɔnni, there are no words with all Low tones; a High must occur somewhere in the word. Some words have no underlying High; if not, one will be inserted. Some relevant forms containing the noun stem *hɔgɔ* 'woman' are shown below (for fuller argumentation that *hɔgɔ* is lexically toneless, see Cahill 1999).

(5) hɔ̀gɔ́ 'woman, wife' hɔ̀gɔ̀bìké 'the small woman'
ù hɔ́gɔ̀ 'his wife'



In K nni, there is an active process which inserts a High tone into a word if it does not contain one. There are also documented languages which do not allow words with no High tone. The availability of data and depth of analysis done on these languages does not always indicate whether a High is inserted, or rather that there merely exist no all Low-toned words, but the surface pattern is the same.

(6) Lack of all-Low toned words across continents

a. The Moore and Dagaare languages of West Africa have a similar pattern to K nni: in disyllabic nouns, HH, HL, and LH are attested, but not LL (Kenstowicz, Nikiema, and Ourso 1988, Antilla and Bodomo 1996). Also, the cognate form for 'woman' (*págá* and *pógó,* respectively) is analyzed as toneless by these investigators as well.

b. In Mixtec of San Miguel El Grande, in Mexico (Goldsmith 1990, from data in Pike 1948), there are no words which are all Low-toned.

c. In Iñapari (Peru), underlyingly every word must have at least one High-toned syllable (Parker 1999).

d. In the Narak, Kairi, Kanite, and Awad Bing languages of Papua New Guinea, no words are all Low-toned (Cahill 2000b).

e. In North Kyungsang Korean (Kim 1997), all stems must contain a High tone.

Some languages do allow all Low-toned words, including Buli, the closest relative of Kɔnni (Kröger 1992), and others. In all but the last example above in (6), the relevant domain is the word. In North Kyngsang Korean and possibly others, the stem is the relevant domain, opening the possibility that the constraint forcing a High tone applies to non-word domains, perhaps phrases. However, the pattern is robust enough across a wide variety of languages to propose the following:

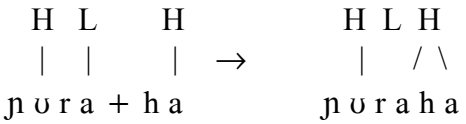
(7) **Proposed universal**: in many languages, Low-toned words (or some domain) are not allowed.

A possible explanation for this lack of all-Low tones in a word is that communication of any sort requires variation in the signal. A totally flat pitch is less communicative than one which exhibits such variation. The question then arises; why not prohibit all-High tones in a word? There is an asymmetry here, in that all-High words *are* allowed in the languages above. Speculatively, this may connect to the proposed universal (1b), that Highs are generally more marked than Lows. This also may relate to pitch-accent languages, where there is one and only one High tone per word. Future investigation is needed to find if languages with Low as the marked tone prohibit all-High words. Beyond that, there may also be a connection between High tone and prominence in general. One phonetic correlate of stress is higher pitch, and it may be that, for lexical items in many languages, there must be some prominent syllable. For tone languages, that prominence manifests itself as the (marked) High tone.

4. HLH is a dispreferred sequence

In Kɔnni, when a HLH sequence would be expected to occur by combining morphemes, the second H spreads left, delinking the Low and causing Downstep:

(8) ɲúrà 'chests' ɲú!ráhá 'the chests'



This pattern is pervasive in Kɔnni, with only two known exceptions,[2] and these exceptions are very restricted cases (Cahill 1999). In Mamaindé (Brazil), on the other hand, the prohibition against HLH shows itself in a much more limited domain. If a HL verb stem is followed by L, the HL remains, resulting in HLL. However, if the HL verb stem is followed by a H, creating an expected HLH situation, the HL on the root changes to a simple H tone, resulting in (Eberhardt 2001):

(9) /sànîn là twá/ → sànîn là twá 'he is happy'
/sànîn áʔ wá/ → sànín áʔ wá 'I am happy'

