

Some observations on the intonational phonology of Kuki Thaadow, a Tibeto-Burman tone language¹

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1 Introduction

The study of intonational phonology presents special problems in languages that use lexical tone. In such languages, pitch carries the double duty of maintaining lexical distinctions while also being manipulated in systematic and language-specific ways to convey pragmatic information. Given a single surface F0 contour, it is a non-trivial task to distinguish the pitch phenomena that are due to lexical tone from those that are due to intonational phonology. The task of analyzing intonational patterns is thus complicated since it is not immediately obvious which patterns one should be analyzing in the first place. Furthermore, one must also distinguish between phonological intonational phenomena and the gradient rules of their phonetic implementation, if one is to isolate the essential phonological patterns for purposes of cross-linguistic comparison - as is the aim of this paper.

This paper will offer a partial overview of some intonational phenomena in Kuki Thaadow, including the interaction of intonation with lexical tone, and some theoretical consequences resulting from the empirical investigation. Kuki Thaadow is a Tibeto-Burman language belonging to the northern part of the Kuki-Chin subgroup. According to the Ethnologue, it is spoken by about 150,000 people in Manipur State, India and in neighboring regions across the border in northwestern Myanmar. The speaker who was consulted and recorded for this paper is Vei Khaw Ning, from Myanmar, who was born in the village of Ley Vom Zang and moved as an adolescent to the nearby city of Homalin. She was a monolingual Kuki Thaadow speaker until the age of about 11, and is now fluent in Burmese, Falam Chin, Tedim Chin, and English, in addition to her native language. She has also lived in the Philippines and had been living and studying in the United States for several years at the time of this research, which was conducted in the context of a graduate Field Methods class at UC Berkeley.

The organization of the paper is as follows: Section 2 presents an overview of the basic lexical tone rules of Kuki Thaadow and the theoretical primitives I am assuming for the purpose of the analysis. Sections 3 through 5 survey the three intonational types that were examined: neutral, surprised, and angry intonation. Neutral and surprised intonation were examined in both statements and questions, while angry intonation was investigated in questions only. Section 6 reports on global patterns of declination and prosodic phrasing in a corpus of 14 traditional proverbs that were read at two different speeds (“slow” and “normal”). Finally, Section 7 summarizes the main points and offers directions for future research.

¹ Many thanks to Ning for her time, patience and enthusiasm. I am also grateful to Carlos Gussenhoven and Larry Hyman for helpful comments. I bear sole responsibility for any shortcomings and errors in this paper.

2 Tone in Kuki Thaadow

Monosyllabic words in isolation have three contrasting tone patterns: rising, high falling, and low falling. These can be analyzed as underlyingly H, HL, and L respectively (see Hyman 2005). I will assume that both H and L are specified in phonological representations. This assumption is open to further testing, of course.

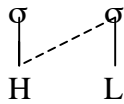
(1)	Underlying tone	Surface tone	Example
a.	H	Rising	vaa 'river'
b.	HL	High falling	ngaa 'fish'
c.	L	Low falling	naa 'leaf'

The most important tone concatenation rules are given in (2), following Hyman (2005):

- (2) a. Contour Simplification: delink the second tone of a contour (in non-final position) when it is followed by another syllable.



- b. H tone spreading: /H - L/ > H - HL



- c. L tone spreading (applies only phrase-finally or when the 3rd syllable is L)



- d. Downstep: /HL - HL/ > H - !HL

Some generalizations fall out from the rules in (2): contour tones are prohibited except in phrase-final position, with lexical tones tending to migrate rightward. At the lexical level, Kuki Thaadow is a two-level tone language, using High and Low. Additional levels come about postlexically through downstep processes. In this respect Kuki Thaadow resembles Hausa and a number of Bantu languages, while it is distinct from three-level languages such as Yoruba which have an underlying Mid tone that contrasts with High and Low.

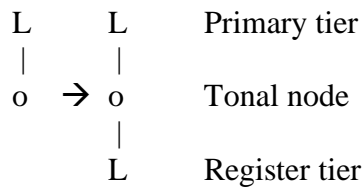
In my analysis of Kuki Thaadow, I will follow Pierrehumbert (1980) and others in using an autosegmental model of tone and intonation. In this model, High (H) and Low (L) tones occupy an independent phonological tier, and are linked to (aligned with) the

segmental tier through association rules. In a language like English, intonational primitives consist of elements such as *pitch accents*, which are H's, L's, and/or combinations thereof that are aligned with accented syllables, and *boundary tones*, tones that occur at the beginning or end of an intonational phrase. Myers (1996) has proposed that pitch accents and boundary tones reside on separate tiers and do not interact. This appears to be the case in Kuki-Thaadow, since downstep does not seem to apply to H% boundary tones.

