

CHAPTER 4

SUPRASEGMENTAL PHONOLOGY

4.0 Introduction

This chapter describes the suprasegmental phonology. This description has three main parts: tone, stress, and intonation. Section 4.1 describes an auditory analysis of tone, Section 4.2 describes stress, and Section 4.3 describes intonation.

4.1 Tone

To define tone, Pike (1949:3) defines "a tonal language as a language having lexically significant, contrastive, but relative pitch on each syllable". Burquest (1993:186) also asserts that "languages which make use of differences in pitch to differentiate lexical items are commonly referred to as tone languages."

Based on the two proposals above, Falam is a tonal language that has contrastive lexical items. Tones associated with syllables spoken in isolation that preserve the most contrasts are considered the underlying tone in Falam following a typical order presented by Chen (2000:49). This analysis proposes that Falam has four contrastive tones, two level tones (low and high) and two contour tones (rising and falling). The four contrastive tones are shown in Figure 11 and Figure 12. Praat, a computerized program for phonetic analysis was used to identify the pitch contours of the tones. The frequency of a sound is measured in hertz (Hz) based upon the number of complete cycles of vibration of the vocal cords.

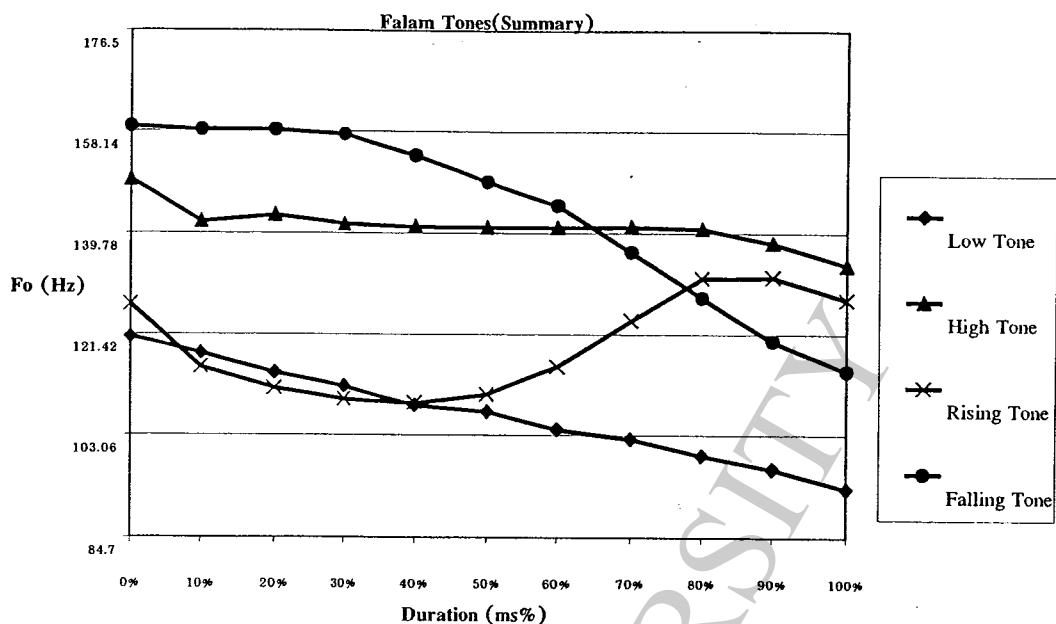


Figure 11. Falam tone contours²²

Tone 1	Low		[21]
Tone 2	High		[44]
Tone 3	Rising		[323/23]
Tone 4	Falling		[52/42]

Figure 12. Tone summary of Falam

The four contrastive tones will be described as follows:

The symbol 21 represents low tone as in /kum²¹/ 'year'. Phonetically the low tone starts at low pitch level 2, and falls slightly to level 1 at the end point. Since

²² Data for this contour analysis comes from a single speaker, and was sorted according to the author's native speaker intuition.

the duration of the 2 is extends to 70 % this analysis will specify 21 to represent low. This tone can occur in both open and closed syllables.

