A PHONOLOGICAL DESCRIPTION OF FALAM

Khar Thuan

Presented to Payap University in Partial Fulfillment

of the Requirements for the Degree of

MASTER OF ARTS IN LINGUISTICS

Faculty of Humanities

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ABSTRACT

Falam belongs to the Central Chin subgroup of the Kuki-Chin languages which is spoken in the Falam area. The name Falam is not from the name of any language group but from the name of the Falam town in years past. Nowadays the name Falam represents the people and the language of those who live in the Falam area.

The main component of this research is a phonological description of Falam. Falam has 31 consonant phonemes and 5 vowel phonemes. Vowel length in closed syllables is contrastive while vowel length in open syllables is predictable. There are eight possible syllable structures. Falam is a tonal language which has four contrastive tones, and has tone alternations.

Falam has complex morphophonemic alternations. Its verb system has two forms called primary and secondary. Regarding morphophonemic alternations, nasal alternations, stop alternations, and final glottalizations in secondary stems are common. Vowel length never increases in secondary stems. Rising tone never occurs in secondary stems. It can be concluded that some markedness in secondary stems decreases while some markedness in secondary stems stays the same.

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บทคัดย่อ

ภาษาฟาลัมเป็นภาษาหนึ่งในกลุ่มย่อยฉิ่นกลาง ในกลุ่มภาษาคุคิ-ฉิ่น ซึ่งพูดในบริเวณฟาลัม ฟาลัมไม่ใช่ชื่อภาษากลุ่มใดกลุ่มหนึ่ง แต่เป็นชื่อเมืองที่ใช้กันมานานหลายปี ปัจจุบันนี้ฟาลัมเป็นชื่อที่ครอบคลุมถึงกลุ่มชนและภาษาที่พูดโดยกลุ่มชนที่อาศัยอยู่ในบริเวณที่เรียกว่า ฟาลัม

วัตถุประสงค์หลักของวิทยานิพนธ์ฉบับนี้ คือ การศึกษาระบบเสียงในภาษาฟาลัม ผลการศึกษาพบว่า ภาษาฟาลัมมีพยัญชนะ 29 หน่วยเสียง และสระ 5 หน่วยเสียง พยางค์ตายมีความแตกต่างกันด้านความสั้นยาวของเสียงสระ ขณะที่พยางค์เป็นมีความสั้นยาวของเสียงสระที่สามารถทำนายได้ ในภาษาฟาลัมมีโครงสร้างพยางค์ถึง 8 แบบ และมีวรรณยุกต์ 4 หน่วยเสียง นอกจากนี้ภาษาฟาลัมยังมีการแปรของเสียงวรรณยุกต์แบบต่าง ๆ อีกด้วย

ภาษาฟาลัมมีการเปลี่ยนรูปแปรของหน่วยคำ (morphophonemic alternations) แบบต่าง ๆ คำกริยาในภาษาฟาลัมมี 2 รูป เรียกว่า กริยาพื้นฐาน (primary verb stem) และกริยารอง (secondary verb stem) เมื่อพิจารณาในแง่การเปลี่ยนรูปแปรของหน่วยคำ พบว่า การเปลี่ยนรูปแปรของเสียงนาสิก (nasals) เสียงกัก (stops) และการบีบเส้นเสียงตอนท้าย (final glottalizations) ในกริยารองเป็นลักษณะที่ปรากฏทั่วไปในภาษาฟาลัม นอกจากนี้ยังพบว่า เสียงสระในกริยารองไม่ได้มีความยาวมากขึ้น ในแง่ของเสียงวรรณยุกต์ พบว่า วรรณยุกต์เสียงขึ้น (rising tone) ไม่เคยปรากฏในกริยารอง จากการศึกษาระบบเสียงในภาษาฟาลัม สามารถสรุปได้ว่า ในตำแหน่งของกริยารองมีการบ่งชี้ความชัดเจน (markedness) บางประการลดน้อยลง ขณะที่การบ่งชี้ความชัดเจนบางประการไม่มีการเปลี่ยนแปลง

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LIST OF ABBREVIATIONS AND SYMBOLS

Abbreviations

Abs.	Absolutive
C	Consonant
CIE	Contrast in Identical Environment
CNE	Contrast in Non-Influencing Environment
Dim.	Diminutive
Erg.	Ergative
F	Falling tone
FCM	Falam Centenary Magazine
H	High tone
Imp.	Imperative
L	Low tone
Loc	Locative
Neg.	Negation
Nom.	Nominalizer
Part.	Particle
Past.	Past tense
Poss.	Possessive
3Pl.	Third Person Plural
Qp.	Question particle
R	Rising tone
Rfl.	Reflexive
1Sg.	First Person Singular
T	Tone
TB	Tibeto-Burman
V	Vowel
W	Word

Symbols

#__	Word Initial
___#	Word Final
/ /	Phonemic Slashes
[ ]	Phonetic Brackets
σ	Syllable
(.)	Syllable Boundary

CHAPTER 1

INTRODUCTION

1.0 Introduction

This thesis is a phonological description of Falam. Since Chin languages have rarely been studied by linguists in the past, a deep phonological study of Falam has not yet been done by any researcher. The Chin researchers, U Van Kyi (1992), U Than Bil luai (1993), Stephen Hre Kio (1999) and some other people have done a partial phonological description focusing on segmental phonology. Another deeper study in Chin is that of Andrea Gail Osburne in 1975, focussing on a transformational analysis of tone in the verb system of Zahao, a related Chin language. Because of the limits of the other studies, this thesis will mainly focus on a phonological description. This chapter introduces the origin of Falam and its location; the people; the language classification; a literature review; and the purpose, limitations, and methodology of this study.

1.1 Background information

This section provides brief information of the Chins, the origin of Falam and the people, the location, and the Falam language and its classification.

1.1.1 The Chins

For more information, it would be good to look at a brief background of the Chins before going further to discuss the name Falam and the Falam. Some claim that the term "Chin" is an old Burmese word "Kyaing" which means "fellow, companion, friend" (Luce 1965). But there is no strong source to support this claim that the Burmese called the Chins fellows or companions or friends. Another interpretation of the term "Chin" is that it is a Burmese word used to denote the various hill tribes living in the country between Myanmar and the provinces of Assam and Bengal. In earlier times the name "Chin" was written and pronounced "Khyang". There is another term "Kuki" for Chin, an Assamese

or Bengali term, applied to various hill tribes, such as the Lusheis, Rangkhols, Thados, etc. The words "Kuki", used in India, and "Chin", used in Myanmar, are synonymous and are both used for many of the hill tribes. The name is not used by the tribes themselves, who use titles such as Zo or Yo and Sho (Gierison 1904:509-510). It is true that many of the Chins do not call themselves Chin but have different names such as Lai, Zo, Cho, and so on, even though all Chins have accepted the designation of themselves as Chins by other people. As a whole, the term "Chin" seems to be just the name given by other people to denote that they are hill tribes.

There is a historical background which tells that the Chins are originally from China. U Bawihu (1998:12) mentions in his thesis, "The name 'Chin' is not a given name to the people living in the hilly region by the Burmese, its name had already been there long time ago since the third century B.C; and it originated in China which is related to the Chin dynasty in China." This information tells that the name "Chin" is not just a given name by the Burmese but the name of the people who came to settle in the region of Myanmar centuries ago. G. H. Luce (1965) puts the entry of the Chin into the general region of Myanmar somewhere between the fourth and the middle of the eighth centuries A.D. By looking at the apparent close linguistic relationship among the many Tibeto-Burman languages of Myanmar, Lehman (1965) states that "both hills and plains peoples have moved about within the central region of Southwest China and Southeast Asia over considerable distances for many centuries, and entered Myanmar from the north in 750 A.D." It would seem that they all settled in the Lushai and Chin Hills some time during the last two centuries. This historical background is more reliable as many researchers have dated their entrance into Myanmar at this time.

Khoi Lam Thang (2000:3) in his paper[1] of Chin languages noted that the Chins entered Myanmar from the North in 800 A.D (Khen Za Sian 1999:322), and 850 A.D (Tuan khaw kham 1999:326). These poeple arrived in the Chin hills in A.D 1347 (Kip Thian Pau 1993:3, and Khen Za Sian 1999:326) and 1490-1510

[1] Linguistics colloquia series 2000-01, Payap University Linguistics Department, Chiang Mai, Thailand.

(Bawihu 1998:27). The report of the District center of Chin State in 2004 estimated that the total population of Chin state was 503,083. Even though the time of entrance into Chin Hills is not clear, all of this information shows that the name "Chin" is not just a given name by the Burmese but the name of the people who came to settle in the region of Myanmar centuries ago.

1.1.2 The origin of Falam[2] and the people

Since there is a relationship between the name Falam and Taisun (Tashon), it is necessary to look at the origin of Tashons. The Tashons believe that their original parents stepped out of a solid rock. According to Bertram S. Carey (1932:142), "at Shunkla village there is a large rock[3], and out of this the Tashons believe that a man and a woman came, who settled down close by and became the parents of those who are now called the Shunkla tribe proper." Though the people believe that they are indigenous according to their traditional belief, there is a historical record that the Taisuns are immigrants. The three brothers, Ralthang, Phurhlum, and Thuan Kai came to settle in the Chin Hills from Kalay valley. As they came across hill after hill, Phurhlum and Thuan Kai reached Lailun and they founded Lailun village[4]. Thuan Kai, who founded Lailun, had three sons and the eldest son was named Taisun, and his father let him found a new village, called Taisun [5] village. The Tashons call themselves Shunkla/Klashun after the name of the village (FCM 1992:10). Bertram S. Carey[6] (1932:142) records a reliable historical background:

> About four generations ago the ancestors of the Shunklas of Falam migrated from Shunkla and founded Klashun, and at the same time another family also quitted the nest and flitted to Saiyo. They had hardly got comfortably settled down before the Haka chief Lien Norn, the great-grandfather of the present Chief Lyen Mo, attacked and destroyed both villages

---

[2] Falam is thought to be English corruption of the original word "Fahlam" (U Tial Luai-personal interview; FCM 1992:9).

[3] This large rock is called Lailun, which many people believe according to tradition, was the origin of Chins.

[4] This Lailun village and Shunkla village were the same name of one village founded by Thuankai (near Shunkla there is a large rock, i.e., Lailun).

[5] This village, which was located near Cinmual ward of the present Falam town, does not exist anymore.

[6] He was British, an assistant commissioner in Burma, and a political officer in the Chin Hills.

> and scattered the inhabitants, who for years lived in settlements as fugitives. However, in the course of time the Shunklas made their peace with the Hakas and returned to found a new village, which is the present Falam village. After the Shunklas had founded Falam they gradually brought all their neighbours, both relatives and aliens, under their control. The Siyins and other northerners call them "palamte" after their capital Falam. We have retained the named by which the tribe was known to the Burmans (Burmese), namely, "Tashon". This word is the Burmese corruption of "Klashun", the name of the village immediately west to Falam, which was made the capital of the tribe after it had left the parent village of Shunkla and before the present magnificient capital was founded. This village Klashun, or Tashon, was confiscated and demolished by us in 1892, when we occupied Falam and required materials to build us a post.

Not long after the occupation of the Falam village in March 13, 1892, the British government had decided to build a new camp at the place where the present Falam town is located, about three miles away from the old Falam village. The construction of a new camp was finished at the end of June in the same year and shifted there for security purposes. Later on the British government had given the new post the name "Falam" and the old Falam village was called Taisun village instead. This new camp, Falam, was made the center of regional administration and later it became the capital of the whole area of Falam.

There are twelve different tribes in the Falam Township. They are Laizo, Zahau, Sim, Hualngo, Ngawn, Bualkhua, Tapong, Zaniat, Khualsim, Lente, Hlawnceu, and Taisun. They believed that their forefathers are Ralthang (the forefather of Khualsim), Phurhlum (the forefather of Laizo and Zaniat), and Thuankhai (the forefather of Taishon, Hlawnceu, Zahau, and Sim). These tribal groups have their own dialects. According to Lai[7] legend (Chawn Kio 2006:31), the forefathers of Lais came to the Chin hills from the Shan country, Kabaw-Kale-Chindwin valleys. Their legends assert that their settlement in Chin Hills was due to the losing of their heritage, not to famine nor the oppression of any ruler. Another possible reason is the war between Shans and Burmese which may have caused political crises or famine. This legend supports that the twelve tribal

[7] The Falams called themselves Lais. According to Chawn Kio (2006:34) Lai is used to refer to Falam, Hakha, Thantlang, and Matu.

groups in Falam area had migrated from the plains areas centuries ago. There are different beliefs of the route to the settlement of these twelve tribal groups in Falam Township. The forefathers of Hualngo, Ngawn, Bualkhaw, Lente and Tapong may have come to settle from different routes. Under a political leadership as one township, all of these twelve tribes mentioned above are considered as Falams. Thus, the name Falam represents the twelve tribal groups in the Falam township[8] and the name of the town as well.

According to the Ethnologue (Grimes 2005), there are 100,000 Falams in Myanmar (UBS 1991). This population includes 9,000 Tashon, 16,000 Zanniat, 7,000 Khualshim, 4,000 Lente, 14,400 Zahao, 18,600 Laizao (1983), 31,000 others. The township peace and development council report of 2004 says that the total population of Falam township is 72,110. Falam is also spoken in Bangladesh and India. The total population in all countries is 125,367.

Since the Falams are widely spread around the country it is suggested that there are more than the total population of speakers of the Falam township in the plains area, namely, Kalay township in Sagaing division. Other unaccounted for speakers of Falams are also found in various places over the country and even abroad.

