Prosodic boundaries and discourse structure in Kammu

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Abstract

The main function of sentence intonation in Kammu is to mark prosodic boundaries. There is no additional tonal marking of focus. It is of particular interest that the underlying intonation system is the same for both tonal (Northern Kammu) and non-tonal (Eastern Kammu) dialects. Prosodic boundaries in Kammu have three functions: they mark prosodic phrases, focus and speaker engagement. In this study we show that relationships between boundaries in terms of upstepping or its absence interact with information and discourse structure. This relationship has the same pattern in both tonal and non-tonal Kammu.

Introduction

Kammu is a Mon-Khmer language. It is spoken by some 600,000 people mainly in Northern Laos, but also in adjacent areas of Vietnam and Thailand. One of the main dialects of this language is a tone language of the 'East Asian' type with (high or low) tone on each syllable, while the other main dialect lacks lexical tones.

The origin of the tones of the tonal dialect is due to the development of high pitch in vowels following a voiceless consonant and low pitch in vowels following a voiced consonant, and the subsequent merger of voiceless and voiced consonants into the unmarked member of the pair, voiceless for stops and voiced for sonorants. Thus, *puuc* 'to undress' became *púuc* (high tone) in the tonal dialect and *buuc* 'wine' became *pùuc* (low tone). The non-tonal dialect kept the original forms unchanged. Other differences, phonological, morphological or syntactic, between the dialects are marginal, and speakers of different dialects understand each other without difficulty (Svantesson 1983; Svantesson & House 2006).

The main function of sentence intonation in Kammu is to mark prosodic boundaries. Phrase boundaries occur at the right edge of each prosodic phrase and are realised by a high (or high falling) pitch. The focused word is by default placed at the end of an utterance coinciding with the place of the boundary tone, and the pitch of the phrase boundary tone is raised. There is thus no additional tonal gesture for focal accent. In the tonal dialect lexical tones do not change the phrase pattern, and we still find the high boundary tone at the right edge of prosodic groups unless it jeopardises the identity of the lexical tones (Karlsson et al. 2012).

Research questions and method

In Kammu, phrase boundaries between utterances said in isolation tend to be up-stepped. Informal observations of spontaneous narratives indicate that besides upstepping of phrase boundaries within an utterance there is also upstepping between boundaries of utterances. The upstepping occurs up to a certain point and then the same pattern repeats again. These turning points seem to occur at thematically similar places in narratives for all our speakers. Our goal is to find out whether these turning points are related to discourse structure. The main assumption is that tonal phrase boundaries in Kammu are multifunctional. They reflect prosodic phrasing, information structure and

discourse structure. First, we assume that information structure is reflected by upstepping of phrase boundaries. The utterance final boundary is the highest one as a reflection of default placement of the focused word (or 'new' information) at the end of an utterance. Second, we assume that the long-term relations between utterance boundaries reflect discourse structure.

In our analysis we distinguish between information structure and discourse structure. Narratives are divided into [given + new] units, called major phrases. As the information becomes given a new major phrase starts. Each major phrase consists of at least one minor phrase. Minor phrases are defined on prosodic grounds. We recognise a group as a minor phrase if it has a prosodic boundary (high or high falling pitch) at its right edge. Discourse topics are recognised on semantic grounds; this is described below. The F0 contour of a part of a narrative with its division into minor and major phrases and topics is shown in Figure 1.

Recordings of four speakers (all men) of the non-tonal dialect and six speakers (four women and two men) of the tonal dialect of Kammu were used for this investigation. They recorded spontaneous accounts of rice growing, from the beginning of the work in the field until the rice is cooked and eaten. All speakers are well acquainted with this process and their accounts are very similar. Thus, we got fairly homogeneous spoken texts lasting about 2–5 minutes each. The narratives were transcribed and glossed by a native speaker of Kammu.

Analysis

Information structure

Structuring of new and old information is achieved in the same way by all speakers: new information is placed at the end of the utterance; it is then repeated in the next utterance and is followed by new information. The informational structuring is [anchor + new_1] [old new_1 + new_2] [old new_2 + new_3]… The new information becomes an anchor point (old information) in the next utterance. There are thus a lot of repeated words in the speakers' monologues, and anaphoric reference is seldom used. An example is (only key events are included):

Before there is rice we have to clear the field… After clearing the field we burn the field… After burning we sow.[1]

The text can thus be seen as a list of successive events. Some speakers use only one utterance per event while some add a lot of additional information.

In order to test our hypothesis that each informational unit [given + new], i.e. major phrase, is reflected in the tonal structure by upstepping of boundary tones, we made two kinds of analysis. First, we divided narratives into phrases on prosodic grounds. This was done by perceptual and visual analysis of the F0 contours using *Praat*. Each unit ending with a prosodic boundary tone was labelled as a minor phrase and the F0 maximum on the last word was measured. Second, we performed an analysis of the informational flow in narratives in terms of 'new' and 'given'. Each unit consisting of 'given + new' is labelled as a major phrase. Thus, the division is:

[[minor phrase]$_{boundary1}$ [minor phrase]$_{boundary2}$ [minor phrase]$_{boundary3}$] major phrase]$_{boundary4}$.