There are a number of other languages in various continents that prohibit HLH. Besides Kɔnni, the same pattern is found in other Gur languages, such as Deg (Crouch 1994), and in other African languages such as Gã, Esaaka Makhuwa, and Zulu (see Odden 2000 for a discussion of "plateauing", basically the same phenomenon as discussed for Kɔnni.) In Papua New Guinea, this active prohibition against HLH is found in Mianmin and Kairi (Cahill 2000b), as well as Usarufa (Bee and Glasgow 1973). In South America, Iñapari (Peru) changes HLH to HLL if the original LH is on a two-syllable word (Parker 1999). Other phenomena that

[2] These are 1) the first person Perfective transitive, e.g. *ǹ lá !*wá bʊ̀àwá 'I have laughed (at) the child' (c.f. third person *ò làwá !bʊ́áwá* 'she has laughed (at) the child'), and 2) when a High tone spreads rightward from one preverbal particle to another, and stops, e.g. *ò tíŋ* wáá kò dá*!gá mìŋ* 's/he was then just showing', where *waa* is Low-toned, but gets a High from *tíŋ*.

have a possible relation are the Mandarin patterns of H.MH → H.H, 35 35 → 53 35, and 53 53 → 35 53 (Chen 2000), which again avoids a dip in pitch between two high tones.

There are many languages which do allow HLH, but it is significant that languages which prohibit it are not restricted to one particular region.

(10) **Proposed universal**: in many languages, a phonetic HLH sequence is not allowed.

A possible explanation for this again refers to the nature of communication and physiological preferences; a HLH is too rapid a change in signal, particularly in the rapidity of the reversal of the pitch trajectory. A HL is permissible, as is LH, but the combination requires more effort than some languages are prepared to put into it.

Again, we find an asymmetry between High and Low tone, in that while HLH is prohibited, a LHL occurs abundantly. This may be related to markedness of High, and calls for more investigation in the minority of languages in which Low is the marked tone.

5. Concluding remarks

The universals proposed here are independent of particular phonological theories and stand as stated above. However, since the prevailing paradigm is Optimality Theory, it is interesting to see how these might be expressed in terms of constraints. The equivalent constraints, from Cahill (1999), are as follows.

(11) **ALIGN TONE-RIGHT**: ALIGN (TONE, PROSDOM-R) - align a tone to the right edge of its prosodic domain (**TONE-RT**).

This is a very general constraint, applicable in the cases of docking a floating tone, spreading a linked tone, or shifting the position of a tone. The case of spreading a linked tone rightward also relates to the pre-autosegmental generalization (1f) that "perseverative tones are more common than anticipatory ones." In most cases, other conflicting constraints prevent a tone from being realized on the last TBU. For example, a LINEARITY constraint, which preserves the serial ordering of tones and penalizes metathesis, would prevent the specified tone from skipping over intervening tones to dock on the last TBU. Constraints against contour tones, toneless TBUs, etc. would also be applicable here.

(12) **H-PRESENT:** there must be at least one High tone present in an utterance.

The question here is the domain over which the constraint operates. Here it is stated in terms of a very broad domain, the utterance, but we have already seen differences in what domain is relevant for different languages. It is likely that this constraint is actually a family of constraints, referring to domains of stem, word, phrase, and utterance, as in the case of pitch accent systems.

(13) ***HLH** = no Low can be singly associated between two High tones: * H L H
                                                                                  |
                                                                                  X

The crucial prohibition here is the association of a single Low tone when surrounded by Highs. There are multiple cases of HLH in Kɔnni, but the Low is floating between the Highs, causing downstep. This is a broad statement, not requiring the flanking Highs to be associated, but not requiring them to be floating either.

There are very few "universals" that are truly universal, in the sense of expressing exceptionless generalizations; but being aware of tendencies helps us know what to expect and helps keep from getting surprised by the "normal."

These patterns are more suggestive than conclusive—as usual, more cross-linguistic data is desirable. With an increased emphasis currently on endangered languages and documentation of languages, the prospects are brighter today for such research than they have been in the past.

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