The tone symbol 44 represents high tone as in /jaan⁴⁴/ 'light (weight)'. Phonetically the high tone starts at pitch level 4 and slightly falls down to level 3 at its end point. Since the high tone has a quality of high pitch that is almost level, that is 90%, this will be analyzed as 44 phonemically. This tone can occur in both open and closed syllables.

The symbol 23 represents rising tone as in /jiin²³/ 'morning'. Phonetically it starts from the pitch level 3 and falls to low level 2 and then rises up to the mid level 3, which can be transcribed phonetically as 323. Since the range between the 3 falling to 2 is not wide, [323] will be simplified to 23 to represent rising tone in this analysis. This tone occurs in open and closed syllables.

The symbol 52 represents falling tone as in /k^haa⁵²/ 'bitter'. This tone falls from the high pitch level 5 to low level 2. This tone can occur in both open and closed syllables. In analyzing falling tone as an underlying tone in Falam, Yip's footnote (2003:11) on Zahao dialect also included that Falam has a HL (falling) as noted below:

The absence of surface HL in this language is mysterious, especially since the related Falam dialect has HL. Cross-linguistically, HL is more common than LH, yet Zahao has only LH. I must assume undominated HL, but the reasons are unclear. It is possible that Osburne failed to notice the HL, but she carefully notes that H is falling pre-pausally or under emphasis, and yet reports no H/HL contrast.

As seen in Yip's footnote, this analysis also finds that Falam has a falling tone with sufficient contrast to be a phonemic tone as will be demonstrated in Section 4.1.1. Luce (1954) identifies a high falling tone in his tone studies in Falam even though no further information is available.

Examples from tone descriptions demonstrate that the four lexical tonemes are not restricted to specific syllable types, nor to initial consonant types.

Table 8 below compares the inventory of Falam tone between Luce, Osburne, Van Kyi, and this analysis.

Number	Luce (1956:28)	Osburne (1975:7)	Van Kyi (2003:14)	Kharthuan (2007)
1	Mid falling	Low	Low level stop	Low
2	High	High	High level	High
3	Rising	Rising	Low rising	Rising
4	High falling	-	High falling	Falling
5	-	-	Low falling	-

Table 8. Falam tonal comparison with Luce, Osburne, and Van Kyi

4.1.1 Contrasts

A set of minimal pairs that demonstrates all four tone contrasts in Falam is rarely found. Mostly, each set of tones, and sometimes three tones, can be established with the following minimal pairs.

L /21/
 /um²¹/ ‘to take care (child/sick person)’
 /law²¹/ ‘negation marker’

H /44/
 /um⁴⁴/ ‘to exist’
 /law⁴⁴/ ‘farm’

H /44/
 /ləj⁴⁴/ ‘to buy’
 /jaaŋ⁴⁴/ ‘light (weigh)’
 /naa⁴⁴/ ‘buffalo’

LH /23/
 /ləj²³/ ‘tongue’
 /jaaŋ²³/ ‘back’
 /naa²³/ ‘to be sick’

L /21/
 /baaŋ²¹/ ‘to be tired’
 /t^haaw²¹/ ‘fat’
 /ŋaa²¹/ ‘work’

LH /23/
 /baaŋ²³/ ‘to stop’
 /t^haaw²³/ ‘to be fat’
 /ŋaa²³/ ‘ear’

LH /23/

/ṇii²³/ 'to laugh'

/ḍiṇ²³/ 'to stand'

/sia²³/ 'mython'

HL /52/

/ṇii⁵²/ 'loincloth'

/ḍiṇ⁵²/ 'to be straight'

/sia⁵²/ 'to be bad'

L /21/

/ṭii²¹/ 'to say'

/ruun²¹/ 'to save'

H /44/

/ṭii⁴⁴/ 'water'

/ruun⁴⁴/ 'group'

LH /23/

/ṭii²³/ 'egg'