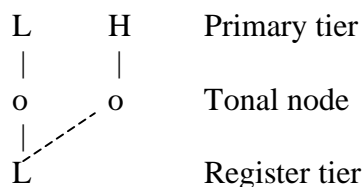
Kuki Thaadow differs from English in already having H's and L's specified lexically in the primary tonal tier. The intonational phonology does not appear (in the data examined here) to insert different-shaped pitch accents that override the lexical tones. Rather, Kuki Thaadow intonation seems to operate mainly through the addition of boundary tones and the manipulation of register, i.e. the pitch range that is utilized for the realization of lexical tones. I analyze Kuki Thaadow as having rules that insert register tones onto certain elements, such as focused elements.

To formalize register, I will use the *register tier* proposed in Inkelas and Leben (1990). In the model, the register tier is independent of the primary tonal tier where the lexical tones reside, but both tiers are linked to a single *tonal node*. A H(igh) tone in the register tier is an instruction to raise the pitch range, while a register L(ow) is an instruction to lower it. In (3) is an example of how downdrift is implemented in the Hausa analysis of Inkelas and Leben (1990:24). A L tone on the primary tier triggers insertion of L on the register tier, which then spreads rightward to the next tonal node.

(3) a. Register Low Insertion



b. Downdrift



It is worth clarifying my reasons for analyzing Kuki Thaadow intonation in terms of a phonological model rather than in terms of phonetic realization. As will be shown below, it is not the case that pitch contours are identical in shape across different intonational types. If the contour shapes retained the same proportions between peaks and valleys, differing only in magnitude, a phonetic analysis along the lines of gradient pitch range expansion would be in order. However, what appears to be happening is that changes in the pitch of certain words relative to the rest of the sentence result in a different contour shape. It is not appropriate to call this kind of “instruction to

raise/lower” a phonetic effect. Rather, inserted register tones might be considered the tone-language counterpart of pitch accents in non-tonal, single-tone-tier languages.

3 Neutral intonation

For the investigation of neutral intonation, the speaker read 9 yes-no questions and 9 statements twice each. The sentences were all of the form Object – Subject Person Clitic – Verb – Particle. Every tone combination of Objects and Verbs is represented in the statements; however, the use of Stem 2 in questions limited the number of available verb tones for questions. The sentences, with rough translations, are listed in (4). The copy that was given to the speaker to read did not have tone markings on it.

(4) Statements

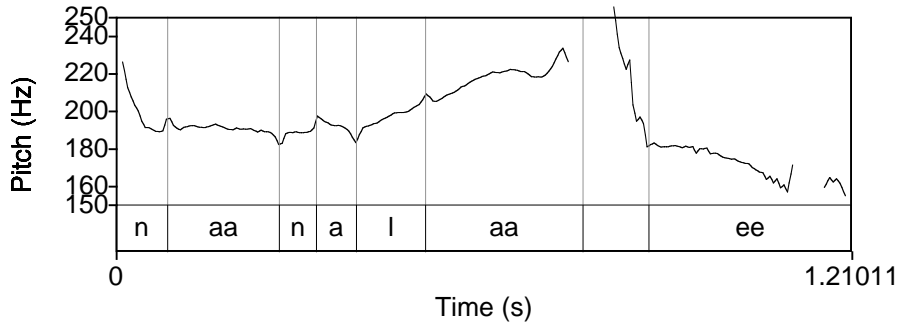
- | | | |
|----|-----------------|---|
| a. | váa nà vÉE êe | ‘You’re looking at a river.’ |
| b. | ngáa nà vÉE êe | ‘You’re looking at a fish.’ |
| c. | nàa nà vÉE êe | ‘You’re looking at a leaf.’ |
| d. | háa nà láa !êe | ‘You’re eating <i>haa</i> [a tuber vegetable].’ |
| e. | ngáa nà láa !êe | ‘You’re eating fish.’ |
| f. | nàa nà láa !êe | ‘You’re eating a leaf.’ |
| g. | váa ná mùu êe | ‘You see a river.’ |
| h. | ngáa !ná mùu êe | ‘You see a fish.’ |
| i. | nàa ná mùu êe | ‘You see a leaf.’ |

Questions

- | | | |
|----|-------------------|---------------------------|
| j. | vaa na vEt am oo | ‘Do you look at rivers?’ |
| k. | ngaa na vEt am oo | ‘Do you look at fish?’ |
| l. | naa na vEt am oo | ‘Do you look at leaves?’ |
| m. | haa na laq am oo | ‘Do you eat <i>haa</i> ?’ |
| n. | ngaa na laq am oo | ‘Do you eat fish?’ |
| o. | naa na laq am oo | ‘Do you eat leaves?’ |
| p. | vaa na muu am oo | ‘Do you see rivers?’ |
| q. | ngaa na muu am oo | ‘Do you see fish?’ |
| r. | naa na muu am oo | ‘Do you see leaves?’ |