Each major phrase consists of at least one minor phrase. The boundary of the last minor phrase is also the boundary of the whole major phrase. We expect the F0 maxima of boundary tones to be upstepped with the highest F0 at the boundary of the major phrase (boundary 4 in the example above).

[1] Kammu people practice slash-and-burn agriculture.

Division of narrative into topics

A discourse topic is seen as an informatively coherent part of discourse with a clear beginning and end (see e.g. Chafe 2001). As we are dealing with narratives about a traditional activity we used the Kammu agricultural calendar compiled by Damrong Tayanin: http://digaaa.humlab.lu.se/digaaa/web/kammu/KamRaw/kammu1.html.

The agricultural periods are:

1) Clearing, 2) First burning, 3) Second burning, 4) Sowing, 5) First weeding, 6) Second weeding, 7) Third weeding, 8) Harvest, 9) Finishing off the year, 10) Cold season.

Having these as our reference frame for division into thematic topics we found that all speakers have the following topics:

1) Clearing, 2) First and second burning, 3) Sowing, 4) Weeding, 5) Ripe rice, 6) Harvest, 7) Putting in barns, 8) Pounding rice, 9) Soaking rice, 10) Cooking rice, 11) Eating rice.

Some speakers have additional topics, such as making field houses, protecting crops from animals or different ways to cook rice. We chose only topics that were found for most speakers: all topics except (5) and (7) occur for all speakers.

As phrase boundary tones in Kammu convey several functions, we assume that they also interplay with discourse structure. As we observe upstepping of boundary tones within major phrases as a cue for their boundaries, we assume that also the end of topics will be marked by a higher boundary.

Results

Final boundaries of major phrases

In order to find out whether the general pattern is that F0 is rising in major phrases, we measured the F0 maximum of the last word of each major phrase and of each minor phrase within the major phrases. As a measure of the F0 rise within a major phrase we took the difference between F0 of the major phrase and the mean of the F0 values of the (non-final) minor phrases that constitute the major phrase. For each speaker we thus obtained a number of differences which should be positive if the hypothesis that F0 increases in a major phrase is true.

To test this hypothesis we used an exact binomial test for each speaker based on the number of positive and negative differences. For tonal speakers, the influence of the tones was compensated for by adding the mean F0 difference between the high and low tone in the measured words for that speaker to the F0 value of the maximum measured in each word with low lexical tone.

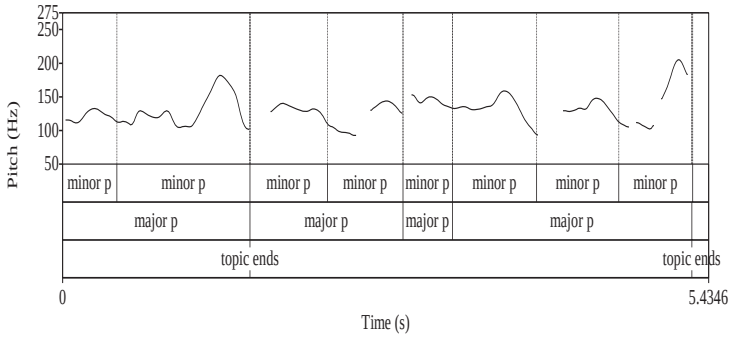

Figure 1. Part of a narrative and its division into minor phrases, major phrases and topics. Non-tonal speaker. Glossing is [[go mark]$_{\text{minor phrase}}$ [we finish then clear]$_{\text{minor phrase}}$]$_{\text{major phrase}}$]$_{\text{topic ends}}$ [[clear]$_{\text{minor phrase}}$ [finish then dry]$_{\text{minor phrase}}$]$_{\text{major phrase}}$ [[cut tree]$_{\text{minor phrase}}$]$_{\text{major phrase}}$ [[that one month]$_{\text{minor phrase}}$ [two months]$_{\text{minor phrase}}$ [finish then burn]$_{\text{minor phrase}}$]$_{\text{major phrase}}$]$_{\text{topic ends}}$.

The results are shown in Table 1. The tests show significant results (on the 5% level) for all speakers except Speaker 7 (non-tonal) and Speaker 18 (tonal), thus supporting our hypotheses for most speakers.

Boundaries of discourse topics

We tried to correlate the phrasing of the discourse with the local F0 maxima of the major phrases. In general there seems to be a tendency that local F0 maxima also serve as boundaries between discourse topics (in about 58% of the cases), but this is not always the case. The general trend of F0 maxima of boundary tones coinciding with the end of each topic is shown in Figure 2.

All speakers mark 'pounding' with the highest F0. After this point the general upstepping trend becomes opposite and we find downstepping between topics and also between boundaries of major phrases.