/ruun²³/ 'house'

H /44/

/in⁴⁴/ 'house'

/baw⁴⁴/ 'to swell'

LH /23/

/in²³/ 'to drink'

/baw²³/ 'to exist'

HL /52/

/in⁵²/ 'ergative marker'

/baw⁵²/ 'to bark'

L /21/

/paa²¹/ 'male'

/jaa²¹/ 'a hundred'

H /44/

/paa⁴⁴/ 'mushroom'

/jaa⁴⁴/ 'to be ticklish'

LH /23/

/paa²³/ 'adverbial particle'

/jaa²³/ 'palm'

HL /52/

/paa⁵²/ 'father'

/jaa⁵²tuum²³/ 'wild goat'

4.1.3 Tone sandhi

According to Burquest (1993:195), "Tone sandhi²³ is a morphophonemic alternation among the tone phonemes of a language." Chen (2000:49) also notes that sandhi occurs because "tones associated with syllables in connected speech tend to merge." Falam also has a tonemic alternation that requires sandhi rules. This section presents tone sandhi that occurs in rising tone and falling tones. The

²³ This term came from Sanskrit (after the usage of the ancient Indian grammarians) *san* 'together' + *dhi* 'put' (L.Roger 1984:70).

sandhi form of tone will be marked with bold. Level tones (low and high) undergo no sandhi rule, but undergo tone alternations described in Section 5.2.2.

There is a tone sandhi rule which affects rising tone syllables ending with vowels (open syllables). The tone of such syllables is high and the vowel also becomes short in connected speech regardless of the tone of preceding or following syllables as in (26). Rising tone syllables retain their underlying tone in isolation or in sentence final position.

Rule: LH → H / _ T

(26) /t^hiⁱ23/ 'to die'

a²¹ t^hiⁱ23

1Sg. die

He died.

an⁴⁴ t^hiⁱ23

1Pl. die

They died.

a²¹ t^hiⁱ44 mɛɛn²³

1Sg. die merely

He merely died.

an⁴⁴ t^hiⁱ44 mɛɛn²³

1Pl. die merely

They merely died.

a²¹ t^hiⁱ44 diŋ⁵²

1Sg. die will

He will die.

an⁴⁴ t^hiⁱ44 diŋ⁵²

1Pl. die will

They will die.

a²¹ t^hiⁱ44 jaw⁴⁴

1Sg. die Past.

He died already.

an⁴⁴ t^hiⁱ44 jaw⁴⁴

1Pl. die Past.

They died already.

a²¹ t^hiⁱ44 law²¹

1Sg. die Neg.

He is not dead.

an⁴⁴ t^hiⁱ44 law²¹

1Pl. die Neg.

They are not dead.

Rising tone sandhi rule with closed syllables requires the following environments.
A rising tone becomes low when it occurs before falling tone or high tone (27):

(27) $LH \rightarrow L_H (L)$

/rɔɔl²³/ 'food'

rɔɔl²¹ ɣiŋ⁴⁴ kan⁴⁴ ej²³

food green we eat

We eat green food.

rɔɔl²¹ sia⁵² ka²¹ ej²³

food bad I eat

I eat the poor food.

But rising tone with closed syllable stays the same when it occurs before low tone as in (28):

(28) /rɔɔl²³/ 'food'

rɔɔl²³ t^haa²¹ ka²¹ ej²³

food good I eat

I eat the good food.

When two syllables of rising tone come together in connected speech, two rules are required; (a) the first to change a rising tone directly following another rising tone into a high tone as in (29) and (b) the second to convert a rising tone into a low tone when it precedes a high tone as in (30). This sandhi pattern is similar to the rule presented in example (27). In this rising tone sandhi, rule (a) must apply before rule (b) and the rules must be applied left to right, especially when three or more syllables are affected, as in (31), (32), and (33).

