

Questions for a round table on "Tone and Intonation"

Annie Rialland

Laboratoire de phonétique et phonologie
UMR 7018, CNRS-Université de la Sorbonne-Nouvelle,
Paris (France)
rialland@idf.ext.jussieu.fr

Abstract

This paper introduces questions to be discussed in a round-table on "Tone and intonation". Considering the state of the art, we propose the following topics:

- Downstep preplanning and downstep patterns
- Question prosody and prosodic universals,
- Focus prosody and prosodic universals,
- "Boundary tones", "intonational tails" and "particles"

1. Introduction

Intonation in tone languages "sneaks" into leeway left by tonal systems and tone realizations. In tone languages, intonation varies depending upon tonal systems and constraints that they impose. Currently, there is little data on intonation on most tone languages of the world and the variety of intonation patterns and their combinations with tone are far from being known. As an Africanist, we have often noted this lack of data. For example, when we began to work on Wolof, one of the major language of West Africa, we found no study of intonation in this language. We have also discovered that the variety of intonation patterns is greater than what would be expected based on better-known languages (see Rialland 2006 for a review of the large range of prosodic questions markers found in Africa). Thus, we are aware that our discussion of "Tone and Intonation" will be based on very incomplete data.

Considering the current state of the art, we have selected the following topics :

- Downstep preplanning and downstepping patterns
- Question prosody and prosodic universals,
- Focus prosody and prosodic universals,
- "Boundary tones", "intonational tails" and "particles"

2. Downstep preplanning and downstepping patterns

The notion of "downstep" is more than a century old (see Christaller 1875, p. 15: "high tone abating by one

step or successive steps"). The phonological nature of downstep and its phonetic implementation still constitutes an important topic in the study of tone languages. We will consider two issues concerning downstep: 1) the relationship between downstep and preplanning, 2) "exponential" downstep and other downstepping patterns.

2.1. Downstep and preplanning

Downstep has been quite generally viewed as a progressive mechanism involving no anticipation. In some models, the realization of each tone is calculated implicitly or explicitly on the basis of the immediately preceding tone (cf. Schachter and Fromkin 1968, Pierrehumbert 1981). In models making use of register, lowering coefficients are assigned based on the immediately preceding register (Clements 1979, Huang 1980). In structures with "nested" downsteps, the tone realization refers to higher levels of organization (Ladd 1996). In all these approaches and calculations, downstep is viewed as a progressive lowering process.

However, it has been found that downstep (or downdrift, that is, "automatic downstep") not only operates progressively, but may imply the raising of preceding tones (see Paulian 1974 on Kukuya and Rialland 1981 in Gulmancema for early work, as well as Gandour et al. 1994 on Thai and Xu 1999 on Chinese). An anticipatory raising component can also be recognized in Japanese downstep (Kubozono 1993, Rialland 2001). Some writers have reported the creation of supra-high tones or upsteps linked to downsteps and floating low tones (see Hyman 1993 and Rialland 1981). In an overview of these phenomena (Rialland 2001), we raised the question whether anticipatory raising might (at least locally) be universal in downstep realization.

Moreover, non local-preplanning effects have been found in some African languages. Thus, Laniran and Clements (2003), examining the strategies used to economize pitch space in long downstepping sequences in Yoruba (a three-level tone language), found that the main strategy used by all speakers is H tone resetting, but that some speakers raise "H tones to extra-high values in anticipation of downsteps occurring four

syllables away." Long-distance preplanning in downstep realization has also been found in Dagara, a two-tone African language spoken in Burkina, whose downsteps are due to both linked and floating L tones (see Rialland and Some, 1998 and in preparation).

It is important to note that in Yoruba and in Dagara, H tone sequences are realized rather flat (with some final lowering) and do not exhibit any kind of anticipatory raising when they get longer. Thus, we think that the anticipatory raising determined by downstep implementation has to be clearly distinguished from raising due to the length of the utterance. The second type of raising occurs in Chinese; for example, Shih (1997) shows how the pitch at the beginning of all-H sentences increases with the length of the utterance (unlike what has been observed in Yoruba and Dagara). Similar types of preplanning triggered by the length of the utterance (sometimes called "soft preplanning") have also been documented in non-tonal languages such as Dutch, Danish, Italian, Spanish and Portuguese (see Prieto et al. (to appear) for Romance languages). However, as utterances recorded for these studies are generally downstepping (they are all downstepping in Danish, according to Thorsen's data, 1983), and as their length is generally calculated in terms of the number of accented groups they contain (each of them triggering a downstep), it is difficult to separate what, in these languages, is due to "downstep anticipation" and what is due to "length anticipation".