[8] Personal interview (U Tial Luai) and magazine (Falam Centennial Jubilee 1892-1992)

1.1.3 Location

Geographically, Falam is located in west Myanmar, in the central part of Chin state, as shown in the map of Myanmar in Figure 1 below:

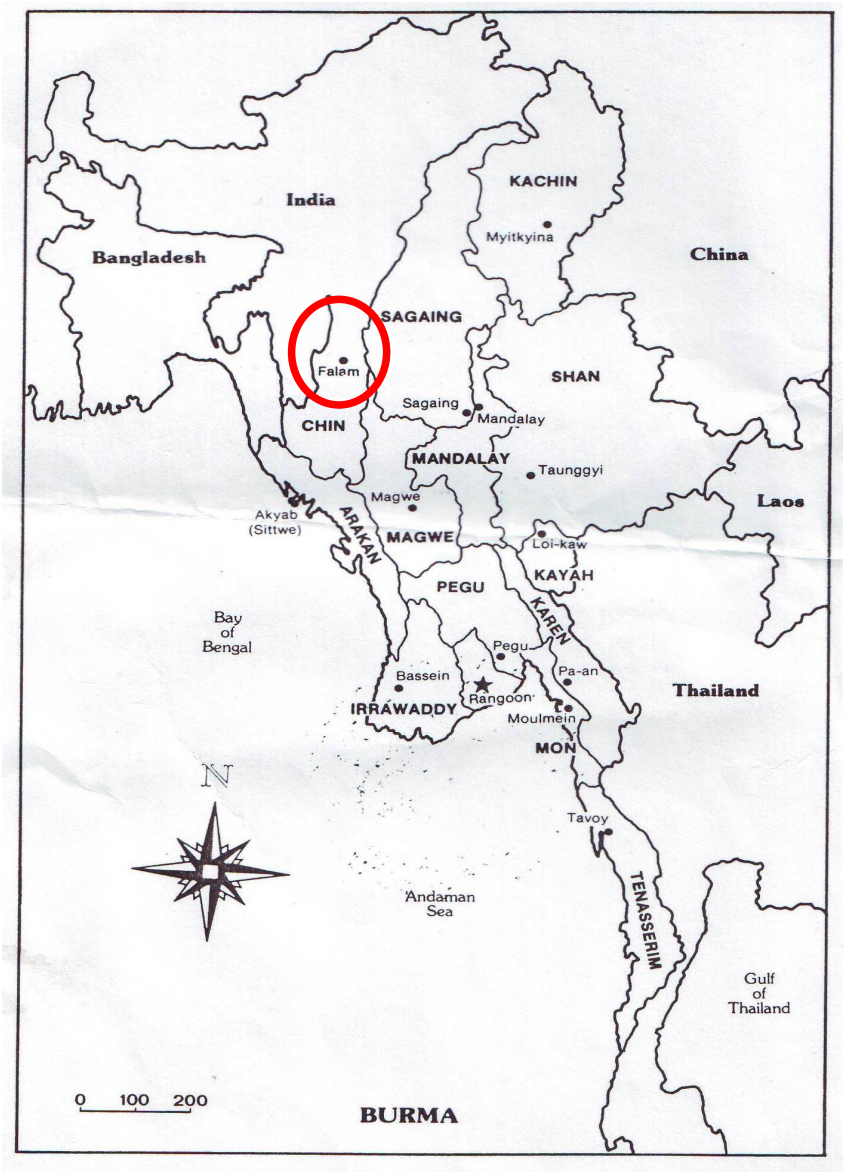

Figure 1. Map of Myanmar showing the location of Falam (Lehman, F.K. 1981)

Also the map in Figure 2. Language map of Falam displays the dialects of the twelve tribal groups in the Falam area.

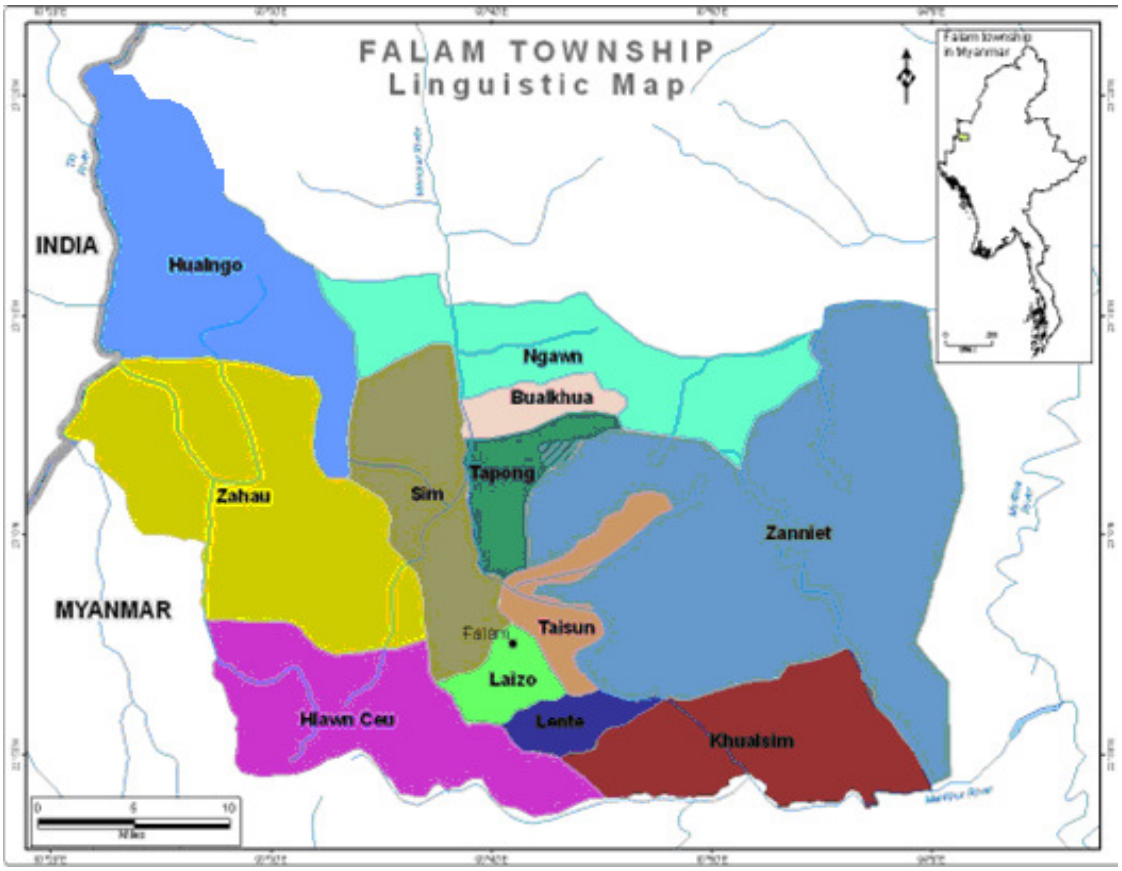

Figure 2. Language map of Falam (Eva Ujlakyova (SIL):2007)

1.2 The Falam language

As already mentioned in the previous section, there are twelve different dialects in the Falam township bearing the names of their tribal groups. Among them, Laizo was used for the official language or the common language of the town since the British colonial period. Evidence for this comes from a resolution made at a conference held in Maymyo in 1924 that one of the twelve dialects in the Falam Township, Laizo language, would be the language to be taught in the primary schools in the Chin Hills. Robert Johnson (1988:459) records, "It did,

however, decide that Laizo Chin was the language to be taught and English the second, with Burmese where desired." After that time onward Laizo was taught in all primary schools in Falam Township until 1975. Gradually the Laizo language has become the common language for the Falam town and for the whole township. This common language had carried the name Laizo until the 1960s (e.g., "Laizo Bible", "Laizo dialect", etc)[9].

After the 1960s, some Christian leaders proposed to change the name Laizo to Falam[10] so that the language could represent the language of the whole tribal community in the Falam Township. Kyon Bil[11], one of the Christian leaders at that time, said that there was no formal meeting to decide the change of the name Laizo to Falam. As time passed on, the use of the name Laizo has diminished and people have been using the name Falam more and more for many years. Presently, Falam has become the lingua franca of the whole tribal community in Falam township and the name Laizo has been completely replaced by the name Falam (e.g., "Falam language", "Falam Bible", "Falam Christian songbook", etc).

1.2.1 Classification of the language

Falam is one of the Kuki-chin languages, descended from the Sino-Tibetan (ST), Tibeto-Burman (TB) group, spoken primarily in and around Falam town in Chin state, Myanmar. Matisoff (2005:9) mentions that:

> The Sino-Tibetan is one of the greatest language families in the world comprised of Sinitic (including Chinese, Tai-Kadai, and Hmong-Mien in extended view), and Tibeto-Burman. The Tibeto-Burman languages are the principal languages of the Himalayan region, spoken from Kashmir in the west, across the Himalayan and sub-Himalayan regions of India, Nepal, Bhutan, Bangladesh, Tibet and China, and into Southeast Asia across Burma, Thailand, Laos and Vietnam, including the great rivers such as Yangtze,

[9] Cope, J.R. 1926. Chin reader in the Laizo dialect.

[10] The term "Falam" does not belong to any tribal group but is a geographical name used to represent the language of all the tribal groups in Falam township. Since the language is changing over time the language used in Falam town now has an increasing dialectal difference from Laizo.

[11] Personal interview in Yangon (March 2006).

> Mekong, Salween, and Irrawaddy. As all the major language families of SEA, TB languages are overwhelmingly verb-final (SOV) in their clause-structure. The first TB group to arrive in what is now Myanmar (formerly called Burma) were probably the Karen. These were followed by the Pyu, and finally by the Burmans, who laid waste the Pyu capital of Sriksetra in the 8th century, ultimately causing the extinction of the Pyu as a people and the disappearance of the Pyu as the TB language family.

This statement of verb-final (SOV) structure supports the claim that Falam is also from the TB language family since it too is SOV. Among TB languages, the Kuki Chin language group is relatively cohesive, both geographically and linguistically, and has been intensively investigated by Shafer, who classifies it as part of Burmic. Benedict likewise links it to Burmese-Lolo[12]. However, Bradley (1975:26) suggests that "the Kuki Chin language group may be more appropriate to include as part of the adjacent SAL[13] or NORTH-EAST INDIA group by looking at their substantial lexical and morphosyntactic similarities. This SAL group has been linked geographically to Matisoff's (2005:2, 26) Kamarupan[14] group. Linguistically the Kuki-Chin languages are characterised by tones, and extensive verb morphology involving tonal alternations and intensive suffixing with some prefixes. The basic word order is SOV."

---

[12] Lolo-Burmese is the TB branch spoken by 5 million speakers in Sichuan, Yunnan, and Guangxi in China.

[13] This subgroup was named by Burling (1998) from the distinctive etymon for 'sun' Sal found in most such languages.

[14] "Kamarupan" (from the Sanskrit word for Assam) is a geographical cover-term for the languages of NE India and W. Burma, the linguistic center of diversification of the TB family (Matisoff 2005:11).

Since the place of the Kuki-Chin language group among TB languages classfied by Matisoff and Bradley have no big differences, only Matisoff's language classification will be displayed in Figure 3:

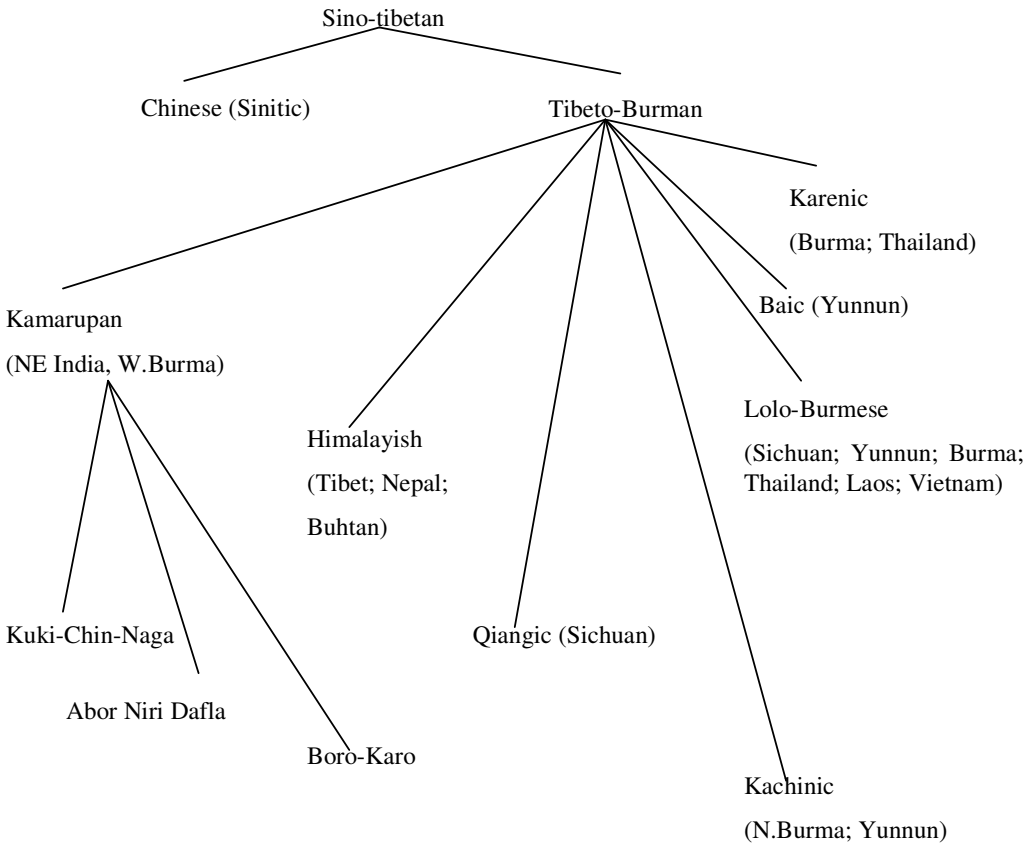

Figure 3. Sub-Groups of Tibeto-Burman (Matisoff, James A. 1991:481)

Within the Kuki-Chin-Naga group, Bradley (1975:4) classifies five main groups comprising Southern Naga, Old Kuki, Meitei, Chin and Other Chin groups. More specifically, he classifies the Chin language group into three groups, Northern Chin, Central Chin, and Sourthern Chin, giving a more detailed picture of the Chin languages at a lower level as in Figure 4:

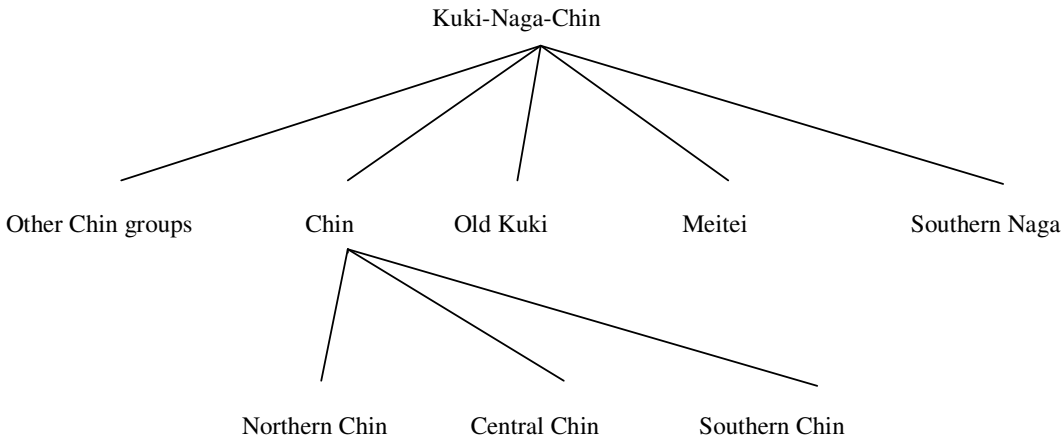

Figure 4. Main tree of Kuki-Chin- Naga including sub-groups of Chin (Bradley, David 1997:28).

