

Tonal features in languages of northern Pakistan

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Tone

Words consist of units of sound that we call *consonants* and *vowels*. In alphabetic writing systems, the alphabet characters represent the consonants and vowels (more or less).

In speech, words also have *melodic* (musical) properties. For instance, when I say *baabáá* the pitch (the musical note; the tone) of the second part of the word is higher than the pitch of the first part. When I say *báábaa* it is the other way around: now, the pitch of the second part is *lower* than the pitch of the first part.

In some languages, these melodic features are not important for the identity of a word. In such languages, of which English is an example, the melody with which a word is spoken may be controlled by other factors, such as whether the speaker is making a statement or asking a question, whether he is expressing agreement or disbelief, whether he is happy or sad, etc.

In other languages, melodic features are an inherent aspect of the pronunciation of a word, just like the consonants and vowels. Such languages are called *tone languages*. Words in tone languages are made up of vowels, consonants, *and* of melodic characteristics. In tone languages, you can often find examples where the identity of a word is changed when you change the melody of the word.

An example of this phenomenon is found in Punjabi. For instance, when I say (1), I am asking you to show me a whip. When I change the melody of the word *koṛaa* as in (2), I am asking you to show me a horse. When I change it again as in (3), I am asking you to show me a leprosy patient.

- (1) munu~ 'kooṛaa takaaο. 'Show me a whip!'
 (2) munu~ 'kòṛaa takaaο. 'Show me a horse!'
 (3) munu~ 'kóṛaa takaaο. 'Show me a leprosy patient!'

The pitch patterns of these Punjabi words can be described as level in the case of 'whip', low-rising in the case of 'horse', and high-falling in the case of 'leprosy patient' (Bailey 1915: ix). (In the Punjabi examples, the prime (´) indicates stress on the following syllable, the grave accent (`) indicates low-rising tone, and the acute accent (´) indicates high-falling tone.)

In tone languages, tone is an integral feature of the word and in principle deserves to be written in the script of such a language, just as the vowels and consonants of a word should be written. If the script cannot make a distinction between the tones, some words that are pronounced differently will be written the same (as in the examples 1-3, if you would just write them with *kaf*, *wau*, *Re*, *alif*). That is to say, not writing the tones may result in ambiguities, just like in English not writing the difference between for instance *p* and *b* would result in ambiguities for words such as *park* and *bark*, or *peach* and *beach*.

Tone in languages of northern Pakistan

It appears to be the case that a majority of the languages of northern Pakistan (Punjab, NWFP, Northern Areas, and Azad Jammu and Kashmir) are tone languages. If we look at the numbers of speakers of these languages, it appears to be the case that a majority of the people of northern Pakistan are speakers of tone languages. See Table 1, where a question mark indicates that I am not certain about the status of the language as to tone.

Table 1: Status of languages of northern Pakistan with respect to tone, with estimated number of speakers according to Ethnologue (2000)

No.	Language	Tonal	Est. number of speakers
1.	Balti	No	270,000
2.	Bateri	Yes?	30,000

<i>No.</i>	<i>Language</i>	<i>Tonal</i>	<i>Est. number of speakers</i>
3.	Burushaski	Yes	60,000
4.	Chilisso	Yes?	3,000
5.	Dameli	Yes	5,000
6.	Domaaki	No?	500
7.	Gawar-Bati	Yes	1,500
8.	Gowro	Yes?	200
9.	Gujari	Yes	300,000
10.	Hindko	Yes	2,500,000
11.	Kalami	Yes	40,000
12.	Kalasha	No?	5,700
13.	Kalkoti	Yes?	4,000
14.	Kamviri	No?	2,000
15.	Kashmiri	No	105,000
16.	Kati	No?	5,100
17.	Khowar	Yes	222,800
18.	Indus Kohistani	Yes	220,000
19.	Ormuri	No	3,000
20.	Pahari-Potwari	Yes	?
21.	Palula	Yes	8,600
22.	Pashto	No	11,000,000
23.	Punjabi	Yes	45,000,000
24.	Shina	Yes	500,000
25.	Siraiki	No	30,000,000
26.	Torwali	Yes	60,000
27.	Ushojo	Yes?	2,000

<i>No.</i>	<i>Language</i>	<i>Tonal</i>	<i>Est. number of speakers</i>
28.	Wakhi	No	9,100
29.	Waneci	No?	95,000
30.	Yidgha	No?	6,000
Languages with reported tone: 13 of 30.			
Languages with suspected tone: 5 of 30.			
Languages with reported tone or suspected tone: 18 of 30 (more than 50 percent).			
Total number of speakers for all the languages: approx. 90,000,000.			
Total number of speakers of reported or suspected tone languages: approx. 49,000,000 (more than 50 percent).			