Thus, the general questions which seem worth discussing currently are the following:

- Is local anticipatory raising a universal of downstep realization?
- Does preplanning vary depending upon the tonal system? And how?
- What is the respective role of utterance length and the number of downsteps in triggering various types of anticipatory raising?

2.2. "Exponential" patterns of downstepping and others types of patterns

In "exponential" patterns of downstepping, the downstep interval becomes progressively smaller across the downstep span, showing an exponential decay tending towards an asymptote. This type of downstep was first found in English by Pierrehumbert and Liberman (1984), who proposed the following formula to account for it: $H_n = d(H_{n-1} - r) + r$, in which H_{n-1} is the value of the preceding H, d , the downstep coefficient and r the value of the reference line. This type of model seems to provide a good fit to other non-tonal languages, such as Spanish (Prieto, Shih, and Nibert 1996), as well.

However, non-exponential downsteps have been signalled in tone languages such as Mandarin (Xu

1997), Yoruba (Laniran and Clements 2003), Dagara (Rialland and Somé 1998), and Swedish (Bruce 1982), among others). Thus, Clements and Laniran (2003) showed that in one type of Yoruba pattern, downstepping H tones do not fall exponentially but drop by two or three equal steps before resetting takes place.

Another type of pattern showing an "equal step tendency", at least for some speakers, has been found in the implementation of phonological downsteps triggered by floating L tone in Dagara (Rialland and Some 1998).

At this point, the main questions which can be raised seem to be the following:

- what are the main types of downstep?
- what is the relationship between the downstep type and the tonal system it occurs in? For example, is the "equal step" type more typical of languages in which downstep is highly distinctive?

2. Question prosodies and prosodic universals

High-pitched question prosody is often considered as a (near-) universal (see Ohala 1983, for example). This universalist view can be traced back to Bolinger's article "Intonation across languages" (1978). The databases on which Bolinger's claim was based are Hermann (1942), containing 175 languages, and Ultan (1969) with 53 languages, to which 41, many of them Amerindian, were added by Bolinger. Later on, various authors made sporadic additions in the course of discussions of various topics in question prosody (see for example the discussion of Roermont Dutch and Chickasaw by Gussenhoven 2002).

In 2003 we decided to collect a data base on question prosody in African languages. Results based on a collection of 78 languages will be published in Rialland (2006) and Clements and Rialland (to appear). These results show that prosodic markers are quite diverse, and that non high-pitched prosodies are actually quite widespread in Africa.

The question prosodic markers that we found are the following :

HIGH-PITCHED YES/NO QUESTION MARKERS:

- 1) cancellation or reduction of downdrift, creating a progressive register expansion
- 2) raising of the last (not necessarily sentence-final) H tone(s)
- 3) cancellation or reduction of final lowering
- 4) final H tone or rising intonation (final H%)
- 5) final HL melody

NON-HIGH-PITCHED YES/NO QUESTION MARKERS:

- 6) final L tone or falling intonation (final L%)
- 7) final polar tone or M tone
- 8) lengthening
- 9) breathy termination

10 [open] vowel

These markers occur alone or in various combinations.

We found evidence for a "lax" question marker characterized by lengthening, breathy termination (opening of the glottis) and an [open] vowel, which appears to be at the origin of the various forms of low-toned and lax prosodies which are widespread across the Sudanic belt.

Existing crosslinguistic databases on question prosodies are clearly outdated and a new one is badly needed. Our African experience shows that there may be greater diversity than has been thought.

A presentation of question prosody markings in other languages belonging to other families would be welcome in this round-table.

3. Focus and prosodic universals

In many languages, whether tonal or not, the focus domain is associated with register expansion and the post-focus segment with register compression (examples include Chinese, Hausa, English, and French). Focus can also be marked by special pitch-accents (as in Portuguese, see Frota 2002). Prosodic phrasing is also widespread as a means to indicate the placement of focus. Thus in many Bantu languages, a Phonological Phrase boundary is inserted at the end of a focus domain. This boundary is characterized by various processes involving length or tones, such as penultimate lengthening, or tonal copying or spreading.

However, prosody is not always involved in the expression of focus. For example, in Wolof (which is not a tone language), informational as well as contrastive focus is expressed only by morphosyntactic means. There is no register expansion, no special pitch accent, and no prosodic phrasing associated with focus (Rialland and Robert 2001). Wolof might seem quite exceptional in this respect, but the apparent rarity of this type of system might be due to the glaring lack of intonational studies of African languages, as well as of languages from most other families.