Grimes (1996) also classified the Chin language group as: the Northern Chin group consisting of Ralte, Yos, Gangte, Siyin, Paite, Tedim, Thado, and Zome; the Central Chin group consisting of Haka, Baungshe, Thangthlang, Zokhua, Shonshe, Senthang, Tawr, Bawm, Lushai, Darlong, Aimol, Hmal, Mara, Purim, Falam, Zanniat, Tashon, Khualsim, Zahau, Lente, Ngawn, Beite, and Chiru; and the Southern Chin group consisting of Asho, Chinbon, Daai, Zotung, Mun, Khumi, Cho, and Mindat.

Again in Bradley's (1997) Chin language classification, Thado, Siyin, Paite, Vuite, Sukte, and Kamhau belong to Northern Chin group; Hualngo (Mizo), Falam, Laizo, Zahao, Taisun, Ngawn, Zaniat, Hakha, Zophei, Lawtu, Lailen, Senthang, and Tawr belong to Central Chin group; and Zolamnai, Welaung, Matu, M'kang, Ng'men, Nitu, Hngizung, Utpu, Chinbok, and Asho belong to Southern Chin group.

The reason for the different lists between Grimes and Bradley is not known. It might depend on the information they got from their language sources.

1.2.2 Proposed sub-classification of Falam

After looking at all Chin language classifications, this study turns to the internal classification of Falam. The languages that belong to the Falam group were mentioned already in Section 1.2. The classification of the language is based only on the author's own knowledge as a native speaker of Falam because no specific research for language classification has been done yet in the Falam area. In language classification, one important thing that needs to be taken into consideration is that tribes and languages are not always identical but generally languages differ according to tribes. This analysis assumes that the twelve tribal groups in the Falam area have their own dialects and proposes the following classification by looking upon their general differences and similarities as in Figure 5:

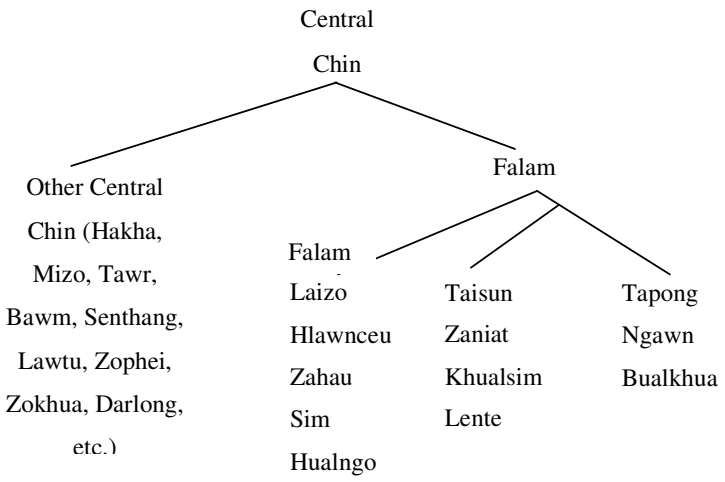

Figure 5. Proposed sub-classification of Falam

As seen in Figure 5, Laizo, Hlawnceu, Sim, Zahau and Hualngo are considered to be one group. Laizo, Hlawnceu, Sim, and Zahau are mutually intelligible. The intelligibility between Hualngo and the other four languages in this group might be low, but they still have a close relationship lexically and structurally. Among Hlawnceu tribes there are some villages which speak a different dialect closer to Hakha (Lai) one of the central Chin languages spoken in Hakha area. But most of the Hlawnceu speak a dialect similar to Laizo, Sim, and Zahau which can be

grouped together as one group. Since Laizo is the dialect chosen to be the common language of the people in the Falam area (nowadays known as the Falam language), this study could be called a description of Laizo dialect. This would be true if it were not for the fact that the language spoken in Falam town has been mixed with other dialects such as Sim, Zahau, and Hlawnceu, closely related to Laizo. Therefore this study is simply called a description of the Falam language.

This analysis proposes that Taisun, Zaniat, Khualsim, and Lente are closely related and classified into one group. Tapong, Bualkhua, and Ngawn are classified as another group. Bualkhua and Ngawn are mutually intelligible. U Kap Tial, in Falam Christian Centenary Magazine (2006:147), states that Bualkhua is one of the tribal groups of Ngawn. The intelligibility between Tapong and Ngawn or Bualkhua is not known clearly, yet this analyst believes that Tapong is appropriate to include in Ngawn and Bualkhua group.

1.3 Literature review

A partial study of some Chin languages has been done by linguists in the past few decades. But the Falam language has rarely been studied by linguists. A little information about linguistic study in Falam is found in *The linguistic tour to Chin Hills* written by G.H. Luce in 1954. In this linguistic tour, some dialects in Falam area were studied as Luce recorded on his short paper. The record says:

> At Falam I met many old friends-Mr. Shiah Lwe, Mr. Lian Chin Thang, Mr. Sum Mang the school principal and Mr. Lal Bik the engineer. I shall always gratefully remember them as my first teachers of Chin in the days before the war. My old recordings, alas, were lost when the Japanese looted the University Library. So the work had to be done all over again. Dr. Stern, who is a keen anthropologist as well as linguist, spent a happy week at Lente, studying village conditions as well as the dialect, and made a fine collection of material culture. Dr. Henderson studied with Mr. Shiah Lwe the grammar of the Fahlam dialect of Taisun (Luce 1954:21)

As a result of their study, the only extant source we can rely on now is a short paper presented by Luce at an ordinary meeting of the Burma Research Society held on the 26 of July, 1956. In his paper, he includes a few general remarks about Chin languages and their relationship in terms of tones, finals, verbs, and

prefixes. Luce proposed four contrastive tones in Falam, such as mid falling, high level, high falling, and rising, but no further information on tone was available. No other helpful material on their studies is available because all data collected in Falam was lost as Luce (1956:22) mentioned in his paper:

> When Dr. Stern rejoined us from Lente, we moved on north to Tiddim… We had to cut our luggage down to a minimum--a bedding roll apiece; and while we piled into one jeep, our luggage accompanied by two orderlies followed in another jeep. This led to a disaster which almost wrecked our whole project. Roads in these parts are one long series of hairpin bends. Rounding one of them, one of the bedding rolls must have fallen out without our orderlies noticing it. It was Dr. Henderson's and it contained all her materials laboriously recorded at Falam, which she intended to check at Tonzang…from that day to this nothing more was seen of Dr. Henderson's precious papers.

Some other helpful books on related languages to Falam used in this thesis are Mizo syntax (Lalnunthangi 1993), a descriptive analysis of two texts of Teddim Chin (Henderson 1965), and short papers of the related Chin languages. Besides these, there are some more helpful books, the four orthographical studies written by four different researchers, U Van Gyi (1993), Than Bil Luai (1993), Hre Kio (1999) and Sen Ro Sang (2004).

Among former researchers on Falam, there are no significant differences in their inventory of consonant phonemes but there are different findings of vowel phonemes. Not only the first researcher but also one who develop the Falam orthography, Dr. Cope proposed six different vowels, as mentioned by Bawihu (1998:201) in his thesis under the title of *The Source and Development of the Chin Writings*. The book notes, "the phonetics of the vowels" as shown in Table 1.

	Front	Cental	Back
Close	iː		uː
Close-mid	eː		
Open-mid		əː	ɔː
Open		aː	

Table 1. Cope's phonetic vowels (Bawihu 1998:201)

This inventory records phonetic vowels but no source is found of phonemic inventory though Cope used six vowels a, e, i, o, u, and aw in his Falam orthography. Another researcher U Van Kyi (1993) listed that there are nine phonetic vowels in Falam. And he also used six vowels a, e, i, u, o, and aw in his Falam orthographical recommendation. Table 2 presents Van Kyi's phonetic vowel inventory:

	Front	Central	Back
Close		ʊ	uː
Close-mid	eː		
Open-mid	ɛ	ə ʌ	ɔː
Open		aː	ɑ

Table 2. U Van Kyi's phonetic vowels (1993:3)

In terms of tone, Hre Kio (1993:103) mentions in his book of Falam Orthography that there are three contrastive tones in Falam. Than Bil Luai (1993:48) also mentions in his Falam Orthography studies, that there are 7-8 tones in Falam. But the two researchers did not do any further systematic studies on tone but only a hypothesis. A more systematic study on tone was done by U Van Kyi (1993:14) and he provides a brief description consisting of five contrastive tones: the high-level tone, high falling tone, low rising tone, low falling tone, and low-level stop tone. All of these native Falam researchers were mainly focused on

grammatical studies and word combination, not the phonological studies, yet they are helpful for this analysis.

The most helpful source for this study is a dissertation by Andrea Gail Osburne (1975) on *A transformational analysis of tone in the verb system of Zahao (Laizo) Chin*, one of the dialects spoken in the Falam area. The study presents many helpful insights into tone patterns, morphophonemic patterns, and the verb system. She demonstrated three distinctive tones in Zahao: low, high, and rising.

Theoretical studies in this analysis are applied from Burquest (2001), Hyman (1975; 1985), Chen (2000), Yip (2002), Mohanan (1986), Pike (1971;1977), Gudschinsky (1972), Smalley (1964), Philip A. Luelsdorff (1987), and many more. The authors focus on descriptive phonemics and generative phonology which will be applied for describing the morphophonemics and phonological processes.

1.4 Goal of the study

A Falam orthography which was developed by missionaries during the early part of the twentieth century is used extensively today, although it does not represent tone, an essential aspect of the language's phonology. In this traditional orthography, vowel length is indicated only when there is a homograph in a sentence which could make a reader confused. Certain characteristics of the orthography, such as how to represent an alveolar/dental distinction in stops, how to represent vowel length, and where to mark word boundaries are subject to ongoing debate. Introducing tone marks could be the next interesting issue for today and might be for the next generation. All these issues have made people, especially educated leaders, have a strong motivation for orthography review or reform. Therefore, the purpose of this thesis is to propose a phonological description, which will be helpful in reviewing the present orthographical issues.

1.5 Limitations of the study

This study is an initial description of the Falam sound system (phonology). It doesn't examine the relationship between the different varieties which mix

together to produce Falam. It does not attempt an explanation for the variations observed in verb forms.

1.6 Methodology

Most of the data used in this thesis consists of two parts: One is library-based data for theoretical studies and the other one is texts gathered from January through March 2006 in Falam. Five different texts and the SEA 436 wordlists were recorded on tape in Falam. A grammar questionnaire was also used for analysis. Several papers and magazines written in Falam were also collected. Since the author of this thesis is a native speaker of Falam, some data for the study is based on the author's own knowledge. The Falam Holy Bible is also one source of the data used in this thesis.

Wordlists recorded on the first data collection trip were transcribed and converted into a chart of consonants and vowels. A wordlist consisting of 436 words and a supplemental 58 item wordlist were used in this analysis. The texts recorded on tape were also transcribed and interlinearized in a notebook and later entered into a Word document and have been analyzed to be able to see the Falam sound patterns accurately. Syllable structure, segmental distribution, suprasegmental phenomena (tone, stress, and intonation) were analyzed. Praat[15], a computerized program for phonetic analysis was used to identify the pitch contours of the tones. Insights were also gained from reading articles about other related Chin languages and from reviewing Yip's paper (2003) *Phonological markedness and allomorph selection in Zahao* and Osburne's (1975) *Transformational analysis of tone in verb system in Zahao*. Data collected during an additional data collection trip and was re-analyzed with the help of my advisors.

[15] Praat program is developed by Paul Boersma and David Weenink <www.praat.org>.

CHAPTER 2

SEGMENTAL PHONOLOGY

2.0 Introduction

This section decribes the segmental phonology of Falam. According to *A dictionary of Linguistics and Phonetics* (Crystal 2003:408), "Segmental phonology analyzes the speech into distinctive units, or phonemes, which have a fairly direct correspondence with phonetic segments." This section is divided into two main sections: consonants and vowels, including their variations.

2.1 Consonants

The consonant phonemes of Falam are displayed in Table 3:

	Labial	**Labio-dental**	**Dental**	**Alveolar**	**Palatal**	**Velar**	**Glottal**
Voiceless stops	p		t̪	t		k	ʔ
Voiceless aspirated stops	p^h		$t̪^h$	t^h		k^h	
Voiced stops	b		d̪				
Voiceless nasals	m̥			n̥		ŋ̊	
Voiced nasals	m			n		ŋ	
Voiceless fricatives		f		s			h
Voiceless affricate				ts			
Voiceless lateral affricate				tɬ			
Voiceless aspirated lateral affricate				$tɬ^h$			
Voiceles flap				ɾ̥			
Voiced flap				ɾ			
Voiceless lateral approximant				l̥			
Voiced lateral approximant				l			
Glides	w				j		

Table 3. Consonant phonemes

This analysis proposes that there are eleven phonemic oral stops in Falam. The stops have five places of articulation, labial /p, p^h, b/, dental /t̪, $t̪^h$, d̪ /, alveolar /t,

t^h /, and velar /k, k^h/, and glottal /ʔ/ which will be desribed thoroughly in Section 3.3.2. All but /ʔ/ have contrasts between aspirated and unaspirated phonemes. A voiceless bilabial stop /p/ and a voiceless dental stop /t̪/ have voiced contrasts. But a voiceless alveolar /t/ and a voiceless velar /k/ have no contrastive voiced phonemes, /d/ and /g/, which are common in many languages. Unaspirated oral stops are unreleased [p˺, t˺, k˺] when they occur word finally. These unreleased stops are treated as allophones of the phonemes /p, t, k/ respectively as will be seen in Section 2.1.2.1.