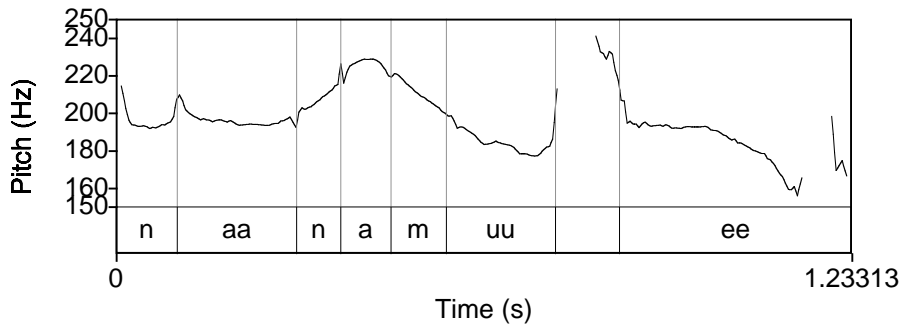
The main intonational feature found in “neutral” sentences was the lowering of the pitch range following a L tone – regardless of whether this L surfaces as an actual F0 valley, or whether it manifests itself only through a downstep on a following H. The latter scenario is the one referred to in the “Downstep” rule in (2). The lowering of the pitch range applies to both the topline and the baseline; that is, a L early on in the sentence will have a higher F0 than a L later on in the sentence.

(5) Downstep in HL + H → H + !H



nàa nà l^áa !êe
 leaf you take DECL
 'You eat leaves.'

(6) Downstep in H + L + H → H + L + H

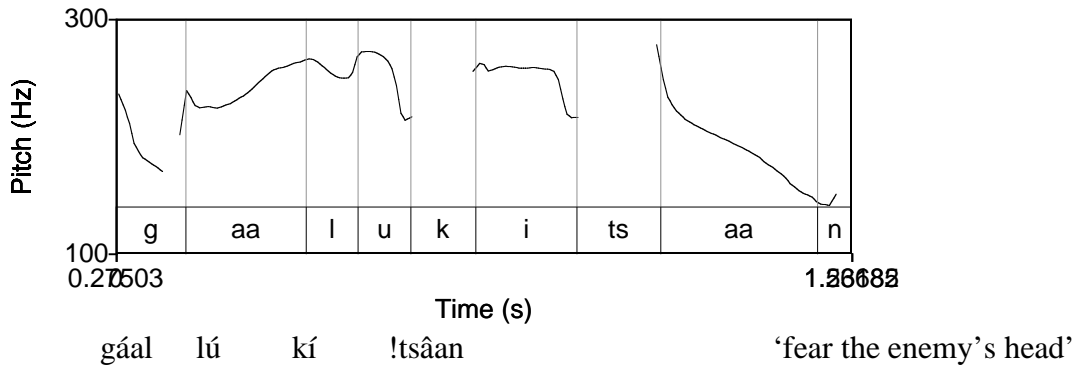


nàa ná mùu !êe
 leaf you see DECL
 'You see a leaf/leaves.'

When there is a sequence of successive H tones, as in (7), the F0 stays at a fairly constant level, with a slight amount of downdrift. Between *lu* and *ki* there is a drop of about 10 Hz. Comparing this to the 30-40 Hz drops between High and Downstepped High in (5) and (6), I am inclined to consider the downdrift in (7) to be a separate phenomenon from downstep, the former being phonetic and the latter being phonological. Thus in a sequence of H tones, there is phonetic downdrift, but no phonological downstep.

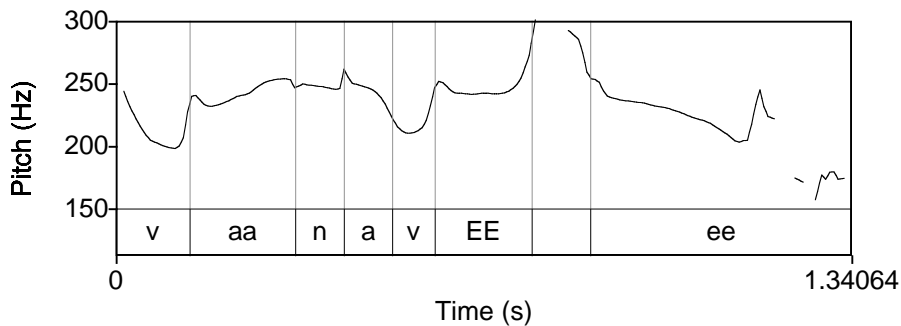
Note that downstep only applies to H tones; an L tone will not cause another L tone to be realized in a lower pitch range.

(7) Downdrift but no downstep in sequence of H's



One interesting finding is that in a sequence of High-tone object + subject clitic + High-tone verb, the tone of the clitic, which should be a polarity-induced L, instead appears to also be phonetically quite high. Furthermore, the pitch of *vEE* is not downstepped relative to the peak in *vaa* as we would expect if *na* had a L tone. However, a small amount of downdrift is apparent across *vaa na vEE* (one should disregard the pitch perturbations on the voiced consonants).