(29) LH → H/LH__

/fuu²³ tsaaj²³/ → [fuu⁴⁴ tsaaj²³]

sugar cane segment 'segment of sugar cane'

(30) LH → L__H

/wuuj²³ raaj²³/ → [vuuj²¹ raaj⁴⁴]

elephant white 'white elephant'

A reduplicated²⁴ adjective also undergoes the same pattern in connected speech as in (31):

(31) LH LH → L H

/mɔɔj²³ mɔɔj²³/ → [mɔɔj²¹.mɔɔj⁴⁴]

beautiful beautiful 'beautiful ones (reduplication)'

/saaj²³ saaj²³/ → [saaj²¹ saaj⁴⁴]

high high 'high ones (reduplication)'

When three syllables of rising tone come together in a phrase, the first two syllables undergo the L H pattern and the third syllable remains unchanged as in (32):

(32) LH LH LH → L H LH

/wuuj²³ raaj²³ fiim²³/ → [vuuj²¹.raaj⁴⁴.fiim²³]

elephant white clever 'clever white elephant'

Thus, derivation to show rule ordering and left to right application can be shown as below:

²⁴ Tones are copied in reduplication except rising tone, /raaj⁴⁴raaj⁴⁴/ 'faster ones', /nuam²¹nuam²¹/ 'beautiful ones', /sia⁵²sia⁵²/ 'bad ones', for example.

/LH	LH	LH/		LH	LH	LH
a. H			a.	—		
b. L			b.	H		
[L	H	LH]		* LH	H	LH

When four syllables of rising tone string together in a noun phrase, the first two create a low-high and the second two syllables also create the same pattern as well, as in (33):

- (33) LH LH LH LH → L H L H
- /wuuj²³ raaj²³ fiim²³ biik²³/ → [vuuj²¹ raaj⁴⁴ fiim²¹ biik⁴⁴]
- elephant white clever most ‘the most clever white elephant’
- /rool²³ t^hoo²³ biik²³ biik²³/ → [rool²¹ t^hoo⁴⁴ biik²¹ biik⁴⁴]
- food good most most ‘the best food’
- /beel²³ dum²³ suj²³ in²³/ → [beel²¹ dum⁴⁴ suj²¹ in⁴⁴]
- pot black inside from ‘out of the black pot’

As in (33), applying Chen’s Minimal Rhythmic Units (MRUs) in Mandarin language introduced by Yip (2002:124), long sequences of rising tone can be divided into two groups, (syllableL syllableH) and (syllableL syllableH) (syllable). Falam has a monosyllabic chunk with a preference for MRUs to be three syllables long and no chunk is ever monosyllabic as in Mandarin. When a preference is to be four syllables long, it creates a (syllableL syllableH) (syllableL syllableH) pattern. It is assumed that the sequence of the L H sandhi pattern of two rising tone syllables is basically derived from the rule that rising tone always becomes low before high tone and falling tone.

There is a tone sandhi rule which affects falling tone syllables with vowel finals (open syllables). The tone of such syllables becomes high (and the vowel shortening) when followed by a low tone syllable as in (34) and becomes low when followed by a high tone as in (35). No tone alternations are found when followed by any other tone syllables. Falling tone syllables retain their underlying rising tone in isolation or in sentence final position.

(34) HL → H / L _ T

/k^haa⁵²/ 'to be bitter'

a²¹ k^haa⁵²

3Sg. bitter

It is bitter.

a²¹ k^ha⁴⁴ biik²³

3Sg. bitter most

the most bitter one

a²¹ k^ha⁴⁴ mii⁵²

3Sg. bitter one

one that is bitter

a²¹ k^ha⁴⁴ t^hej⁴⁴

3Sg. bitter may

It may be bitter.

a²¹ k^ha⁴⁴ law²¹

3Sg. bitter Neg.

It is not bitter.