A glottal stop /ʔ/ is analysed as a phoneme even though it is restricted to occurring as the final element of a word. In word final position the glottal stop has complete closure and full articulation and is significant. It frequently occurs and demonstrates a number of peculiarities that set it apart from the other consonantal segments. It has a high frequency of occurrence, a substantial number of lexical verb roots have an underlying final glottal stop and it contrasts with other phonemes and with zero (ø) as will be seen in Section 2.1.1.

As a phoneme, a glottal stop has some more restrictions. The realisation of the glottal stop almost always occurs with low tone, an

with long vowels but the glottal can occur only with low tone, sometimes with high tone, and does not allow long vowels), yet in a phonemic analysis it clearly demonstrates a contrastive function as will be shown in Section 2.1.1. On the other hand, there is no consonant deletion rule word-internally while a glottal stop can be deleted word-internally. There is an exceptional occurrence of the glottal stop with high tone. Syllables closed with glottal stop and glottalized syllables can have high tone when they appear in secondary verb stems. Also a conjunction morpheme in Falam is pronounced with high tone as /iʔ^{44}/. As mentioned above the glottal stop is very ambiguous and as such it is a good topic for further study.

There are six nasal phonemes in Falam. The nasal phonemes occur in three places of articulation, labial /m, m̥/, alveolar /n, n̥/, and velar /ŋ, ŋ̊/. They are contrastive in voicing. It is observed, however, that the nature of the phonetic realization of the voiceless nasals can be substantially similar with that of the aspirated stops.

There are voiceless fricatives in three places of articulation: labiodental /f/, alveolar /s/, and glottal /h/. There are also voiceless flap /ɾ̥/ that contrasts with voiced alveolar flap /ɾ/.

There is one voiceless alveolar sibilant (grooved) affricate /ʦ/. In the case of this affricate, the phoneme /ʦ/ occurs as a unit even though these two phonemes /t/ and /s/ occur as separate phonemes in elsewhere. There is a voiceless alveolar lateral affricate that has an aspirated contrast /tɬ, tɬ^{h}/ (see also Section 3.3.1).

Falam has two glides: the palatal /j/ and the labial /w/ (an alternative term for such sounds is semivowel). The palatal /j/ involves an articulation similar to that for the vowel /i/, with the front of the tongue close to the palate; the labial /w/ is similar to /u/, with rounded lips and the back of the tongue raised toward the velum. The two glides are in free variation with voiced fricatives word initially

and they occur significantly in word final positions and they are considered as phonemic consonants /j, w/ in this analysis[16]. In addition, transcribing these two phonemes as consonants rather than the vowels /u/ and /i/ agrees with the phonemic realization of free variation between [v] and /w/, and between [z] and /j/ as will be seen in examples (2) and (3).

2.1.1 Consonant contrasts

Evidences for consonant phonemes are provided below:

/p/ : /p^h/

CIE #352 /$puan^{21}$/ 'to be shallow'	#285 /p^huan^{21}/ 'to float'
CIE #435 /$piat^{52}$/ 'to eat (by animal)'	#291 /p^hiat^{52}/ 'to rub'
CNE #139 /pum^{21}/ 'to be round'	#300 /p^hun^{44}/ 'to plant'

/p/ : /b/

CIE #50 /paa^{44}/ 'mushroom'	#436 /baa^{44}/ 'ground potato'
CIE #230 /$puaɾ^{23}$/ 'to be full'	#437 /$buaɾ^{23}$/ 'to break the law'
CNE #314 /$pɛɛl^{44}$/ 'to hunt'	#205 /$bɛɛl^{23}$/ 'cooking pot'

/t/ : /t^h/

CIE #438 /$taŋ^{23}$/ 'to resist'	#439 /$t^haŋ^{23}$/ 'to grow'
CIE #439 /tum^{44}/ 'to get down'	#440 /t^hum^{44}/ 'to be lower'
CNE #465 /$taaŋ^{23}$/ 'chest'	#476 /$t^haŋ^{21}$/ 'to wake up'

[16] For example: /aw/ is transcribed as VC and will not be considered as a diphthong /ao/, which would be considered VV, though there are also diphthongs in Falam.

/t̪/ : /t̪^{h}/

CIE #23 /t̪ii^{44}/ ‘water’ #164 /t̪^{h}ii^{44}/ ‘blood’

CIE #369 /t̪aɾ^{23}/ ‘to be old’ #368 /t̪^{h}aɾ^{23}/ ‘to be new’

CIE #441 /t̪ɔɔŋ^{21}/ ‘to confront’ #441 /t̪^{h}ɔɔŋ^{21}/ ‘to punch’

/ t^{h} / : /t̪^{h}/

CIE #200 /t^{h}ii^{23}/ ‘to sew’ #269 /t̪^{h}ii^{23}/ ‘to die’

CIE #201 /t^{h}im^{23}/ ‘needle’ #370 /t̪^{h}im^{23}/ ‘to be dark’

/t̪/ : /t/

CIE #444 /t̪um^{44}/ ‘to play music’ #439 /tum^{44}/ ‘to get down’

CIE #271 /t̪aw^{23}/ ‘to sit’ #445 /taw^{23}/ ‘seedling’

CNE #196 /t̪aʔ^{21}/ ‘to measure’ #226 /tap^{21}/ ‘to cry’

/d̪/ : /t̪/

CIE # 479 /d̪aw^{23}/ ‘to fight’ #271 /t̪aw^{23}/ ‘to sit’

CIE #449 /d̪ɔk^{21}/ ‘to leak’ #450 /t̪ɔk^{21}/ ‘to point’

/k/ : /k^{h}/

CIE #447 /kaw ^{23}/ ‘to call’ #446 /k^{h}aw^{23}/ ‘bowl’

CIE #448 /kuʔ^{21}/ ‘to be green (fruits)’ #236 /k^{h}uʔ^{21}/ ‘to cough’

CIE #396 /kɔlʔ ^{21}/ ‘to be bald’ #294 /k^{h}ɔlʔ^{21}/ ‘to bathe’

/p/, /t/, /k/ : /ʔ/

CIE #250 /sak^{21}/ ‘to build’ #449 /saʔ ^{21}/ ‘to be thick’

CIE #197 /but^{21}/ ‘to dye (cloth)’ #79 /buʔ^{21}/ ‘cooked rice’

CIE #494 /k^{h}up^{21}/ ‘to put upside down’ #236 /k^{h}uʔ^{21}/ ‘to cough’

/ø/ **:/ʔ/**

CIE #250 /kua^{21}/ ‘hold’ #449 /kuaʔ^{21}/ ‘to hug’

CNE #48 /ɾua^{23}/ ‘bamboo’ #7 /ɾuaʔ^{21}/ ‘rain’

CNE #129 /n̥aa^{23}/ ‘ear’ #43 /n̥aʔ^{21}/ ‘leaf’

/m/ : /m̥/

CIE #46 /muu^{52}/ ‘seed’ #224 /m̥uu^{52}/ ‘to see’

CNE #90 /mɛj^{44}/ ‘tail’ #178 /nu^{21}.m̥ɛj^{21}/ ‘widow’

CNE #337 /mal^{44}/ ‘to be few’ #409 /m̥in^{23}/ ‘to be ripe’

/n/ : /n̥/

CIE #450 /naa^{23}/ ‘to be sick’ #129 /n̥aa^{23}/ ‘ear’

CNE #451 /naal^{44}/ ‘to be slippery’ #127 /n̥aaɾ^{21}/ ‘nose’

/ ŋ / : / ŋ̥/

CIE #156 /ŋal^{23}/ ‘shin’ #518 /ŋ̥al^{23}/ ‘to be stubborn’

CNE #101 /ŋaa ^{52}/ ‘fish’ #257 /ŋ̥aak^{52}/ ‘to wait’

CNE #222 /ŋaaj^{23}/ ‘to hear’ #419 /ŋ̥aaj ^{44}/ ‘plural marker’

/n/ : /ŋ/

CIE #180 /naaw^{23}/ ‘brother’ #77 /ŋaaw^{23}/ ‘gibbon’

CNE #221 /naam^{44}/ ‘knife’ #222 /ŋaaj^{23}/ ‘to hear’

CNE #88 /naa^{44}/ ‘buffalo’ #101 /ŋaa^{52}/ ‘fish’

/n̥/ : /ŋ̥/

CIE #160 /n̥aak^{52}/ ‘rib’ #257 /ŋ̥aak^{52}/ ‘to wait’

CNE #43 /n̥aʔ^{21}/ ‘leaf #453 /ŋ̥at^{21} .san^{52}/ ‘to trust’

CNE #413 /n̥iit^{52}/ ‘water leech’ #262 /ŋ̥ɔɔk^{44}/ ‘to snore’

/f/ : /w/

CIE #454 /faaɾ^{23}/ ‘torch’ #363 /waaɾ^{23}/ ‘white’

CIE #274 /fɛʔ^{21}/ ‘to walk’ #455 /wɛʔ^{21}/ ‘to visit patient’

/s/ : /j/

CIE # 343 **/**saaŋ^{23}**/** ‘to be tall, high’ #138 **/**jaaŋ^{23}/ ‘back’

CNE #306 **/**suaŋ^{44}**/** ‘to cook #456 /juaŋ^{23}/ ‘to fly’

/s/ : /h/

CIE # 343 **/**saa^{23}**/ ‘**to be hot’ #133 **/**haa^{23}/ ‘tooth’

CIE #250 **/**sak^{21}**/ ‘**to build’ #456 /hak^{21}/ ‘to be hard’

/ts/ : /s/

CIE #46 /tsii^{52}/ ‘seed’ # 457 /sii^{52}/ ‘to be’

CIE #458 /tsaw^{23}/ ‘to receive’ # 307 /saw^{23}/ ‘to boil’

CNE #71 /tsii^{21}/ ‘salt’ #265 /sii^{23}/ ‘medicine’

/tɬ/ :/tɬ^{h}**/**

CIE #283 /tɬaa^{52}/ ‘to fall ’ #460 /tɬ^{h}aa^{52}/ ‘cause to fall’

CNE #459 /tɬaaj^{44}/ ‘to be late’ #95 /tɬ^{h}aa^{21}/ ‘wing’

CNE #35 /tɬaaŋ^{23}/ ‘mountain’ #22 /tɬ^{h}aŋ^{21} .lam^{44}/ ‘south’

/tɬ^{h}**/ : /**l̥**/**

CIE #374 /tɬ^{h}um^{23}/ ‘to be sweet’ #479 /l̥um^{23}/ ‘to be warm’

CNE #481 /tɬ^{h}aa^{52}/ ‘caused to fall’ #358 /l̥aa^{44}/ ‘to be far’

/tɬ/ : /ts/

CIE #478 /tɬuŋ^{44}/ ‘go towards home’ #463 /tsuŋ^{44}/ ‘to pick (over, upon)’

CIE #520 /tɬaan^{44}/ ‘to flee’ #521 /tsaan^{44}/ ‘to be lost (portion)’

CIE #480 /tɬɔːŋ^{23}/ ‘to travel, to visit’ #464 /tsɔːŋ^{23}/ ‘to imitate’

/tɬ/ : /t/

CIE #35 /tɬaaŋ^{23}/ ‘mountain’ #465 /taaŋ^{23}/ ‘chest’

CNE #371 /tɬɛɛw^{23}/ ‘to be bright’ #289 /tɛɛm^{23}/ ‘to tie’

CNE #27 /tɬak^{21}/ ‘mud’ #476 /tap^{21}/ ‘to cry’

/l/ : /l̥/

CIE #468 /law^{21}/ ‘negation marker’ #472 /l̥aw^{21}/ ‘to be lost’

CNE #475 /liam^{44}/ ‘to overflow’ #264 /l̥iam^{21}/ ‘to hurt’

/ɾ/ : /ɾ̥/

CIE #321 /ɾuu^{52}/ ‘to steal’ #473 /ɾ̥uu^{52}/ ‘to wear’

CIE #380 /ɾaw^{23}/ ‘to be dry’ #470 /ɾ̥aw^{23}/ ‘to scold’

CNE #144 /ɾil^{23}/ ‘intestines’ #111 /ɾ̥il^{23}/ ‘to choose’

/l/ : /ɾ/

CIE #131 /lɛj^{23}/ ‘tongue’ #477 /ɾɛj^{23}/ ‘to be last long’

CIE #242 /liak^{52}/ ‘to lick’ #471 /ɾiak^{52}/ ‘to sleep at night’

/l̥/ : /ɾ̥/

CIE #467 /l̥uum^{44}/ ‘to be round’ #474 /ɾ̥uum^{44}/ ‘to be roar’

CIE #41 /l̥iŋ^{23}/ ‘thorn’ #365 /ɾ̥iŋ^{23}/ ‘to be green’

CNE #264 /l̥iam^{21}/ ‘to be far’ #384 /ɾ̥iam^{23}/ ‘to be sharp’

ø: /j/

CIE #130 /kaa^{23}/ ‘mouth’	#469 /kaaj^{23}/ ‘to climb up’
CIE #133 /haa^{23}/ ‘tooth’	#59 /haaj^{23}/ ‘mango’
CNE #423 /laa^{52}/ ‘to take’	#140 /laaj^{23}/ ‘navel’

ø: /w/

CIE #466 /naa^{23}/ ‘to be sick’	#180 /naaw^{23}/ ‘brother, sister’
CNE #382 /saa^{23}/ ‘to be hot’	#341 /saaw^{44}/ ‘to be long’
CNE #152 /kɛɛ^{21}/ ‘leg’	#83 /kɛɛw^{52}/ ‘to bite’

2.1.2 Variation of Consonants

There are two types of consonant variation in Falam, namely, allophonic variation[17] and free variation[18].