In our view, questions of special interest concerning this topic are the following:

- Which languages do not have prosodic focus markers?
- What are the characteristics of these languages, in terms of the morphology and syntax of focus and in terms of their prosodic system?

4. "Boundary tones", "intonational tails" and "particles"

4.1. Differences between "boundary tones" and other tones

The difference between "boundary tones" and other types of tones is usually sought in terms of

function and position: non-boundary tones are lexical or grammatical in function and are borne by tone-bearing units anywhere in the utterance, while boundary tones, typically demarcative or illocutory in function, are found at boundaries.

The phonetic difference between boundary and non-boundary tones is quite clear in languages such as Gulmancema, a Gur language spoken in Burkina which has three level tones and downdrift. In this language, a rising intonation pattern is used to form one variety of yes/no questions. This pattern rises from the level of the last tone; thus, if the last tone is a H tone, the rise begins at the level of the H tone and ends at a supra-high level, as is illustrated by the following examples:

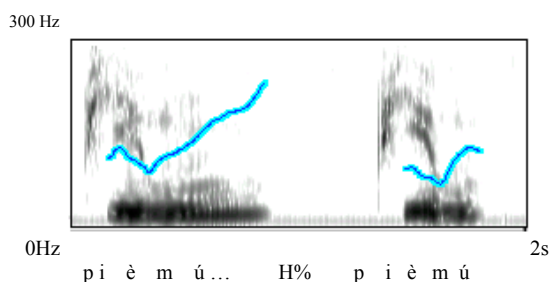


Figure 1. Spectrograms with superimposed pitch contours in Gulmancema: (left) *pièmú* H% 'an arrow?', (right) *pièmú* 'an arrow' (female speaker).

(Note also the substantial final lengthening in the question, indicated with suspension points (...), which is not triggered just by the presence of breathy termination; see Rialland to appear). The rising contour does not result from any lexical or grammatical tone. It can be analyzed as resulting from a "boundary tone" (H%, following the common autosegmental notation), which introduces an extra-high target at the end of the utterance. The extra-high quality of this type of boundary tone has also been found in other languages such as Chichewa (Myers 2004). In another type of question, Gulmancema has a falling intonation induced symmetrically by an extra-low "boundary" tone. Thus, the phonetic targets of "boundary tones" in this language are located out of the range of non-boundary tone realizations at the end of the utterance (whether lowered by downstep or not): they are either lower or higher. These extra-H and L "boundary tones" are in fact quite similar to "boundary" tones found in questions and statements in many non-tonal languages. For example, the L% of English has been shown to be realized as an extra-low tone (Maeda 1976).

Thus, a language such as Gulmancema reveals an interesting geometry in the distribution of the pitch range, with its extra-high and extra-low "boundary tone" targets placed in extreme positions outside the ordinary tonal range. Might this pattern be true of other languages, including non-tonal languages?

Gulmancema is just an example: the same issues can be considered in other tone languages:

- How are "boundary tones" characterized in terms of phonetic implementation, especially in terms of their phonetic targets?
- Are the differences between the "pitch accents" or phrase tones and the "boundary" tones in non tonal languages?
- How do "tones" and "boundary tones" share the overall "pitch space"?

4.2. "Intonational tails" and "particles"

Besides pitch characteristics, such sentence endings may be characterized by types of intonational phenomena other than boundary tones. Thus the questions to be considered are the following:

- What is the length and composition of the "intonational tail"?
- What voice qualities are involved in these endings?

We previously mentioned an African example of a complex intonational "tail": the "lax" question marker whose realization involves an open vowel (generally *a*), a breathy termination and a falling intonation. In many African languages, there are other types of intonational tails which can be quite long. In Tem, a Gur language spoken in Togo, they can extend up to 6 moras or more due to reduplication of some patterns, as illustrated by the following examples (Tchagbalaye 1976):

bòòbó? 'they went'
 bòòbòò 'they went, didn't they?'
 bòòbòòòòòò 'they went! (the poor guys)'

In the second and third examples the final vowel *o* is lengthened and carries intonational modulations.

These tails bear a variety of melodic patterns, whose realizations differ from that of successive tones. For example, in Tem, downstep does not apply in these tails.

The so-called "particles" of Asian languages would be interesting to compare with the intonational endings and "tails" of African languages, as they seem to display some similarities.

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