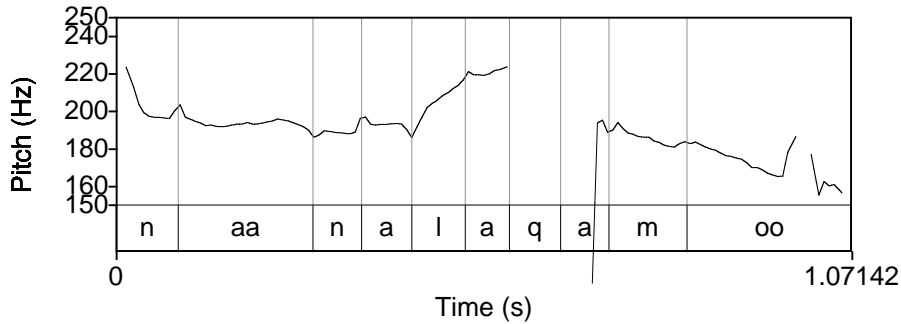
(8) Phonetically H subject-pronoun clitic that "should" be L



váa nà vÉE ée
river you look DECL

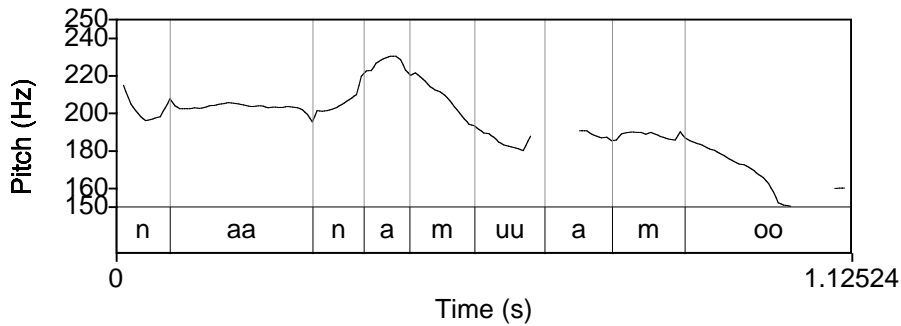
No readily apparent intonational differences were found between the yes-no questions and the statements. They both had a L% right boundary tone following the H + L sentence particle that is manifested as a falling tone on the statement particle, and a H + L sequence on the disyllabic question particle + emphasis particle group in questions. Also, the pitch ranges were virtually identical throughout in corresponding pairs of statements and questions. It seems that the morphosyntax, in the form of particles, is doing the bulk of the work in differentiating questions from statements in this context. However, intonational differences can often be quite subtle, so further testing would be needed to discern possible intonational differences between questions and statements.

(9) Yes-no question corresponding to (5)



nàa nà lác !ám òo
leaf you eat QU EMPH

(10) Yes-no question corresponding to (6)



nàa ná mùu ám !ôo
leaf you see QU EMPH

In addition, it seems possible to argue for the existence of an initial %L boundary tone, although it is not clear which contexts it appears in and whether or not it is sometimes optional. One piece of evidence is that the underlyingly HL word *ngaa* ‘fish’ is phonetically rising in many instances when it is in sentence-initial position, even though there is no lexical L tone to motivate starting anywhere other than the top of the pitch range. This is also apparent in the F0 contours of the initial, underlying H-tone words in examples (7) and (8).

4 Surprise intonation

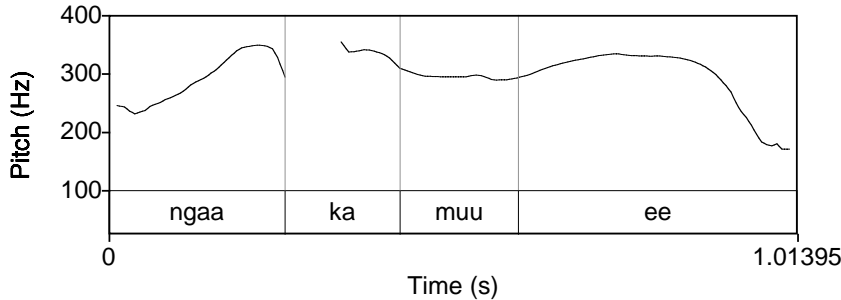
Surprise intonation (“Wow! Amazing!”) was examined in recordings of statements (4a-i) and questions similar to those in (4j-r) but with the particle *ham oo* instead of *am oo* (for pragmatic reasons which I will not go into here). Unlike with the neutral intonation, there are noticeable differences between surprise question and surprise statement intonation, despite the semi-redundant presence of disambiguating sentence-final particles. It must be that there is something special about the pragmatics of surprise in questions versus statements (e.g. tendency to shift focus from one element to another),

which triggers different intonational patterns (whereas neutral questions and statements lack the relevant difference).