(35) HL → L/H__ T

/k^haa⁵²/ 'to be bitter'

an⁴⁴ k^haa⁵²

3Pl. bitter

They are bitter.

an⁴⁴ k^ha²¹ kaw²³

3Pl. bitter surely

They are surely bitter.

an⁴⁴ k^ha²¹ ɖiŋ⁵²

3Pl. bitter will

They will bitter.

an⁴⁴ k^ha²¹ t^hej⁴⁴

3Pl. bitter may

They may be bitter.

an⁴⁴ k^ha²¹ law²¹

3Pl. bitter Neg.

They are not bitter.

All verbs with falling tone and open syllables follow this pattern, e.g., /pee⁵²/ 'to give', /ruu⁵²/ 'to steal', /sii⁵²/ 'to be'.

Falling tone syllables that are closed do not undergo this tone sandhi rule as in (36).

(36) /ɖiŋ⁵²/ 'to be straight'

a²¹ ɖiŋ⁵² 'it is straight'

an⁴⁴ diŋ⁵² law²¹

3Pl. straight Neg.

They are not straight.

a²¹ diŋ⁵² law²¹

3Sg. straight Neg.

It is not straight.

A low tone syllable with vowel final has high tone in connected speech regardless of preceding or following syllables as in (37). Its vowel length is shortened when it occurs as the first member of a compound noun.

(37) /paa²¹/ 'male'

ka²¹ pa⁴⁴ tsan⁴⁴

1Sg. male old

I become an adult.

kan⁴⁴ pa⁴⁴ tsan⁴⁴

1Pl. male old

We become adult.

/ti²¹/ 'to do/make, to say'

ka²¹ ti⁴⁴ jaw⁴⁴

1Sg. do/make Past

I made already.

kan⁴⁴ ti⁴⁴ jaw⁴⁴

1Pl. do/make Past.

We made already.

In the case of low tone sandhi pattern in (37), low tone sandhi is not affected by the tone of the following syllables. Like falling tone, closed syllables with low tone also do not undergo tone sandhi. Tone sandhi rules in Falam are summarized in the table

below.

Tone	Syllable type	Sandhi rule
21	open	44/21__
	closed	-
44	open	-
	closed	-
23	open	a. 44/23__
	closed	b. 21/44__
52	open	21/44__ or 44/21__
	closed	-

Table 9. A summary of tone sandhi

As summarized in Table 9, low tone syllables become high when preceded by a low tone syllable. High tone undergoes no tone sandhi. A rising tone open syllable becomes high when it occurs before any tone syllables. But a rising tone closed syllable becomes low when followed by another rising tone syllable, which itself becomes high. The rising tone has two conditions in this case, the first to convert a rising tone directly following another rising tone into a high tone, and the second to convert a rising tone into a low tone when it precedes a high tone or falling tone. Falling tone open syllables become low when preceded by a high tone syllable and becomes high when preceded by a low tone. Falling tone closed syllables undergo no tone sandhi.

4.1.4 Tonal dissimilation

Among the four contrastive tones, low tone has two kinds of tone dissimilation patterns. The first tone dissimilation occurs when low tone verbs and nouns with live syllables are preceded by other low tone syllables, especially the pronominal markers (or subject agreement markers before a verb) such as /ka²¹/ 'my (I)', /na²¹/ 'your (you)', and /a²¹/ 'his/her/its (s/he, it)', the preceding tone is high as in (38). This occurs whether the following syllable is closed or open. Only low tone allows this tone dissimilation pattern.

- | | | |
|------|---|---|
| (38) | /kεε ²¹ / 'leg' | /pum ²¹ / 'stomach' |
| | ka ⁴⁴ kεε ²¹ 'my leg' | ka ⁴⁴ pum ²¹ 'my stomach' |
| | na ⁴⁴ kεε ²¹ 'your leg' | na ⁴⁴ pum ²¹ 'your stomach' |

/tii²¹/ 'to say'

ka⁴⁴ tii²¹ 'I say'

na⁴⁴ tii²¹ 'you say'

/nej²¹/ 'to have'

ka⁴⁴ nej²¹ 'I have'

na⁴⁴ nej²¹ 'you have'