2.1.2.1 Allophonic variation

Unaspirated stops /p, t, k/ and the unreleased [pˀ, tˀ, kˀ] are in complementary distribution. The unaspirated stops always occur word initially and the unreleased stops always occur word finally. These phones are phonetically similar, and they are called variants or allophones of the same phoneme as in (1):

(1) **Allophonic rule**: /p, t, k/ → [pˀ, tˀ, kˀ]/ ___#

/puan/ ‘to shallow’	[tsuapˀ] ‘lung’
/kɛɛw/ ‘to bite’	[kɔɔkˀ] ‘to scold’
/tum/ ‘to get down’	[k^{h}atˀ] ‘to be full’

[17] The variation in sound is conditioned by the environment in which the sound occurs.

[18] Phones are not affected by the environment but there is a free choice between one phone and the other.

2.1.2.2 Free variation

There is a phonetic difference between [v] and [w] in word initial positions but these two segments can be substituted for each other without changing the meaning of the word. All syllables beginning with [v] can be pronounced as [w] in connected speech or rapid speech. This condition can be found at the word level, phrase level, and clause level. [z] and [j] also follow the same pattern of [v] and [w]. Therefore, this analysis proposes that [v] and [w] as well as the [z] and [j] are in free variation in Falam. In this variation, /w/ and /j/ have wider distributions, they occur significantly word finally while they are in free variation with [v] and [z] word initially. Therefore, /w/ and /j/ are chosen to be the underlying form to keep the phoneme chart simpler. Examples of free variation are provided in examples (2) and (3):

(2) **Free variation rule** : /w/ ~ [v]/#___

/wɔk^{21} saa^{52}/ ~ [vɔk^{21} saa^{52}] 'pig meat'

wɔk^{21} saa^{52} na^{21} d̰uʔ^{44} mɔɔ^{21}

pig meat 2S want Qp.

do you want pork?

(3) **Free variation rule** : /j/ ~ [z]/#___

/juaŋ^{23}/ ~ [zuaŋ^{23}] 'to fly'

waa^{21} tɛɛ^{44} pɔɔl^{21} an^{44} juaŋ^{23} ɾɛɛ^{21}raw^{21}

bird Pl. 3P fly continuously

Birds are flying.

2.2 Vowels

This analysis proposes that Falam has five single vowel phonemes. The vowel phonemes in Falam are shown in Table 4.

	Front	**Central**	**Back**
Close	i		u
Open-mid	ɛ		ɔ
Open		a	

Table 4. Vowel phonemes

There are two front vowels: the close front unrounded vowel /i/ and an open mid front unrounded vowel /ɛ/. The two back vowels are the close back rounded vowel /u/ and an open mid back unrounded vowel /ɔ/. Length is contrastive in Falam (see Section 3.3.4), but long vowels will be regarded as a sequence of two indentical vowels (see Section 3.3.3).

There are also two diphthongs in Falam: the front diphthong /ia/ and the back diphthong /ua/. The front diphthong /ia/ is an opening diphthong starting from a close front vowel position to an open central vowel position. Examples of front diphthong are shown in (4):

(4) /sia^{52}/ 'to be bad' /biaŋ^{23}/ 'cheek'

/lian^{21}/ 'to be wealthy' /jial^{44}/ 'floor'

The back diphthong /ua/ is an opening diphthong starting from a close back rounded vowel position to an open central vowel position. Examples of back diphthongs are shown in (5).

(5) /kua^{21}/ 'hole' /ɾua^{23}/ 'bamboo'

/suaŋ^{44}/ 'to cook' /tsuap^{52}/ 'lung'

2.2.1 Vowel contrasts

Evidences for vowel contrasts are provided below.

/i/ : /ɛ/

CIE #482 /t̪il^{44}/ ‘scrotum’	#483 /t̪ɛl^{44}/ ‘to participate’
CIE #484 /iɾ^{23}/ ‘upper throat’	#485 /ɛɾ^{23}/ ‘to make, to mold’
CIE #486 /kiɾ^{44}/ ‘to be curled’	#195 /kɛɾ^{44}/ ‘clothes’
CNE #259 /tiʔ^{21}/ ‘to be afraid’	#274 /fɛʔ^{21}/ ‘to go’
CNE #487 /sin^{52}/ ‘to apply (blanket)’	#364 /sɛn^{23}/ ‘to be red’

/a/ : /ɔ/

CIE #391 /tsak^{21}/ ‘to be strong’	#488 /tsɔk^{21}/ ‘to mingle, to mix’
CIE #377 /t̪^{h}ak^{21}/ ‘to be spicy’	#489 /t̪^{h}ɔk^{21}/ ‘to start’
CIE #196 /t̪aʔ^{21}/ ‘to weave’	#490 /t̪ɔʔ^{21}/ ‘key’

/u/ : /ɔ/

CIE #493 /t̪uŋ^{23}/ ‘to (make) stand upright’	#492 /t̪ɔŋ^{23}/ ‘to meet’
CIE #494 /k^{h}up^{21}/ ‘to put upside down’	#495 /k^{h}ɔp^{21}/ ‘to be enough’
CIE #141 /luŋ^{23}/ ‘heart’	#516 /lɔŋ^{23}/ ‘to take over’

2.2.2 Allophonic variation of vowels

The high front vowel [e] always occurs before the glide /j/ but it appears as [ɛ] in all other environments as in (6). The two phones are in complementary distribution and are phonetically similar, and they are called variants or allophones of the same phoneme.

(6) **Allophonic rule**: /ɛ/ → [e] / ___ j

/p^{h}ɛɾ^{23}/ ‘mat’ → [p^{h}ej^{23}] ‘to go straight forwards’

/kɛɛw^{52}/ ‘to bite’ → [kej^{44}] ‘I’

/t̪^{h}ɛʔ^{21}/ ‘to sprinkle’ → [t̪^{h}ej^{21}] ‘to hear’

The central vowel /a/ is realized as [ə] when it is short and followed by /w/; therefore, the segment [ə] is analyzed as an allophone of the phoneme /a/ as in (7):

(7) **Allophonic rule**: /a/ → [ə] /___ w

/laaw^{44}/ 'to be wild' → [ləw^{44}] 'field, farm'

/t̪^{h}aaw^{23}/ 'to be fat' → [səw^{23}] 'to be boiled'

/kaaw^{21}/ 'to be wide' → [kəw^{23}] 'to call'

The occurrence of [ə] is very limited as in (7) and the phoneme /a/ appears in all other environments like [lan^{52}] 'to overcome, to jump over', [tap^{21}] 'to cry', [haj^{23}] ' to be wanted, to be needed', and [tam^{44}] 'to be many'. In both of these rules a vowel which is not a back vowel becomes raised slightly preceding a semivowel, which in Falam always high.

2.2.4 Nasalization

Nasalized vowels are not phonemic in Falam. Vowels are nasalized when they occur after and between nasal consonants as seen in (8):

(8) V → [+nasal]/ $C_{[+nasal]}$ ___ $C_{[+nasal]}$

[nĩĩ^{23}] 'sun' [mĩĩ^{52}] 'person'

[ŋãã^{52}] 'fish' [mãn^{52}] 'to be free or to be ready'

[ŋũũn^{23}] 'silver' [mũũ^{52}] 'seed'

[ŋõõŋ^{23}] 'neck' [nãŋ^{44}] 'you (2s)'

The derivation rule for nasalization can be drawn as below:

Underlying Form:	{vaan^{21}}'sky'	{nii^{23}}'to laugh'
Nasalization Rule:	vaan^{21}	nĩĩ^{23}
Surface Form:	[vaan^{21}]	[nĩĩ^{23}]

CHAPTER 3

SYLLABLE STRUCTURE

3.0 Introduction

This chapter demonstrates Falam syllable structure including internal constituents and the template. Also this chapter presents syllable and word structure, segmental distributions in a syllable, and processes conditioned by syllable structure.

3.1 Internal constituents and template

To present the internal structure of a syllable, Hyman (1975:188) asserts that "the syllable consists of three phonetic parts: (1) the onset, (2) the peak or nucleus, and (3) the coda". Following this rule Falam monosyllabic words can be displayed as in Figure 6.

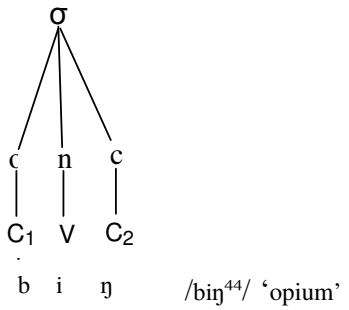

Figure 6. A syllable with coda

For phonological purposes, however, a further sub-grouping is relevant, namely (1) the onset, C_1, and (2) the core or rhyme, consisting the phonetic peak and coda combined, V_1C_2. Besides the CVC template, Burquest (2001:150) states that "every language has a CV syllable which is considered to be universal but since a number of languages do not have a CVC syllable type, the coda position must be a

subordinated syllable position. This, along with some other facts, has given rise to the notion of a syllable rhyme as an intermediate node in syllable structure". In line with this structure the typical Falam monosyllabic word can be analyzed as in Figure 7.

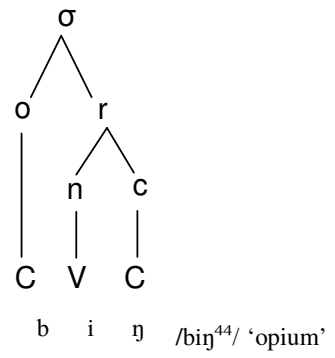

Figure 7. A syllable with rhyme

Based on the syllable structures discussed by the two linguists above, there are a total of nine syllable templates possible in Falam as displayed in Table 5.

Lexeme	**Gloss**	**Syllable Type**
/um^{44}/	'to exist'	VCT
/uam^{23}/	'to ferment'	VVCT
/aa^{44}/	'to be mad'	VVT
/a^{21}/	'his/her,its'	VT
/ka^{21}	'my'	CVT
/kua^{21}/	'hole'	CVVT
/kiaŋ ^{44}/	'to give way'	CVVCT
/kut^{21}/	'hand'	CVCT
/d̪ɔlʔ^{21}/	'to swallow'	CVCCT

Table 5. Falam syllable templates

As seen in Table 5, Falam has an obligatory syllable type of V_1, and an optional second vowel after an obligatory vowel $V_1(V_2)$[19], and can have up to one optional final consonant accompanied with an optional glottal stop $(C_1)V_1(V_2)(C_2)(C_3)$. The syllable pattern $V_1(V_2)$ can be either long vowel (analysed as two identical vowels) or diphthong as will be seen in Section 3.3.3. The T in Table 5 represents any tone that can occur in a syllable. There are four tones which will be discussed later in Section 4.1. Assuming a $(C_1)V_1(V_2)(C_2)(C_3)$ maximal template, the discussion of syllables will be divided into two types consisting of live syllables and dead syllables.

3.1.1 Live syllable

A live (or "smooth" according to Chen 2002) syllable is defined as any syllable ending with a vowel or a sonorant consonant /m, n, ŋ, l, ɾ, w, j/. Live syllables ending with a vowel can have all four contrastive tones. Mostly, vowel finals in live syllables are usually long as provided in (9), except in connected speech when they often shorten.

(9) /kua^{21}/ 'hole' /t̪uu^{21}/ 'sheep'

/l̥aa^{44}/ 'to be far' /aa^{44}/ 'to be mad'

/ɾaa^{23}/ 'to come' /k^{h}aa^{52}/ 'to be bitter'

As an exception, the three syllables (possessive morphemes or subject agreement markers) /a/ 'her, his, it (or s/he,it)', /na/ 'your (or you)', and /ka/ 'my (or I)', which are always attached to following possessed nouns or verbs, have short vowels as already shown in Table 5.

[19] Parentheses indicates an optional. In the syllable template $(C_1)V_1(V_2)(C_2)(C_3)$, C_1 can be any consonant except glottal stop, V_1 and V_2 can be any vowel, C_2 can be an unreleased stop or sonorant, and C_3 can only be a glottal stop which is very limitedly possible after a sonorant (w, j, l, and ɾ).

Live syllables closed with sonorant finals[20] can also occur with any tone and can have either long or short nuclei as in (10):

(10) /baaŋ[21]/ 'to be tired' /kum[21]/ 'year'

/tɬaan[44]/ 'to run' /law[44]/ 'field'

/taaɾ[23]/ 'to hang up' /haj[23]/ 'to be needed'

/kaan[52]/ 'to jump over' /ɾɔl[52]/ 'to live alone'

3.1.2 Dead syllable

A dead (or "checked" according to Chen 2002) syllable is any syllable closed with an oral stop, including a glottal stop. All of the four contrastive tones may occur with dead syllables but have different occurrence of their nuclei as in (11)-(15).

Dead syllables with low tone always have short nuclei as in (11):[21]

(11) /tap[21]/ 'to cry'

/tsak[21]/ 'to be strong'

/t̪[h]at[21]/ 'to kill'

Like oral stops, a syllable closed by a glottal stop is also analyzed as a dead syllable. This is because the occurrence of the glottal stop in syllable final positions functions similar to oral stops with low tone that does not allow long nucleus. It can have a diphthong but not a long vowel as in (12):

(12) /tsiaʔ[21]/ 'to soak, to dip'

/fɛʔ[21]/ 'to go'

/d̪ɔlʔ[21]/ 'to swallow'

---

[20] Among sonorant finals the two glides, /w/ and /j/ are analysed as consonants in this study (see Section 2.1).

[21] Osburne (1975) found dead syllables with low tone and long nuclei in her Zahao study as in /vaak[21]/ 'to crawl', /ŋaak[21]/ 'to wait', /nɔɔk[21]/ 'to burn, to set a fire', but these do not occur in Falam.