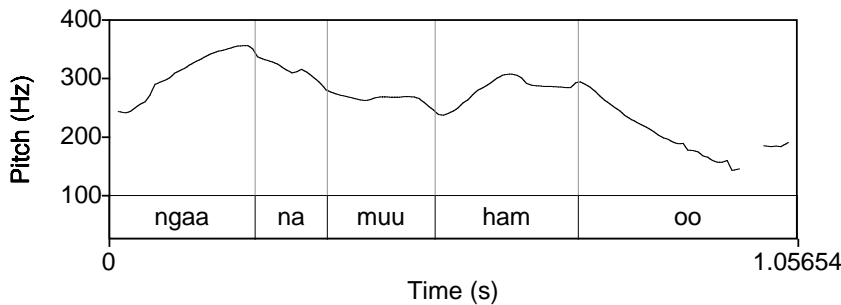
There are two features of surprise intonation that are common to questions and statements. The first is the raising of the overall pitch range. The second is the presence of the L% boundary tone, the same one used in neutral intonation. The main difference is that in statements, the raised pitch range is sustained through the sentence-final particle *ee*, with some apparent near-neutralization of downstepping, while the pitch range in questions also starts high but the H + L sentence-final particle undergoes downstep as normal so that the pitch range falls dramatically. However, there is one important caveat: the sentences tested were very short. If longer sentences are tested, it may turn out that some elements (e.g. non-focused ones) will show normal downstepping behavior even in surprise statements.

In (11a), the clitic *ka*, even though it should be phonologically downstepped, is not audibly lower than the preceding *ngaa*, which is underlyingly HL. When compared with a similar sentence using a H-tone word, where we do *not* expect a downstep, the pitch curves look virtually identical. However, this is not an absolute neutralization, since other repetitions of (11a) do show a noticeable downstep in the expected location. There seem to be conflicting pressures requiring downstep on the one hand, and maintenance of a high pitch register on the other. These conflicting pressures appear to give rise to variation.

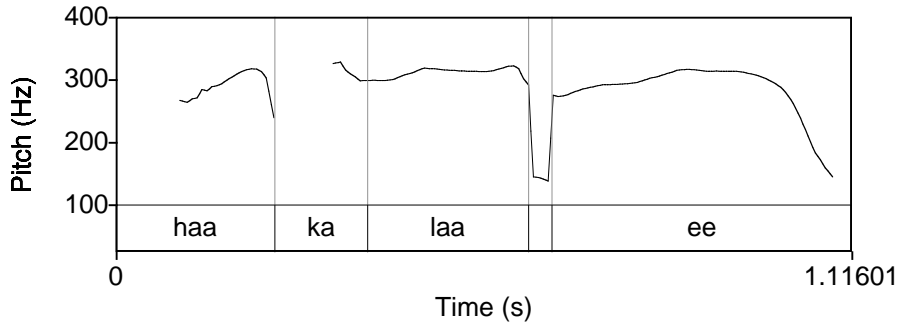
(11) a. Statement *ngáa !ká mùu êe* ‘I see a fish!!’



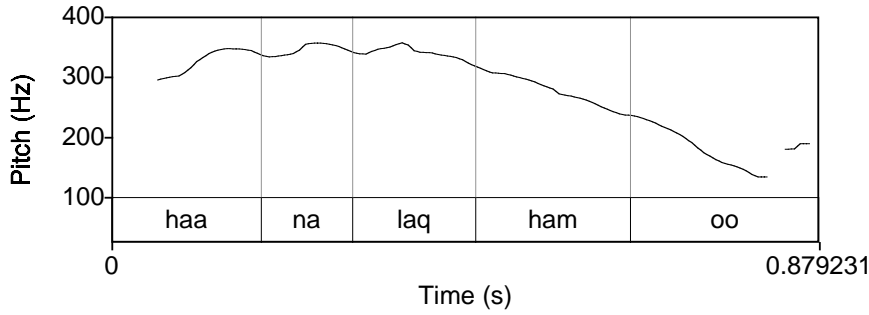
b. Question *ngáa !ná mùu háam ò* ‘Did you see the fish?!?!’



(12) a. Statement *háa kà láa !êe* 'I'm eating *háa*!!'



b. Question *háa kà láq !hám òo* 'Are you eating *háa*?!?!'



In both (11) and (12), the statements show a sustained high pitch range, whereas the questions drop the pitch range. As shown especially clearly in (12), this drop does not take place until the sentence-final particle. Note that (12) also shows the plateauing of the clitics *ka* and *na*, which are otherwise expected to be phonologically L. As for downstepping, the downstep between *laq* and *ham* is clearly realized in (12b). In (12a), the particle *ee* starts at a lower pitch level than *laa* but actually rises to nearly the same level as *laa*. It is possible that the rise serves to emphasize the particle. The other repetition of the same sentence, not shown here, lacked any kind of downstep whatsoever between *laa* and *ee*. I should repeat however that there was variation, and such downsteps were realized in some other surprise statements where they were expected.

There seem to be two main possibilities for an analysis of surprise intonation: a global analysis, involving raising of the pitch range for an entire span or domain by spreading a H tone along the register tier; or alternatively, local insertion of H tones on the register tiers of specific words. The advantage of the local analysis is that it predicts that raising of the pitch range is not all-or-nothing; it can account for the fact that question particles do not have raised pitch range by saying that they simply do not receive a register H tone. A global analysis may be able to do the same thing, as long as it does not define register-H-spread as unconditional. More investigation is needed to settle on the correct analysis.