Classification of tone systems

In my research so far, I have found that the approximately 18 tone languages of northern Pakistan can be divided into three types. The first type we have already seen in the example of Punjabi. In Punjabi there are three different tones, namely the level tone (also called *mid tone* in the literature), the high-falling tone (or *high tone*) and the low-rising tone (or *low tone*).

The second type of tone language is exemplified by Shina. Shina is spoken in Gilgit and other parts of the Northern Areas and in some parts of Kohistan and Kashmir. There are only two distinctive tones in Shina, namely a high-falling tone and a low-rising tone. Furthermore, this distinction between the high-falling tone and the low-rising tone is only important on words that have a long vowel.

Whereas Shina has a smaller number of tones as compared to Punjabi, there are also languages that have a greater number of tones. This third type of tone language is exemplified by Kalami, a language that is spoken in Dir Kohistan and Kalam Kohistan. Kalami has no less than five different tones. They are shown in the following examples, where the underlined words can have different tones as indicated:

- (4a) mākā boor pāšā (high level tone) ‘Show me a lion!’
 (4b) mākā boor pāšā (high-falling) ‘Show me lions!’ (plural)
 (4c) mākā boor pāšā (delayed falling) ‘Show me a deaf man!’
 (4d) mākā boor pāšā (low level) ‘Show me a Pathan!’
 (5a) mākā goor pāšā (low-rising) ‘Show me a horse!’
 (5b) mākā goor pāšā (high level) ‘Show me a partridge!’
 (6a) mākā baan pāšā (high level) ‘Show me a joint!’
 (6b) mākā baan pāšā (high-falling) ‘Show me an excuse!’
 (6c) mākā baan pāšā (low level) ‘Show me a bowl!’

A number of minimally contrastive sets of words are also shown in Table 2.

Table 2: Minimally contrastive sets of Kalami words (on each row, tone is the only distinction between the words)

<i>high level</i>	<i>high falling</i>	<i>delayed falling</i>	<i>low level</i>	<i>low rising</i>
boor ‘lion’	boor ‘lions’	boor ‘deaf’	boor ‘Pathan’	
goor ‘partridge’	goor ‘partridges’			goor ‘horse’
baan ‘joint’	baan ‘excuse’		baan ‘bowl’	
			çhaar ‘loss’	çhaar ‘milk jet’
		bäär ‘many’		bäär ‘Open!’

For the time being, we can label the three types of tone languages as follows:

- *Shina-type (2 tones)*
- *Punjabi-type (3 tones)*
- *Kalami-type (more than 3 tones)*

A tentative classification of the 18 tone languages mentioned above then looks as in Table 3.

Table 3: Tentative classification of tone languages of northern Pakistan

<i>Shina-type</i>	<i>Punjabi-type</i>	<i>Kalami-type</i>
Shina	Punjabi	Kalami
Burushaski	Hindko	Torwali
Palula	Gujari	Kalkoti?
Indus Kohistani	Pahari-Potwari?	
Khowar?		
Gowro?		
Bateri?		
Chilisso?		
Dameli?		
Gawar-Bati?		
Ushojo?		

One of the interesting things to note here is that the degree of contact between languages seems to be an important factor in the development of tone systems, more than the genetic relationships between the languages. For instance, Burushaski is genetically totally unrelated to the other languages of Pakistan. Burushaski has not yet been classified as belonging to any family of languages at all. Yet, its tone system (like other aspects of its pronunciation) is very similar to that of Shina and other languages of the region.

Also, Indus Kohistani is genetically closely related to Kalami and Torwali. However, due to its geographical location it is in contact with Shina, and thus its tone system looks more like that of Shina than like that of Torwali and Kalami. (I base this claim on as yet unpublished work on Indus Kohistani tone by Claus Peter Zoller, corroborated by some preliminary investigations of my own.)

Ushojo may be an interesting case for investigating the effect of language contact on tone. This language has not yet been studied very well and we do not know much about it. From what we do know it appears

that it is genetically closely related to Shina. However, the current location of this community is in Swat, where it is surrounded by Torwali-speaking people. The Ushojo-speaking people must have come to Swat several hundreds of years ago from the Shina-speaking part of Indus Kohistan. The question as to what has happened with their tone system in the last few hundred years is intriguing. Does it still look like a Shina-type system? Does it begin to look like a Kalami-type system under the influence of their Torwali neighbours? Or is there a third type of development? This is a question that is worthy of further study.

Linguistic analysis

In order to gain a deeper understanding of how these tone systems work, a number of building blocks need to be put into place.