Dead syllables with high tone always have long nuclei as in (13):

(13) /d̤ɔɔp^{44}/ ‘to jump down’

/bɛɛk^{44}/ ‘to be muddy’

/kaak^{44}/ ‘to separate’

Dead syllables with rising tone also have long nuclei as in (14):

(14) /k^{h}aat^{23}/ ‘to be rare, to be bare’

/d̤ɔɔk^{23}/ ‘to drink, to suck’

/siip^{23}/ ‘to go back, to withdraw’

Dead syllables with falling tone also have long nuclei as in (15):

(15) /kaap^{52}/ ‘to shoot’

/kɔɔk^{52}/ ‘to scold’

/suut^{52}/ ‘to ask’

Dead syllables with falling tone can have diphthongs as in (16):

(16) /tsuap^{52}/ ‘lung’

/fiak^{52}/ ‘to be narrow’

/ɾuat^{52}/ ‘to think’

3.2 Syllable and word structure

In terms of the Falam word structure, it is observed that Falam permits more than one syllable, including disyllables, trisyllables, and quatrisyllables. There is, sometimes, an ambiguity in making syllable boundaries, because of the difficulty in identifying word breaks. Falam is primarily monosyllabic like other Chin languages so there is an almost perfect one-to-one correspondence between the syllable and the morpheme. However, not all words are totally monosyllabic. Sometimes there is a highly complex word structure based on grammatical and semantic considerations. For example, in translating the conjunction word ‘or’

like word in Falam that contains four syllables, i.e., /a^{21}.si^{44}.law^{21}.lɛɛ^{52}/ which means 'if it is not'. This can make people confused whether they are separate words or a word as each syllable has its own meaning. In this case, the meaning is more than a composite of the parts and thus it may be regarded as an independent word. This study demonstrates up to quatrisyllabic words though Falam may have more multi-syllabic words with affixation. The following are examples of word structures taken from the Mainland South East Asia 436 wordlists (MSEA 2002).

A. Monosyllabic word

Most of Falam words are monosyllabic (see also Figure 7) as in (17):

(17) /kum^{21}/ 'year'

/m̥ul^{44}/ 'feather'

/jiiŋ^{23}/ 'morning'

/puuk^{52}/ 'cave'

B. Disyllabic word

Disyllabic words are also found commonly as in Figure 8.

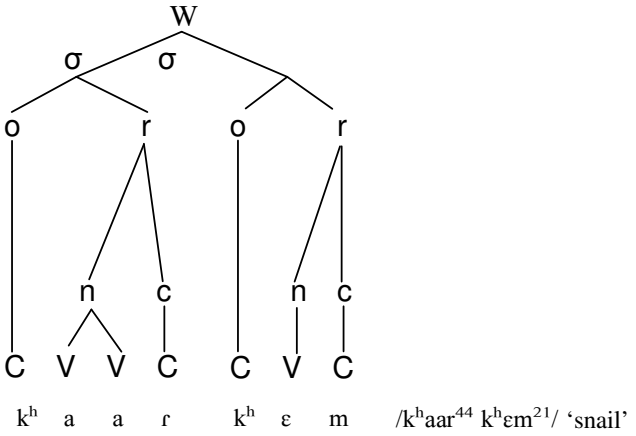

Figure 8. Disyllabic word pattern

More examples are provided in (18):

(18) /bɔʔ^{21}.luŋ^{44}/ ‘how many’

/wut^{21}.jaam^{23}/ ‘ashes’

/tuk^{21}.wiɾʔ^{21}/ ‘window’

C. Trisyllabic word

The trisyllabic word pattern is rarely found in normal words, but it is common to find trisyllables in names of people; /wan^{21}.nɛj^{21}.t̪^{h}aŋ**^{23}**/, for example. The Falam trisyllabic word pattern can be seen as in Figure 9:

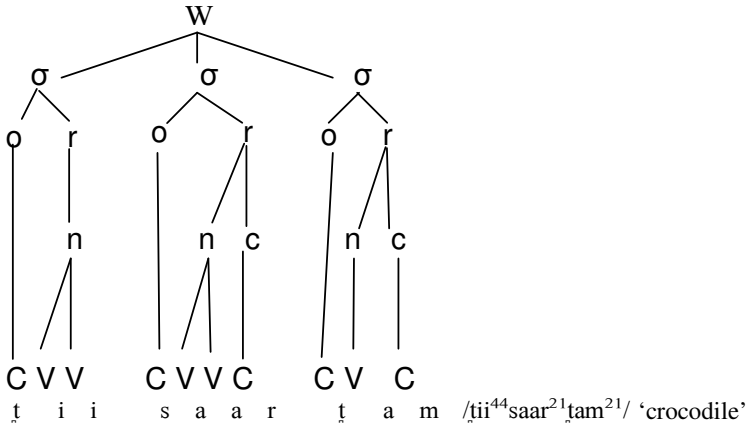

Figure 9. Trisyllabic word pattern

More examples are provided in (19):

(19) /ni^{44}.suaʔ^{21}.lam^{44}/ ‘east’

/ni^{44}.tɬaak^{52}.lam^{44}/ ‘west’

/tɬaŋ^{23}.kaaj^{21}.kuaŋ^{23}/ ‘scorpion’

D. Quatrisyallabic word

Only a few quatrisyllabic words are found as in Figure 10:

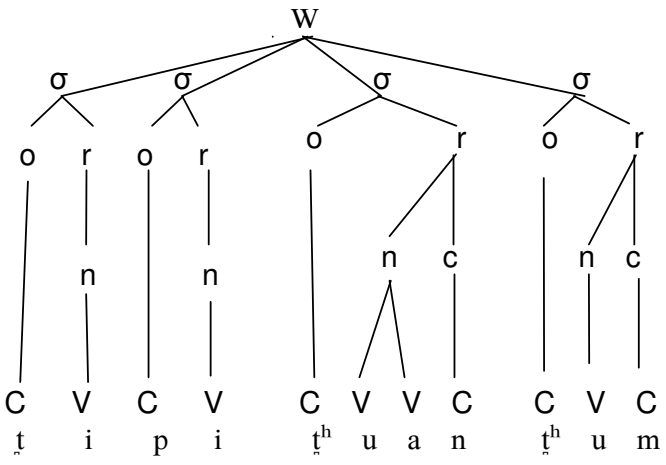

Figure 10. Quatrisyllabic word pattern

More examples are provided in (20):

(20) /tsuu^{21}.tsik^{44}.kʰaaɾ^{44}.bɔɔk^{21}/ ‘insect’

/in^{44}juat^{52}sum^{21}n̥am^{44}/ ‘livestock’

3.3 Segmental distributions in syllable

According to the inventory of consonant and vowel phonemes proposed in Section 2.1 and 2.2 Falam has 29 consonants and 5 vowel phonemes. This section describes segmental distribution patterns of consonant-vowel sequences, ambiguous segments and sequences, vowel-vowel sequences, vowel length distributions, monophthong distribution, and diphthong distribution.

3.3.1 Ambiguous consonant determinations

The phonemes such as /ts/, /tɬ/, and /tɬʰ/ are interpreted as occupying a single consonant position. This single consonant interpretation is called for because the only unambiguous word-initial onsets in Falam are single consonants. There are no unambiguous clusters like /st/, /kr/, and /pl/ for which an interpretation as a cluster is justified. Therefore, they can best be analyzed as affricates because this keeps the syllable template simpler.

There are very limited consonant final clusters with the following phonemes: /l/, /r/, /w/ or /j/ followed by /ʔ/ as shown in (21):

(21) /d̪ɔlʔ[21]/ 'to swallow'

/t̪liɾʔ[21]/'to sprinkle'

/jawʔ[21]/ 'to look'

/ajʔ[21]/ 'to celebrate'

No other consonant clusters are permitted.

3.3.2 Consonant-vowel distributions

There is no heavy restriction on the co-occurrence of initial consonants with vowels. Almost all consonant phonemes can appear in a syllable initial position with monophthongs as well as with diphthongs except the glottal stop /ʔ/. All syllables which begin with vowels are realized to be preceded by glottal stops but this glottal insertion in word initial positions is not significant and is not treated as phonemic. In syllable final position the unreleased allophones [pˀ, tˀ, kˀ] of stops /p, t, k/, voiced nasals /m, n, ŋ/, voiced lateral approximants /l, r/, glides /w, j/, and glottal stop /ʔ/ occur as displayed in Table 6.

	Labial	Alveolar	Velar	Palatal	Glottal
Glottal stop					ʔ
Voiced Nasals	m	n	ŋ		
Voiced Flap		ɾ			
Voiced Lateral Approximant		l			
Glides	w			j	

Table 6. Final consonant phonemes

3.3.3 Vowel-vowel sequences

Falam vowel sequences are displayed in Table 7. Long vowels will be interpreted as a sequence of two identical vowels in this analysis because a single syllable structure template can accommodate both long vowels and diphthongs while keeping the phoneme inventory simple.

	i	**ɛ**	**a**	**u**	**ɔ**
i	+		+		
ɛ		+			
a			+		
u			+	+	
ɔ					+

Table 7. Vowel sequences

3.3.4 Vowel length distributions

In Falam, open syllables always have vowel length phonetically, but this is never contrastive, while vowel length is contrastive in closed syllables. Below is evidence for vowel length contrasts in Falam.

/i/ : /ii/

CIE #486 /kiɾ^{44}/ ‘to be curled’ #278 /kiiɾ^{44}/ ‘to return’

CNE #246 /sim^{23}/ ‘to tell’ #498 /siim^{44}/ ‘late at night, to invade’

CNE #487 /sin^{52}/ ‘to apply (blanket)’ #499 /siin^{21}/ ‘to cover’

/ɛ/ : /ɛɛ/

CIE #500 /sɛm^{21}/ ‘to distribute’ #240 /sɛɛm^{21}/ ‘to blow’

CNE #502 /bɛl^{44}/ ‘a piece of’ #205 /bɛɛl^{23}/ ‘cooking pot’

CNE #501 /d̪ɛŋ^{52}/ ‘at the bottom of’ #282 /d̪ɛɛŋ^{23}/ ‘to throw’

/a/ : /aa/

CIE #372 /baŋ^{21}/ ‘to be the same’ #393 /baaŋ^{21}/ ‘to be tired’

CIE #505 /jaŋ^{44}/ ‘penis’ #504 /jaaŋ^{44}/ ‘ to run’

CIE #369 /t̪aɾ^{23}/ ‘to be old’ #503 /t̪aaɾ^{23}/ ‘to hang’

/u/ : /uu/

CIE #298 /sun^{21}/ ‘to stab’ #13 /suun^{21}/ ‘noon, day’

CIE #510 /suŋ^{44}/ ‘to fail’ #511 /suuŋ^{44}/ ‘to pour’

CIE #522 /fuŋ^{44}/ ‘stick’ #390 /fuuŋ^{44}/ ‘to be slow’

/ɔ/ : /ɔɔ/

CNE #513 /d̪ɔk^{21}/ ‘to run, to leak’ #241 /d̪ɔɔk^{23}/ ‘to suck, to drink’

CNE #492 /t̪ɔŋ^{23}/ ‘to meet’ #441 /t̪ɔɔŋ^{21}/ ‘to confront’

CNE #514 /sɔm^{52}/ ‘to hold up’ #496 /sɔɔm^{23}/ ‘to invite’

3.3.5 Vowel length constraint

This section discusses vowel length constraint in a syllable. As stated already in Section 3.3.4, Falam has length contrasts in closed syllables, but there is a constraint against long vowels closed with a glottal stop. Long vowels or two identical vowels cannot occur in a glottal final syllables (see also Section 3.3.1) as in (22):

(22) /d̰uʔ/ [21] 'to want, to love'

/ɾuʔ[21]/ 'bone'

/kulʔ [21]/ 'to surround, to fence'

But diphthongs can occur with a glottal stop final as in (23):

(23) /kuaʔ [21]/ 'to hug'

/tsiaʔ [21]/ 'to soak'

/ɾuaʔ [21]/ 'rain'

Also vowel length is affected by consonant alternation and verb stem alternation as will be seen in Section 5.5.2.1. A syllable that has a long vowel becomes short when the syllable final is glottalized in secondary stem as in Section 5.2.1.3 or when an oral stop final is alternated to the glottal stop as in Section 5.2.1.2 However, verb stems that have a diphthong with the glottal final can survive without changing their vowel qualities in secondary stems.

3.3.6 Monophthong distributions

Monophthongs can occur word initially, word medially, and word finally.

3.3.7 Diphthong distributions

This analysis proposes that Falam has two diphthongs, /ia/ and /ua/. They can occur word initially, word medially, and word finally like monophthongs. In live syllables, both open and closed, diphthongs occur with the four contrastive tones as in (24).

(24)

/jia^{21}/ ‘habit’	/t̪uan^{21}/ ‘to be early’
/hua^{44}/ ‘to hate’	/liam^{44}/ ‘to overflow’
/ɾua^{23}/ ‘bamboo’	/biaɾ^{23}/ ‘loincloth’
/sia^{52}/ ‘to be bad’	/jiaŋ^{52}/ ‘what’

Diphthong distribution in dead syllables permits only falling tones as shown in (25).

(25)

/ɾuak^{52}/ ‘corpse’	/ɾiak^{52}/ ‘to stay overnight’
/tsuap^{52}/ ‘lung’	/tsiap^{52}/ ‘to be wet’
/kuat^{52}/ ‘to send’	/siat^{52}/ ‘to destroy, to be ruine’

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 **Error! Reference source not found.** and Figure 11. Praat, a computerized program for phonetic analysis was used to identify the pitch contours[22] 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.