5 Angry intonation

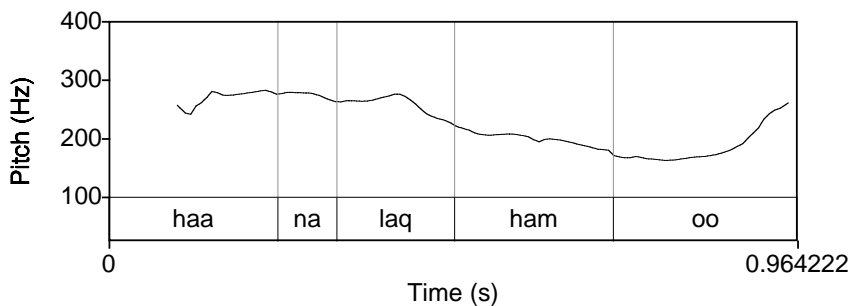
Two different kinds of angry intonation were collected, using questions only (the same ones used for the surprise intonation). The first can be called “displeasure” intonation, and the second might be labeled bona fide “anger” intonation. They have different characteristics but are described in the same section due to their pragmatic commonalities. “Displeasure” or “suspicion” intonation is used in situations where one suspects that someone has done something he or she was not supposed to do, and asks in an obviously displeased way whether the person has indeed done that action. “Angry” intonation seems to be used more to ask someone whether he or she has done something, while expressing anger at the idea that he or she might have done it.

Displeased-question intonation is very much like surprise-question intonation in that the pitch range is raised on all tones except the final sentence particle tones, which downstep (at least in the short sentences tested here). The major difference is the H% boundary tone, which causes the question to end in a pronounced rise. The boundary tone does not appear to interact with the lexical tones in that it can rise above previous H’s in the sentence, showing that it is not affected by L-induced downstep. Myers (1996) observes that Chichewa boundary tones also do not participate in “automatic” downstep, and proposes that they are on a separate tier from the lexical tones.

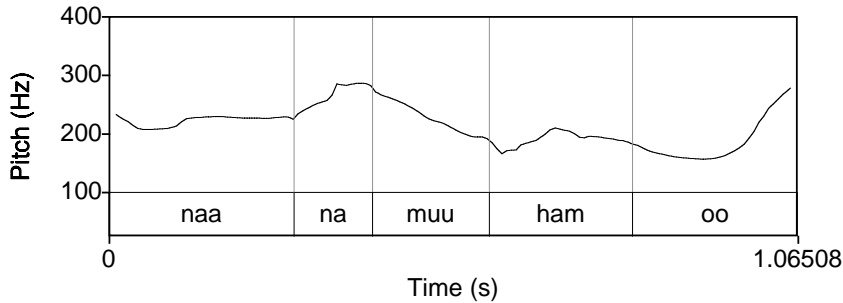
Myers (1996) also shows that in Chichewa, the amount of declination was proportional to the height of the boundary tone. In sentences with a H% boundary tone, there was not much overall declination/downdrift in F0 throughout the sentence, but in sentence with a L% boundary tone, F0 declined at a predictable, faster rate towards the low boundary tone. The displeased questions presented here, however, suggest that declination is independent of boundary tone in Kuki Thaadow, since F0 declines and dips quite low before the sharp rise to H%.

(13) Displeased questions

- a. *háa na láq !háam òo* ‘Did you eat the *haa*?’



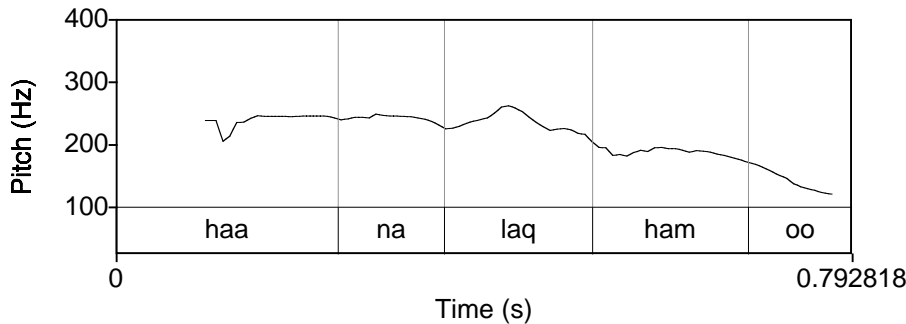
b. *nàa ná mùu hám ò* ‘Did you see the leaf?’



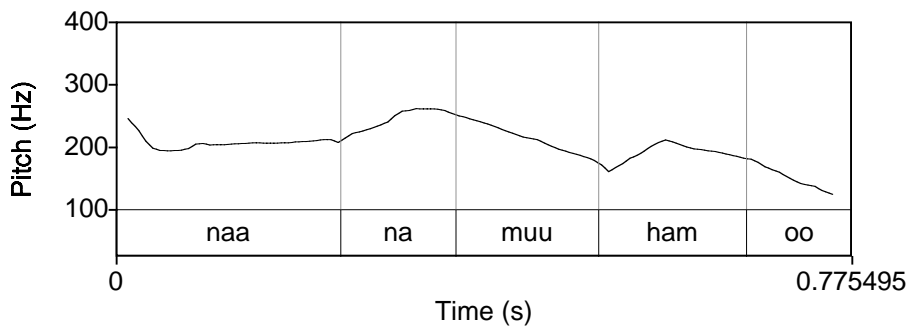
The “angry” questions contrast with the “displeased” questions in that they use a L% boundary tone. The angry questions were similar in intonation to neutral questions, with a slightly higher pitch range in some cases. As in some of the surprise questions, the final L% often dropped to a lower F0 than in neutral questions. Overall, the most salient characteristic was a very fast speech rate, with *ham oo* pronounced especially quickly.