The second tone dissimilation occurs when low tone verbs and nouns in dead syllables (glottal final as well) are preceded by other low tone syllables, especially the pronominal clitics (or subject agreement markers), the preceding tone stays the same and the second syllable is high as in in (39):

(39) /wək²¹/ 'pig'

ka²¹ wək⁴⁴ 'my pig'

na²¹ wək⁴⁴ 'your pig'

/ruŋ²¹/ 'bone'

ka²¹ ruŋ⁴⁴ 'my bone'

na²¹ ruŋ⁴⁴ 'your bone'

/tap²¹/ 'to cry'

ka²¹ tap⁴⁴ 'I cry'

na²¹ tap⁴⁴ 'you cry'

/feŋ²¹/ 'to go'

ka²¹ feŋ⁴⁴ 'I go'

na²¹ feŋ⁴⁴ 'you go'

In the case of low tone dissimilation, if the first syllable is closed there is no tone dissimilation regardless of whether the second syllable is open or closed (40).

(40) /wək²¹/ 'pig'

wək²¹ tsak²¹ 'strong pig'

jaan²¹ wək²¹ 'night pig'

/ruŋ²¹/ 'bone'

wək²¹ ruŋ²¹ 'pig's bone'

kiiw²¹ ruŋ²¹ 'elbow bone'

/feŋ²¹/ 'to go'

rak²¹ feŋ²¹ ɔɔ⁵² 'go ahead'

/tap²¹/ 'to cry'

run²¹ tap²¹ 'to come down and cry'

4.1.5 Tone distributions

This section provides tone distributions in a syllable. In Falam a tone occurs on the whole syllable as a unit, of which the vowel is the peak. All four tones can occur with all vowels. The relation between tone and syllable structure is different according to its environment. Syllables retain their underlying tones in isolation. In other places some alternations of tones occur according to their neighboring tone. These alternations and tone sandhi can be seen Sections 4.1.3 and 4.1.4. The following table illustrates tone distributions in a syllable.

Syllable				
Tones	Initial consonants	Open rhyme	Sonorant finals	Stop finals
Low tone	All consonants	Monophthong	m n ŋ r l w j	p t k ?
		Long nucleus	m n ŋ r l w j	----
		Diphthong	m n ŋ r l w j	--- ?
High tone	All consonants	Monophthong	m n ŋ r l w j	---
		Long nucleus	m n ŋ r l w j	p t k
		Diphthong	m n ŋ r l w j	---
Rising tone	All consonants	Monophthong	m n ŋ r l w j	---
		Long nucleus	m n ŋ r l w j	p t k
		Diphthong	m n ŋ r l w j	---
Falling tone	All consonants	Monophthong	m n ŋ r l w j	---
		Long nucleus	--- -- w j	p t k
		Diphthong	m n ŋ r l w j	p t k

Table 10. Tone distribution in Falam

As shown in the table above, all consonants are possible with all tones. Monophthongs, long vowels, and diphthongs can occur in the open rhyme of syllables with all tones. Two glides, /w/ and /j/, significantly occur word finally in a syllable and appear word initially in free variation with [v] and [z] respectively as in examples (2) and (3). Low tone never allows final stops and glottal stop with long nucleus as in examples (11) and (12) and allows final glottal stop with diphthong in a syllable (see also(12)). High tone never allows a final stop with monophthongs and diphthongs but allows a final stop with a long

nucleus as shown in example (13). Rising tone allows final stops /p, t, k/ only with a long nucleus and it never allows a glottal stop word-finally as seen in example (14). Falling tone allows no final stops with monophthongs but final stops with long nuclei and diphthong are possible as shown in examples (15) and (16).

4.2 Stress

Bickford (2003:69) defines stress as “syllable that is in some way more prominent than the other in the same word when it is spoken.” Bickford further defines that a stressed syllable usually exhibits at least one or two of the following qualities:

- a. it is loudly,
- b. it is higher in pitch,
- c. it has a longer vowel, or
- d. it uses the full range of vowels in the phonemic inventory.