Table 1. The number of major phrases for which the difference between the F0 maximum of the major phrase and the mean F0 maxima of the constituent minor phrases is equal to, greater than or less than zero.

Non-tonal speakers:

Speaker	#Diff =0	#Diff >0	#Diff <0	*p*-value
1	0	15	0	<0.001
6	1	29	1	<0.001
7	0	9	3	0.07
8	0	20	4	<0.001

Tonal speakers

Speaker	#Diff =0	#Diff >0	#Diff <0	*p*-value
17	0	11	1	0.003
18	0	10	4	0.09
19	0	9	2	0.033
20	0	12	1	0.0017
21	0	9	1	0.01
26	1	5	0	0.03

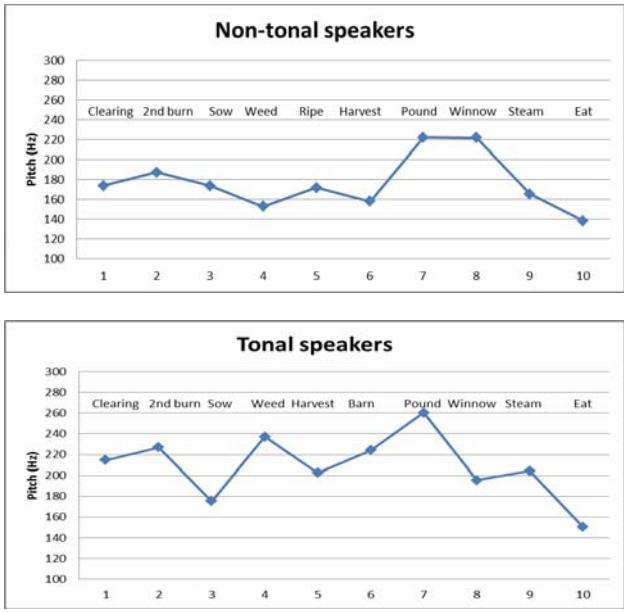

Figure 2. Mean of F0 maxima of topics

Discussion

Final boundaries of major phrases

Spontaneous discourse encompasses many factors that may influence tonal patterns, such as phrasing, focusing, turn-taking, speakers' attitudes and degrees of engagement, self-corrections, hesitations, etc.

Having investigated only one of these factors – topic marking – in our study, we have to keep in mind that our result may be influenced by all these factors. We chose to separate information structure and discourse structure in our study, which proved to be fruitful. Material was analysed by using three principles: prosodic analysis to extract tonal boundaries, analysis of informational status to detect major phrases and semantic analysis to decide topics. The three analyses were performed independently of each other and were then matched to see if our hypotheses are correct.

The division of narratives into information units [given + new] (major phrases) is reflected in prosodic phrasing by upstepping of boundary tones. We obtained statistical significance for both tonal and non-tonal speakers. As we move to discourse structure we can only talk about trends. All speakers mark the topic about pounding with the highest tonal boundary. Kammu speakers may see activities connected to rice as divided into two main parts: field work and cooking rice. Field work ends when one can pound the harvested and dried rice. Pounding is then the end of the first part of the narratives and is also marked by the highest boundary.

The end of other topics tends also to be tonally marked by a higher boundary. This trend is, however, broken by two main factors. The part after 'pounding', in which the rice is cooked and eaten, shows the opposite trend: boundaries of all units (both of major phrases and topics) tend to decline. Thus the end of discourse is marked by a long-term downtrend of prosodic boundaries.

Due to the character of the structure of the narratives, we assumed that topics are structured as [description + name of activity when it is finished]. For example, in

We go to seek a field, seek in the forest, after finding the field we clear

the part before *clear* will be the description, and *clear* is the name of the activity and its ending, coinciding with the end of the topic. However, in some cases we found another type of structuring of topics, when the topic is introduced at the beginning and then described, e.g.:

We seek a place we will clear, yes, seek the forest, look for a place that will be good for the rice and we clear.

Here, *clear* is introduced in the beginning as a new topic and its development comes afterwards. This kind of topic gets the highest F0 at the beginning of the topic instead of at the end.

Typological implication

As regards prosodic typology, Kammu belongs to the phrase language type in Féry's (2010) typology. In this type of language, information structure is most often conveyed by morpho-syntactic means, and focusing is achieved by changes in the pitch level of phrasing tones, dephrasing or insertion of a new boundary tone. No new pitch accents are added to mark a focused word as is the case in intonation languages. According to this description, major Indian languages as Hindi, Bengali, Tamil and Malayalam (Féry 2010), as well as Korean (Jun 2005), West Greenlandic (Arnhold, to appear) and Mongolian (Karlsson, to appear) are typical phrase languages. Kammu has one type of boundary tone realised with a high (or high falling) pitch. Boundaries are multifunctional and they convey phrasing, focus, engagement, and topic structure.

The occurrence of lexical tones does not lead to any differences, and we find the same strategies in conveying discourse structuring into topics in both tonal and non-tonal speakers.

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