(14) Angry questions

a. *háa na láq !hám ò* ‘Did you eat the *haa*?’



b. *nàa ná mùu hám ò* ‘Did you see the leaf?’



In general it is not completely clear how well the artificial recording situation succeeded in capturing intonational patterns as used in real situations, especially for the emotional anger intonations. After all, it is not easy to imagine being angry at someone for seeing a river. In the future, more plausible sentences could be constructed to elicit

stronger and more natural emotional response. However, the intonational patterns (neutral, incredulous, displeased, angry) did all differ from each other, so it seems that these differences do correspond to real types of variation in Kuki Thaadow intonation.

6 Global trends in slow versus fast speech

A separate topic I wanted to look into was the intonational differences in fast and slow speech. I could hear that there were differences in Ning's intonation at her natural rate of speech, as opposed to the hyperclear speech she used especially when we were trying to transcribe tone. Specifically, there seemed (impressionistically) to be fewer and/or smaller pitch excursions in fast speech; the F0 peaks and valleys seemed flattened out. The purpose of this section is to sort out the source of these impressions. Are there tonal neutralization rules in fast speech? Or is the "flattening out" effect due to something else?

The data used for this part of the investigation consist of 14 traditional Kuki Thaadow proverbs. I chose proverbs because of their extralinguistic value as windows into Thaadow culture, and because they seemed pragmatically rather uniform, as opposed to constructed sentences which could lead to inconsistencies if they were subconsciously associated with different pragmatic contexts and hence different intonational features. Each proverb was read a total of four times. Ning was instructed to read each one twice at a "slow, careful" speed, and twice at a "faster, natural" speed. The data were recorded into and analyzed in Praat.

One conclusion I came to after eyeballing the pitch curves was that the "flattening out" effect observed in fast speech can be seen, at least in declarative sentences, as an epiphenomenon due to differences in *prosodic phrasing* in slow versus fast speech. The same peaks and valleys are still there, but they are smaller (in terms of F0 excursion). This is because in faster speech, the entire sentence is treated as a single intonational phrase, and hence there is one steady declination spanning the entire sentence. If 6 or 7 different surface pitch levels (resulting from the 2 underlying pitch levels plus downstep processes) need to be accommodated in a single intonational phrase, there is necessarily a very small F0 difference between each level, since the overall pitch range is for physiological reasons not freely expandable. Conversely, at a slower rate of speech, the same sentence might be broken up into 2 or 3 separate intonational phrases, each with an identifiable boundary tone. Since the pitch level can be "reset" between intonational phrases, each phrase might only need to accommodate 2 to 3 surface pitch levels on a single declination slope, and the F0 differences between those levels can be made greater.

The picture is bound to end up being more complex than this, however. In (15), although there is a clear breaking up of the sentence into phrases, pitch is not obviously reset between the second and third phrases. Also, the second phrase starts at a lower F0 than the first one, leaving the question of whether there really is a pitch reset, or whether it is just that separate-phrase status has made *lowq* eligible to receive some kind of "pitch-accent" register H tone.

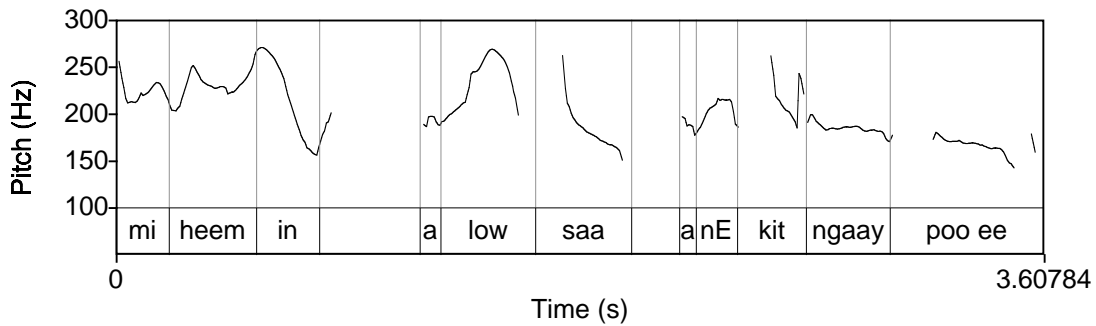
(15) Two renditions of *mii hèem in à lówq saa à nÉ !kít !ngáay !póo èe*

‘Humans [should] never re-eat that which they have already vomited.’