Firstly, we need to understand the distinction between *segmental features* on the one hand and *tonal features* on the other hand. Simply stated, segmental features are properties of the vowels and consonants that make up a word. Tonal features, on the other hand, are properties of the melody or pitch pattern with which a word is pronounced. Segmental features and tonal features occur simultaneously. We can think of this as two streams of information that occur at the same time, where the tonal stream is mostly controlled by the vocal cords which are located in the larynx, while the segmental stream is mostly controlled by the shape and position of the articulators (tongue, lips, teeth, etc.). One task of the analysis is to describe how these two streams of information are synchronized, that is, how they are aligned with one another in time.

The segmental stream can be chopped up into syllables. A *syllable* is a part of a word that consists of a vowel and any number of preceding and following consonants that are pronounced as one unit with that vowel. For instance, the Punjabi word *kooṛaa* ‘whip’ consists of two syllables, *koo-ṛaa*.

When a word consists of more than one syllable, one of the syllables usually stands out as being louder and more prominent than the other syllables. This is called *stress*, and the most prominent syllable of a word is called the *stressed syllable*.

The most basic observation for all the tone languages of northern Pakistan is that the tone features are associated with the stressed syllable.

The pitch patterns that are characteristic of one tone or another, occur on or near the stressed syllable.

In order to be able to state things more precisely, we need to break down the concept of the syllable, as well as the concept of the melody or pitch pattern of a word.

As to syllables, we need to make a distinction between *short syllables* and *long syllables*. A short syllable is a syllable that ends in a short vowel, such as *ta*, *ti*, or *tu*. A long syllable is a syllable that ends in a long vowel, e.g. *taa*, *tii*, *tuu*, or a syllable that consists of a vowel followed by one or more consonants in the same syllable, e.g. *tak*, *tik*, *taak*, *tiik*, *tart*.

We will say that a short syllable consists of one timing unit, or *mora*, and that a long syllable consists of two timing units, that is, of two moras.

The length of the syllable is a factor in determining the location of stress in a word. Generally speaking, long syllables are more likely to be stressed than short syllables.

We have now broken down the segmental stream into syllables, and the syllables, in turn, into moras (timing units), and we have said that long syllables consist of two moras while short syllables consist of only one mora.

Now we are going to break down the pitch patterns of words into smaller units. These smaller units are the tone elements, of which there are two: *L* and *H*. The symbol *L* stands for relatively low pitch, that is, a pitch level that is lower than the surrounding pitch levels in the word. In the same way, the symbol *H* stands for relatively high pitch (a pitch level that is higher than the surrounding pitches in the word).

A falling pitch can be broken down into a sequence of *H* and *L*. In other words, a pitch fall is seen as a high pitch level, followed by a low pitch level. Similarly, a rising pitch can be broken down into a sequence of *L* and *H*.

One more concept needs to be introduced at this point. In linguistics, we often describe things in terms of the following formula:

underlying form + rules → *surface form*

This means that we often analyse the form of a word that we actually hear as being the result of applying rules to an underlying form. These rules allow us to state things that are generally true for all the words in a certain language, or for a certain subset of the words of a language. An example of such a rule for a certain language might be: “A stressed syllable is always associated with a relatively high pitch.”

The analysis of Shina-type languages

Now that we have the machinery in place, we can begin the analysis of the three types of tone languages that were mentioned above.

As we have seen, in Shina-type tone languages the surface form of words can have two pitch patterns, namely either high-falling, or low-rising. One can say, then, that on the surface there are two distinctive tones in Shina-type languages. However, according to the analysis of several linguists (see Schmidt & Kohistani 1998: 125-134, Radloff 1999: 83-88, and references cited by them), the underlying forms of the words have no tone at all. The tones that show up at the surface are supplied by rules.

What we need to assume for Shina-type languages is that stress applies to the mora. Stress is assigned to one of the moras of the word. So what we have underlyingly may be represented as follows (in the Shina examples, the acute accent indicates the location of stress):

- (7) káči ‘near’ kač́í ‘scissors’
 káam ‘relative’ kaám ‘a vegetable’

Furthermore we assume that there is a rule that associates a H tone with a stressed mora. When you apply that rule, the result is as in (8), where the tone symbol is written directly under the vowel with which it is associated.

- (8) k á č i ka č ́ í k á a m ka á m
 H H H H

In addition, there is a rule that associates a L tone with the other moras. The result of that further rule is illustrated in (9).

- (9) k á č i ka č ́ í k á a m ka á m
 H L L H HL LH

In summary we can say about Shina-type languages that underlyingly, only stress is marked, and the relevant domain for stress is the mora. In the underlying forms, there are no tones. The tones that we hear on the surface are supplied by rules.