As defined by Bickford, Falam also has a stress pattern which is hard to distinguish between stress and intonation. Both stress and intonation are meaningful in their context but they are not contrastive. One common stress pattern in Falam is that diphthongs and contrastively long vowels are stressed (, is used for stress marker) as in (41).

- (41) ,luan²³ ‘to flow’
 ,fiim²³ ‘to be wise’
 ,baan²¹ ‘to be tired’
 ,nuam²¹ ‘to be good, to be joyful’
 ,hua⁴⁴ ‘to hate’
 ,jaan⁴⁴ ‘to run’

Stress pattern also occurs when monosyllabic words are attached with nominalizers, /naak⁵²/ and /tuu⁵²/. A nominalized word with two syllables always stresses the second syllable as in (42):

- (42) /du²¹/ 'to love' du²¹,naak⁵² 'love'
 /du²¹/ 'to love' du²¹,tuu⁵² 'lover'
 /fel⁴⁴/ 'to be honest' fel²¹,naak⁵² 'honesty'
 /lej⁴⁴/ 'to hate' lej⁴⁴,tuu⁵² 'one who buy'

It is proposed that Falam stress pattern always occurs in the last syllable of disyllabic word or trisyllabic word, or even in a final word of connected speech as we will see in the following section.

Another stress pattern common in Falam is attaching a central vowel /a/ before nouns and adjectives in order to mark the prominence of the words as (43):

- (43) a pa²¹ k^hat²¹naak⁵² 'the first'
 one nom.

 a nuu²¹ a paa²¹ 'all (including male and female)'
 female male

 a tuum²³ a seen²³ 'all people (including old and young)'
 big + small

 a nan⁴⁴ma²¹ 'you (angrily speaking)'
 you

 a kej⁴⁴ma²¹ 'even me (humbly speaking)'
 I

4.3 Intonation

Bickford (1981:61) states that “intonation is the pitch pattern over an entire utterance and is usually used to indicate emotions, convey thoughts or attitudes, or to distinguish between such things as questions and statements but not to distinguish one word from another”.

Being a tonal language, some pitch patterns of Falam are difficult to clarify with intonation. However, it is certain that Falam has intonation patterns and some of the variants Falam tones possess are related to intonation. An extra high falling pitch is sometimes used for emphasis. An extra high rising tone is also sometimes used for excitement, surprise, and for other exclamatory speeches. Some different usages of intonation are provided in the following examples:

- (44) Question word “who?”

HL L

[zəw⁵² ɛɛ²¹]

Simple question

who Part.

HL LH

[zəw⁵² ɛɛ²³]

Surprise

who Part.

- (45) Imperative clause “don’t do”.

L L

[tua²¹ ja²¹]

Simple imperative

do not (Imp.)

L L LHL

Graciously speaking

[tua²¹ ja²¹ ɔɔ³⁵²]

do not Imp.

L L HL

[tua²¹ la²¹ ɔɔ⁵²] Angry

do not Imp.

(46) with a question particle “maw”

H L L L

[na⁴⁴ t^hej²¹ ləw²¹ mɔɔ²¹] Simple question

You know not Part.

Don't you know?

H L L LH

[na⁴⁴ t^hej²¹ ləw²¹ mɔɔ²³] Graciously speaking

you know not Part.

Don't you know?

H L L H

[na⁴⁴ t^hej²¹ ləw²¹ mɔɔ⁴⁴] Angry or unbelieving or surprise

you know not Part.

Don't you know?

One common pattern of intonation in Falam is that the vocalic nucleus of the last word of a sentence is often lengthened more than normal to indicate different purposes, such as emphasis, anger, and agreement. The way that people use intonation patterns also depends on a person's style, such as male or female, young or old, etc. Generally speaking, the use of high pitch in a word is mostly in a person's speech of impatience or excitement. In many other cases, intonation is meaningful in its different contexts.