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

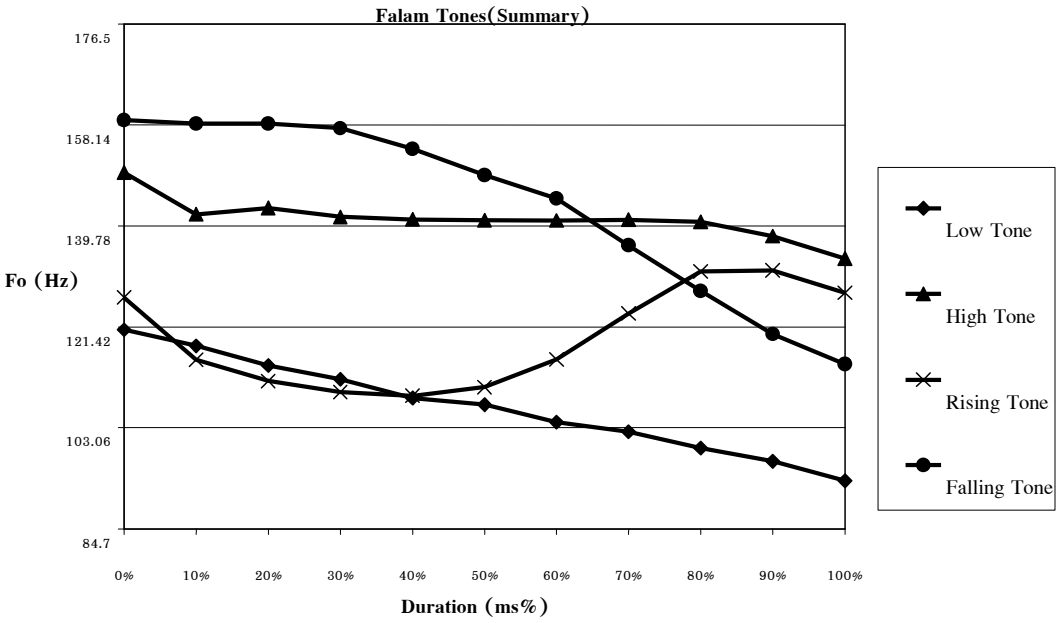

Figure 11. Falam tone contours

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

Figure 11. Tone summary of Falam

The four contrastive tones will be described as follows:

The symbol 21 represents low tone as in /kum^{21}/ 'year'. Phonetically the low tone starts at low pitch level 2, and falls slightly to level 1 at the end point. Since 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 /jaaŋ^{44}/ 'light (weight)'. Phonetically the high tone starts at picth 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 /jiiŋ^{23}/ '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^{h}aa^{52}/ '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/	**H** /44/
/um^{21}/ ‘to take care (child/sick person)’	/um^{44}/ ‘to exist’
/law^{21}/ ‘negation marker’	/law^{44}/ ‘farm’

H /44/	**LH** /23/
/lɛj^{44}/ ‘to buy’	/lɛj^{23}/ ‘tongue’
/jaaŋ^{44}/ ‘light (weigh)’	/jaaŋ^{23}/ ‘back’
/naa^{44}/ ‘buffalo’	/naa^{23}/ ‘to be sick’

L /21/	**LH /**23/
/baaŋ^{21}/ ‘to be tired’	/baaŋ^{23}/ ‘to stop’
/t̪^{h}aaw^{21}/ ‘fat’	/t̪^{h}aaw^{23}/ ‘to be fat’
/n̥aa^{21}/ ‘work’	/n̥aa^{23}/ ‘ear’

LH /23/	**HL** /52/
/n̪ii^{23}/ ‘to laugh’	/n̪ii^{52}/ ‘loincloth’
/d̪iŋ^{23}/ ‘to stand’	/d̪iŋ^{52}/ ‘to be straight’
/sia^{23}/ ‘mython’	/sia^{52}/ ‘to be bad’

L /21/	**H** /44/	**LH** /23/
/t̪ii^{21}/ ‘to say’	/t̪ii^{44}/ ‘water’	/t̪ii^{23}/ ‘egg’
/ruun^{21}/ ‘to save’	/ruun^{44}/ ‘group’	/ruun^{23}/ ‘house’

H /44/	**LH** /23/	**HL** /52/
/in^{44}/ ‘house’	/in ^{23}/ ‘to drink’	/in^{52}/ ‘ergative marker’
/baw^{44}/ ‘to swell’	/baw ^{23}/ ‘to exist’	/baw^{52}/ ‘to bark’

L /21/	**H** /44/	**LH** /23/	**HL** /52/
/paa^{21}/ ‘male’	/paa^{44}/ ‘mushroom’	/paa^{23}/ ‘adverbial particle’	/paa^{52}/ ‘father’
/jaa^{21}/ ‘a hundred’	/jaa^{44}/ ‘to be ticklish’	/jaa^{23} / ‘palm’	/jaa^{52}t̪uum^{23}/ ‘wild goat’

4.1.3 Tone sandhi

According to Burquest (1993:195), “Tone sandhi [22] 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

[22] 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 syllabes as in (26). Rising tone syllables retain their underlying tone in isolation or in sentence final position.

Rule: LH → H / _ T

(26) /t̪ʰii^{23}/ 'to die'

a^{21} **t̪ʰii^{23}**	an^{44} **t̪ʰii^{23}**
1Sg. die	1Pl. die
He died.	They died.
a^{21} **t̪ʰi^{44}** mɛɛn^{23}	an^{44} **t̪ʰi^{44}** mɛɛn^{23}
1Sg. die merely	1Pl. die merely
He merely died.	They merely died.
a^{21} **t̪ʰi^{44}** d̪iŋ^{52}	an^{44} **t̪ʰi^{44}** d̪iŋ^{52}
1Sg. die will	1Pl. die will
He will die.	They will die.
a^{21} **t̪ʰi^{44}** jaw^{44}	an^{44} **t̪ʰi^{44}** jaw^{44}
1Sg. die Past.	1Pl. die Past.
He died already.	They died already.
a^{21} **t̪ʰi^{44}** law^{21}	an^{44} **t̪ʰi^{44}** law^{21}
1Sg. die Neg.	1Pl. die Neg.
He is not dead.	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 → L/___H (L)

/ɾɔɔl^{23}/ 'food'

ɾɔɔl^{21} ɻ̥iŋ^{44} kan^{44} ɛj^{23}

food green we eat

We eat green food.

ɾɔɔl^{21} sia^{52} ka^{21} ɛj^{23}

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) /ɾɔɔl^{23}/ 'food'

ɾɔɔl^{23} t^{h}aa^{21} ka^{21} ɛj^{23}

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__

/fuu^{23} tsaaŋ^{23}/ → [**fuu^{44}** tsaaŋ^{23}]

sugar cane segment 'segment of sugar cane'

(30) LH → L/__ H

/wuuj^{23} ɾaaŋ^{23}/ → [**vuuj^{21}** ɾaaŋ^{44}]

elephant white 'white elephant'

A reduplicated[23] adjective also undergoes the same pattern in connected speech as in (31):

(31) LH LH → L H

/mɔɔj^{23} mɔɔj^{23}/ → [**mɔɔj^{21}**.mɔɔj**^{44}**]

beautiful beautiful 'beautiful ones (reduplication)'

/saaŋ^{23} saaŋ^{23}/ → [**saaŋ^{21}** saaŋ^{44}]

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

/wuuj^{23} ɾaaŋ^{23} fiim^{23}/ → [**vuuj^{21}**.ɾaaŋ^{44}.fiim^{23}]

elephant white clever 'clever white elephant'

[23] Tones are copied in reduplication except rising tone, /raŋ^{44}raŋ^{44}/ 'faster ones', /nuam^{21}nuam^{21}/ 'beautiful ones', /sia^{52}sia^{52}/ 'bad ones', for example.

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

/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

/wuuj^{23} ɾaaŋ^{23} fiim^{23} biik^{23}/ → [**vuuj^{21}** ɾaaŋ^{44} **fiim^{21}** biik^{44}]
elephant white clever most 'the most clever white elephant'

/ɾɔɔl^{23} t̪^{h}ɔɔ^{23} biik^{23} biik^{23}/ → [**ɾɔɔl^{21}** t̪^{h}ɔɔ^{44} **biik^{21}** biik^{44}]
food good most most 'the best food'

/bɛɛl^{23} d̪um^{23} suŋ^{23} in^{23}/ → [**bɛɛl^{21}** d̪um^{44} **suŋ^{21}** in^{44}]
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^{h}aa^{52}/ 'to be bitter'

a^{21} **k^{h}aa^{52}**

3Sg. bitter

It is bitter.

a^{21} **k^{h}a ^{44}** biik^{23}

3Sg. bitter most

the most bitter one

a^{21} **k^{h}a ^{44}** mii^{52}

3Sg. bitter one

one that is bitter

a^{21} **k^{h}a ^{44}** t̪^{h}ɛj^{44}

3Sg. bitter may

It may be bitter.

a^{21} **k^{h}a ^{44}** law^{21}

3Sg. bitter Neg.

It is not bitter.

(35) HL → L/H__ T

/k^{h}aa^{52}/ ‘to be bitter’

an^{44} **k^{h}aa^{52}**

3Pl. bitter

They are bitter.

an^{44} **k^{h}a^{21}** kaw^{23}

3Pl. bitter surely

They are surely bitter.

an^{44} **k^{h}a^{21}** d̤iŋ^{52}

3Pl. bitter will

They will bitter.

an^{44} **k^{h}a^{21}** t̤^{h}ɛj^{44}

3Pl. bitter may

They may be bitter.

an^{44} **k^{h}a^{21}** law^{21}

3Pl. bitter Neg.

They are not bitter.

All verbs with falling tone and open syllables follow this pattern, e.g., /pee^{52}/ ‘to give, /ɾuu^{52}/ ‘to steal’, /sii^{52}/ ‘to be’.

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

(36) /d̪iŋ^{52}/ ‘to be straight’

a^{21} **d̪iŋ^{52}** ‘it is straight’

an^{44} **d̪iŋ^{52}** law^{21}

3Pl. straight Neg.

They are not straight.

a^{21} **d̪iŋ^{52}** law^{21}

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) /paa^{21}/ ‘male’

ka^{21} **pa^{44}** tsaŋ^{44}	kan^{44} **pa^{44}** tsaŋ^{44}
1Sg. male old	1Pl. male old
I become an adult.	We become adult.

.

/t̪ii^{21}/ ‘to do/make, to say’

ka^{21} **t̪i^{44}** jaw^{44}	kan^{44} **t̪i^{44}** jaw^{44}
1Sg. do/make Past	1Pl. do/make Past.
I made already.	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 /ka^{21}/ 'my (I)', /na^{21}/ 'your (you)', and /a^{21}/ '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) /kɛɛ^{21}/ 'leg' /pum^{21}/ 'stomach'

ka^{44} kɛɛ^{21} 'my leg' ka^{44} pum^{21} 'my stomach'

na^{44} kɛɛ^{21} 'your leg' na^{44} pum^{21} 'your stomach'

/tii^{21}/ ‘to say’	/nɛj^{21}/ ‘to have’
ka^{44} tii^{21} ‘I say’	ka^{44} nɛj^{21} ‘I have’
na^{44} tii^{21} ‘you say’	na^{44} nɛj^{21} ‘you have’

The second tone dissimiliation 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)	/wɔk^{21}/ ‘pig’	/ɾuʔ^{21}/ ‘bone’
	ka^{21} wɔk^{44} ‘my pig’	ka^{21} ɾuʔ^{44} ‘my bone’
	na^{21} wɔk^{44} ‘your pig’	na^{21} ɾuʔ^{44} ‘your bone’

/tap^{21}/ ‘to cry’	/fɛʔ^{21}/ ‘to go’
ka^{21} tap^{44} ‘I cry’	ka^{21} fɛʔ ^{44} ‘I go’
na^{21} tap^{44} ‘you cry’	na^{21} fɛʔ ^{44} ‘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)	/wɔk^{21}/ ‘pig’	/ɾuʔ^{21}/ ‘bone’
	wɔk^{21}tsak^{21} ‘strong pig’	wɔk^{21} ɾuʔ^{21} ‘pig’s bone’
	jaan^{21} wɔk^{21} ‘night pig’	kiiw^{21} ɾuʔ^{21} ‘elbow bone’

/fɛʔ^{21}/ ‘to go’	/tap^{21}/ ‘to cry’
ɾak^{21} fɛʔ^{21}ɔɔ^{52} ‘go ahead’	ɾun^{21} tap^{21} ‘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 Long nucleus Diphthong	m n ŋ ɾ l w j m n ŋ ɾ l w j m n ŋ ɾ l w j	p t k ʔ - - - - - - - ʔ
High tone	All consonants	Monophthong Long nucleus Diphthong	m n ŋ ɾ l w j m n ŋ ɾ l w j m n ŋ ɾ l w j	- - - p t k - - -
Rising tone	All consonants	Monophthong Long nucleus Diphthong	m n ŋ ɾ l w j m n ŋ ɾ l w j m n ŋ ɾ l w j	- - - p t k - - -
Falling tone	All consonants	Monophthong Long nucleus Diphthong	m n ŋ ɾ l w j - - - - - w j m n ŋ ɾ l w j	- - - p t k 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 (ˌ is used for stress marker) as in (41).

(41) ˌluaŋ^{23} 'to flow'

ˌfiim^{23} 'to be wise'

ˌbaaŋ^{21} 'to be tired'

ˌnuam^{21} 'to be good, to be joyful'

ˌhua^{44} 'to hate'

ˌjaaŋ^{44} 'to run'

Stress pattern also occurs when monosyllabic words are attached with nominalizers, /naak^{52}/ and /tuu^{52}/. A nominalized word with two syllables always stresses the second syllable as in (42):

(42) /d̤uʔ^{21}/ 'to love' d̤uʔ^{21}ˌnaak^{52} 'love'

/duʔ^{21}/ 'to love' duʔ^{21}ˌtuu^{52} 'lover'

/fɛl^{44}/ 'to be honest' fɛl^{21}ˌnaak^{52} 'honesty'

/lɛj^{44}/ 'to hate' lɛj^{44}ˌtuu^{52} '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 pa^{21} k^{h}at^{21}naak^{52} ' the first'
one nom.

a nuu^{21} a paa^{21} 'all (including male and female)'
female male

a t̤uum^{23} a sɛɛn^{23} 'all people (including old and young)
big + small

a naŋ^{44}maʔ^{21} 'you (angrily speaking)'
you

a kɛj^{44}maʔ^{21} '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	
[zəw^{52} εε^{21}]	Simple question
who Part.	
HL LH	
[zəw^{52} εε^{23}]	Surprise
who Part.	

(45) Imperative clause "don't do".

L L	
[t̪uaʔ^{21} l̥aʔ^{21}]	Simple imperative
do not (Imp.)	
L L LHL	Graciously speaking
[t̪uaʔ^{21} l̥aʔ^{21} ɔɔ^{352}]	
do not Imp. .	

L L HL

[t̪uaʔ^{21} l̥aʔ^{21} ɔɔ^{52}] Angry

do not Imp.