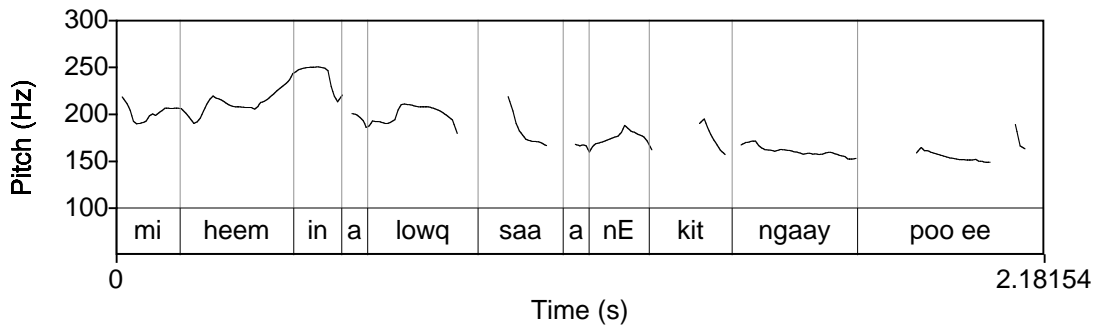
(meaning: You shouldn’t start to love something or do something again after you’ve already denounced it, hated it or given it up.)

mii heem	in	a lowq saa	a	nÉ	kit	ngaay	poo	ee
humans	ERG		3 rd	eat	again	never	NEG	DECL
		that which has been vomited						

a. Slow speech



b. Fast speech



On the other hand, (16) seems to be a more straightforward case of phrasal pitch reset in slow speech giving way to a gradual, steady declination over the whole sentence in fast speech.

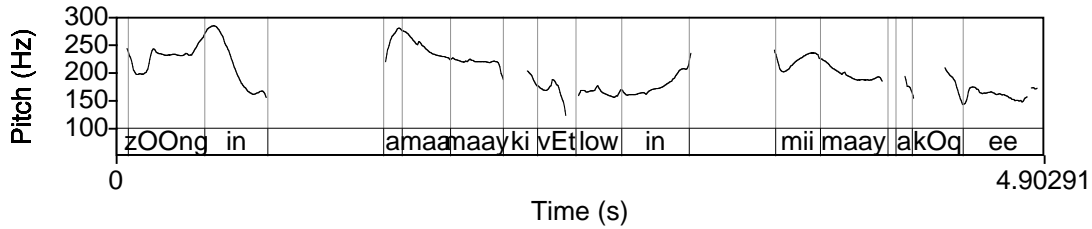
(16) Two renditions of *zÒOng ín á !máa máay kì vÈt lòw in mii !máay à kÓq !êe*

<i>zÒOng ín</i>	<i>á !máa máay</i>	<i>kì</i>	<i>vÈt</i>	<i>lòw</i>	<i>in</i>
monkey-ERG	his face	REFL	look	NEG	CONJ
<i>mii</i>	<i>!máay à</i>	<i>kÓq</i>	<i>!êe</i>		
people	face	3 rd	point	DECL	

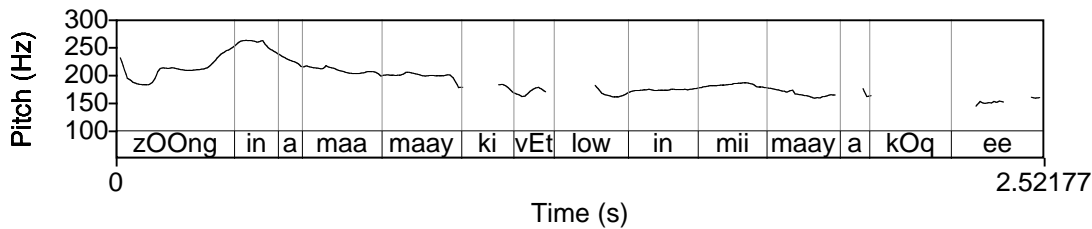
‘The monkey points at people’s faces, but doesn’t look at his own.’

(meaning: Nobody likes to acknowledge their own flaws, even if they’re quick to point out the same flaws in other people.)

a. Slow speech



b. Fast speech



Further study of longer sentences should shed light on the correct analyses for the patterns described above in shorter sentences.

7 Conclusion

In this paper, I have presented basic data and preliminary conclusions on Kuki Thaadow intonation. Of the observations made here, two seem to be the most generally worthy of repetition: first, that Kuki Thaadow, as a tone language, tends to manipulate register rather than pitch shape or alignment for expressive intonational meaning. It may be possible to model this as insertion of tones onto a register tier, in much the same way as non-tonal languages like English insert tones onto a primary tonal tier. Boundary tones are also important to the intonational system. Secondly, it may be possible to analyze the language as having two coexisting but distinct declination processes: a phonological process of downstep, and a phonetic process of downdrift. Although a more comprehensive database will be required for a solid theoretical analysis of the patterns described, it is hoped that these results will provide a platform for further investigation.

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