The analysis of Punjabi-type languages

In Punjabi-type languages, the domain of stress is the syllable. Furthermore, a L tone may or may not be pre-associated with a mora somewhere in the underlying form of the word. Look at the examples in (10), where the first word ('whip') has no underlying tone, while the second word ('horse') has an underlying L tone associated with the first mora of the stressed syllable, and the third word ('leprosy patient') has an underlying L tone associated with the first mora following the stressed syllable.

(10) 'kooṛaa 'kooṛaa 'kooṛaa
 L L

Next, there is a rule that associates a H tone with the moras of a stressed syllable that are not yet associated with a tone symbol. That rule results in (11).

(11) 'kooṛaa 'kooṛaa 'kooṛaa
 HH LH HH L

What we see as a result of applying the rule to the underlying forms, are the three melodies mentioned before for Punjabi, namely level (H only), rising (first L, then H), and falling (first H, then L). While there are three patterns at the surface, underlyingly only one tone is relevant, namely L.

(Matters in Punjabi are, of course, much more complex than described here, as there is a wide variety of phonetic realizations of the tones across dialects, see e.g. Bhatia 1975: 23. I would suspect, though, that most of these realizations can be derived by further rules from underlying forms of the type illustrated in (10). An example of such an analysis can be seen in Losey 2002: Ch. 3 for Gojri (Gujari); Gojri is not itself a dialect of Punjabi, but its tone system is clearly of the Punjabi type.)

The analysis of Kalami-type languages

Kalami-type languages have four distinctive pitch patterns on the surface, namely low-level, high-level, falling and rising. (Kalami itself has in fact two types of falling pitch patterns, but the difference between them is a matter of timing; melodically they are the same.)

In order to be able to generate that many surface patterns, we must assume that both H and L can occur in the underlying forms. (For an analysis of Kalami tone, see Baart 1997: 40-49 and 1999. For Torwali tone, see Lunsford 2001: 34-36.)

An alternative characterization, then, of the three types of tone languages under discussion is as follows:

- *Shina-type (no underlying tone)*
- *Punjabi-type (1 underlying tone)*
- *Kalami-type (2 underlying tones)*

Implications for writing

One of the interesting aspects of the linguistic analysis is that it creates more options for marking tone in writing systems for the languages. In writing, one can choose to mark the surface pitch patterns, but another option is to mark the underlying tones.

For instance, Punjabi has three distinctive pitch patterns on the surface. However, in underlying forms of Punjabi words, only one tone is relevant. So, if you want to write surface pitch patterns, you need three different symbols to mark each one of them. If you write underlying tones, you need only one symbol in Punjabi-type languages.

Interestingly, the tone-marking system that is actually being used in Punjabi writings (in Perso-Arabic script) comes very close to marking underlying tone, rather than marking surface pitch patterns. Simplifying things a bit, the letter *he* is used to mark the underlying L tone. Actually, the *he* may take different forms (*allographs*) because of etymological considerations (*do-chashmi he* in some cases, *chhoti he* and *bari he* in other cases), but we can ignore that for the time being. When *he* precedes the stressed vowel of a word, it marks a L tone that is pre-associated with the first mora of that stressed vowel. On the surface, this

results in a low-rising pitch pattern. When *he* follows the stressed vowel of a word, it marks a L tone that is pre-associated with the first mora *after* the stressed vowel. On the surface, that results in a high-falling pattern.

The examples in (12) illustrate this principle in an interesting way (see Joshi 1973: 27-8 for a discussion of tone in similar pairs of verbs). In both words, the tone marker is the *do-chashmi he* that is following the *Re*. However, the first word has a high-falling tone, and the second word has a low-rising tone. On the surface, then, there are two distinct tones. But in the written forms, only one tone marker is used (the *he*). That is possible because of the fact that the tone marker marks the underlying tone (L), rather than the surface tones. What the reader needs to know is that the underlying tone is interpreted according to its position with respect to the stressed syllable, along the lines of the principle explained above. (Of course, the reader also needs to know which syllable is the stressed one; the location of stress, however, is predictable from segmental structure for most Punjabi words.)

(12) پڑھنا pāṛṇaa (high-falling) ‘to read’

 پڑھاڻا paṛàṇaa (low-rising) ‘to teach’

Conclusion

It is sometimes thought that Punjabi (and its related dialects) is the only tone language among the currently-spoken Indo-Aryan languages (for an example, see Bhatia 1993: 343). We have seen that probably a majority of the languages of northern Pakistan are tone languages, and most of these are Indo-Aryan. I classified these tone languages into three groups on the basis of the number of tonal contrasts. The geographical distribution of these three groups suggests that language contact is the overriding factor in determining the development of tone systems. In the final part of this paper, I briefly sketched an approach to the linguistic analysis of these tone systems and discussed some implications for writing systems.

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