(46) with a question particle “maw”

H L L L

[na^{44} t̪^{h}ej^{21} ləw^{21}mɔɔ^{21}] Simple question

You know not Part.

Don’t you know?

H L L LH

[na^{44} t̪^{h}ej^{21} ləw^{21}mɔɔ^{23}] Graciously speaking

you know not Part.

Don’t you know?

H L L H

[na^{44} t̪^{h}ej^{21} ləw^{21}mɔɔ^{44}] 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.

CHAPTER 5

MORPHOPHONEMICS

5.0 Introduction

Burquest (2001:81) states that "when the sounds of morphemes vary as a result of being adjoined to other morphemes, the pattern is referred to as morphophonemics." Burquest distinguished three types of morphophonemic alternation: phonologically conditioned alternation, lexical alternation, and morphologically conditioned alternation." In Falam, there may not be a direct correspondence to Burquest's theories, but there are phonologically conditioned alternations and lexical alternations which will be described in Sections 5.1 and 5.2.

5.1 Phonologically conditioned alternations

Phonologically conditioned alternations in Falam can be divided into two groups: major word classes and minor word classes. The major word classes include the alternations of nouns and verbs. The minor word classes include the alternations of adverbial, possessive, and locative morphemes.

5.1.1 Phonologically conditioned alternations in major word classes

The major word classes in this phonologically conditioned alternations include the alternations of noun stems and primary verb stems.

5.1.1.1 Noun stems

In Falam, any open syllable, whether verb or noun[24], is underlyingly (or phonemically) long. There is a process that shortens long vowels. When a common noun syllable that is open becomes the first syllable in a compound word its vowel length becomes short as in (47):

[24] Excluding agreement markers (or possessive markers).

(47) /VV/ →/V/__, in a compound word

a. /paa^{21}/ ‘male’

paa^{21} + tsaŋ^{44} → **pa^{21}** .tsaŋ^{44} ‘a man’

male + old

paa^{21} + fiim^{23} → **pa^{21}**.fiim^{23} ‘a clever-man’

male + clever

b. /t̪ii^{44}/ ‘water’

t̪ii^{44} + waa^{23} → **t̪i^{44}**.waa^{23} ‘river, stream’

water + go

t̪ii^{44} + k^{h}uu^{52} → **t̪i^{44}**.k^{h}uu^{52} ‘vapor’

water + smoke

c. /fuu^{23}/ ‘sugar cane’

fuu**^{23}** + tsaaŋ^{23} → **fu^{44}**. tsaaŋ^{23} ‘segment of sugar cane’

Sugar cane+ step

fuu**^{23}** + m̥uan^{21} → **fu^{44}** .m̥uan^{21} ‘sugar cane (farm)’

sugar cane+ farm

d. /saa^{52}/ ‘animal or meat’

saa^{52}+ wɔm^{23} → **sa^{21}**.wɔm^{23} ‘bear’

animal+ kind

saa^{52}+ bɛk^{21} → **sa^{21}**. bɛk^{21} ‘rabbit’

animal + kind

As an exception, this rule does not apply for some common nouns such as /naa^{44}/ 'buffalo', and /tsɔɔ^{44}/ 'cow' as in (48):

(48) a. /naa^{44}/ 'buffalo'

naa^{44} + saa^{52} → naa^{44}.saa^{52} 'buffalo meat'

buffalo + meat

naa^{44} + pii^{44} → naa^{44}.pii^{44} 'female buffalo'

buffalo + big

b. /tsɔɔ^{44}/ 'cow'

tsɔɔ^{44} + saa^{52} → tsɔɔ^{44}.saa^{52} 'cow meat'

cow + meat

tsɔɔ^{44} + paa^{21} → tsɔɔ^{44}.paa^{21} 'bull'

cow + male

A common noun with a final diphthong also coalescences when it becomes the first syllable of a compound word as in (49):

(49) a. /ɾua^{23}/ 'bamboo'

ɾua^{23} + kuuŋ^{44} → **ɾɔ^{44}**.kuuŋ^{44} 'bamboo tree'

bamboo + tree

kua^{21} 'hole'

kua ^{21} + pii ^{44} → **kɔ^{21}**.pii ^{44} 'big hole'

hole + big

b. /sia^{23}/ 'mithan'

sia^{23} + pii ^{44} → **s**ɛ^{44}pii ^{44} 'mithan (female)'

mithan + big

The following table displays a summmary of lexical alternation of noun stem compounds.

Root syllables			Compound syllables		
Tones	**Rhyme structure**	**Examples**	**Tones**	**Phonological alternation**	**Examples**
21	CVV (long vowel)	paa^{21} 'male'	21	CV (shortening)	**pa^{21}**tsaŋ^{44} 'man'
	CVV (diphthong)	kua^{21} 'hole'		CV (coalescence)	**kɔ^{21}**pii^{44} 'big hole'
44	CVV (long vowel)	n̰ii^{44} 'water'	44	CV (shortening)	**n̰i^{44}**waa^{23} 'river, stream'
23	CVV (diphthong)	ɾua^{23} 'bamboo'	**44**	CV (coalescence)	**ɾɔ^{44}**kuuŋ^{44} 'bamboo tree'
52	CVV (long vowel)	saa^{52} 'animal,	**21**	CV (shortening)	**sa^{21}**bɛk^{21} 'rabbit'

Table 11. A summary of phonological alternations in noun stem compounds

As in Table 11, phonologically conditioned alternation of noun stems is limited to common nouns that have an open syllable when they occur as the first syllable of a compound word. The vowel length is shortened to a single vowel and the vowel is coalesced if it is a diphthong. There is no alternation of noun stems for closed syllables.

5.1.1.2 Primary verb stems

A primary verb stem formation has a relationship with grammatical conditions, yet it has a relationship with phonological conditions. This section will turn only on phonologically conditioned alternations. The primary verb stem formation will be demonstrated in Section 5.2. Verbs in open syllables also have shortening of their vowel length values and coalescence of diphthongs in connected speech as in (50). Verbs with high tone have no shortened form.

(50) a. /saa^{23}/ ‘to be hot’

a^{21} **sa^{44}** tuk^{44}

be hot very

It’s very hot.

b. /sii^{52}/ ‘be, it is’

a^{21} **si^{44}** law^{21}

we be neg.

No, it is not.

c. /t̪ii^{21}/ ‘to say’

a^{21} **t̪i^{44}** law^{21}

He say neg.

He didn’t say.

d. /bia^{52}/ ‘to talk, to speak’

ka^{21} **b**ɛ^{44} d̪iŋ^{52}

I talk will

I will talk to....

The following table displays a summary of phonologically conditioned alternations of primary verb stems.

Root Syllables			Syllables in connected speech		
Tones	**Rhyme structure**	**Examples**	**Tones**	**Phonological alternation**	**Examples**
21	CVV (long vowel)	ˌtii^{21} 'to say'	**44**	CV (shortening)	a^{21} ˌti^{44} law^{21} He didn't say.
	CVV (diphthong)	ˌtia^{21} 'same side'	no alternation		wuj^{23} ˌtia^{21} a^{21}sii^{52} It is big as an elephant.
44	CVV (long vowel)	paa^{44} 'to be thin'	no alternation		a^{21}paa^{44}mii^{52}pɔɔl^{23} The thin ones...
	CVV (diphthong)	hua^{44} 'to hate'			an ^{44}hua^{44} ɔɔ^{52} They hate each other.
23	CVV (long vowel)	saa^{23} 'to be hot'	**44**	CV (shortening)	a^{21}sa^{44} law^{21} It is not hot.
52	CVV (long vowel)	k^{h}aa^{52} 'to be bitter'	**44**	CV (shortening)	a^{21}k^{h}a^{44} paam^{44} It's quite bitter.
	CVV (diphthong)	bia^{52} 'to talk'		CV (coalescence)	ka^{21} bɛ^{44} ˌdiŋ^{52} I will talk to..'

Table 12. A summary of phonologically conditioned alternations in primary verb stems

As shown in Table 12, like noun stems, the phonological alternation of verb stems occurs only with open syllables. The vowel length is shortened and diphthongs are coalesced. This verb stem alternation occurs in primary stem forms in main clause with focus, absolutive, imperative, and declarative when verb finals of these clauses are followed by any syllable in connected speech as in (50). Verbs with closed syllables have no alternate forms of primary stems.

5.1.2 Phonologically conditioned alternations in minor word classes

The minor word classes in phonologically conditioned alternation include the alternations of adverbial, possessive, and locational morphemes.

There are some phonological processes which find their motivation in the notion of syllable structure. This analysis considers the following types of these processes: fortition, linking, deletion, and vowel coalescence.

5.1.2.1 Resyllabification

Minor word classes undergo resyllabification in connected speech, as can be seen in example (52) in which the glides /w/ and /j/ spread to the onset of the following syllable and thereby undergo the rule of conditioned free variation (see Section 2.1.2.2) and may appear as allophones [v] and [z] respectively as in (51):

(51) /law^{44} in^{23}/ → [law^{44} vin^{23}]

field from
from the field

/k^{h}uj^{23} in^{23}/ → [k^{h}uj^{21} zin^{44}]

where from
where from

In example (51), the second example undergoes rising tone sandhi rule (see Section 4.1.3). In rapid speech the coda the first syllable can be deleted: [la^{44} vin^{23}]; [k^{h}u^{21} zin^{44}].

5.1.2.3 Deletion

There is another process which has the effect of changing the structure of the syllable itself, that is, deletion[25]. Falam also has a deletion pattern in which the initial vowel of adverbial, possessive, and locative morphemes.

The adverbial morpheme /in/ is fully pronounced in careful speech, but the segment /i/ of the adverbial morpheme is deleted in connected speech as in (52).

(52) /kan^{44} jaa^{21} ţɛɛ^{44} in^{23}/ → [kan^{44} jaa^{21} ţɛɛn^{44}]

1Pl. all-Dim. Adv.
all of us

[25] In most cases of deletion, the motivation is to preserve or restore a syllable or word pattern which is acceptable within the phonotactics of the language (Burquest 1998:169).

/a^{21} si^{44} naa^{44} in^{23}/ → [a^{21}. si^{44}.naan^{44}]

it be though Adv.

but/however

/ka^{21} pa^{52} t̪^{h}ɔɔ^{44} in^{23}/ → [ka^{21}. pa^{52}. t̪^{h}ɔɔn^{44}]

1Sg. father with Adv.

with my father

As seen in example (52), not only the segment [i] of the adverbial morpheme is deleted but the segment [n] is also combined with the preceding syllable and the tone of an adverbial morpheme is totally lost.

In possessive morpheme deletion the glottal final of the possessive morpheme /iʔ^{44}/ is deleted and the remaining segment [i] may optionally becomes a palatal glide final in connected speech as in (53):

(53) /bɔɔj^{52} paa^{52} iʔ^{44} t̪aa^{23}/ → [bɔɔj^{52} paa^{52} i ^{44} t̪aa^{23}] ~ [bɔɔj^{52}paaj^{44} t̪aa^{23}]

lord man Poss. thing

the Lord's thing (thing of the Lord)

/ka^{21} nuu^{52} iʔ^{44} t̪aa^{23}/ → [ka^{21}nuu^{52} i ^{44} t̪aa^{23}] ~ [ka^{21}nuuj^{44} t̪aa^{23}]

1S mother Poss. thing

my mother's thing (thing of my mother)

/kɛj^{52}-maʔ^{21} iʔ^{44} t̪aa^{23}/ → [kɛj^{52}.maʔ^{23} i ^{44} t̪aa^{23}] ~ [kɛj^{52}.maaj^{23} t̪aa^{23}]

I-self Poss. thing

My thing (mine).

The locative morpheme /iʔ ^{44}/is fully pronounced in careful speech, but the phoneme /ʔ/ of the locative morpheme is deleted in connected speech as in (54):

(54) /wan^{21} iʔ^{44} sii^{21} in^{23}/ → [wan^{21}. i^{44}. siin^{23}]

heaven Loc. place from

from heaven

/k^{h}uj^{23} iʔ^{44} sii^{21} in^{23}/ → [k^{h}uj^{21}.i^{44}.siin^{23}]
where Loc. place from
from where

Sometimes the locative morpheme /iʔ^{44}/ and the indicating place morpheme /sii^{21}/ in examples (55) can totally be deleted. Thus, the syllable structure becomes simpler as [wan^{21}.in^{23}] 'from heaven' and [k^{h}uj^{21}.in^{44}] 'from where' (see rising tone sandhi rule in Section 4.1.3, example 50).

This deletion rule with locative morpheme also occurs when it is preceded by demonstrative pronouns. An initial vowel in the locative morpheme is deleted and loses its syllabic status and the glottal stop is deleted as in (55):

(55) /k^{h}aa^{44} iʔ^{44}/ → [k^{h}aaj^{44}] 'that'
that Loc.

/tsuu^{44} iʔ^{44}/ → [tsuuj^{44}] 'that (abstract matter)'
that Loc.

Slightly different from (55), the final glide /j/ disappears or even the whole morpheme /iʔ^{44}/ disappears in a syllable after deletion if the demonstrative syllable has a front high vowel /i/ as in (56):

(56) /hii^{44} iʔ^{44}/ → [hii^{44}] 'this'
this Loc.

/k^{h}ii^{44} iʔ^{44}/ → [k^{h}ii^{44}] 'there'
there Loc.

It is assumed that the absence of final /j/ in (56) is conditioned by the vowel-like correspondence of the glide /j/ to the vowel /i/.

However, there is also a pattern that allows one to pronounce /iʔ^{44}/ different from the deletion rules mentioned as in (53)-(56). This is a glottalization that only affects vowel length as in (57):

(57) /bɔɔj^{52}paa^{52} iʔ^{44}/ → [bɔɔj^{52}pajʔ^{44}] 'of the Lord'

/ka^{21}nuu^{52} iʔ^{44}/ →[ka^{21}nujʔ^{44}] 'of my mother'

/kej^{52}maʔ^{21} iʔ^{44}/ → [kej^{52}.majʔ^{44}] 'of mine'

/k^{h}aa^{44} iʔ^{44}/ → [k^{h}ajʔ^{44}] 'that'

/tsuu^{44} iʔ^{44}/ → [tsujʔ^{44}] 'that of unseen'

/hii^{44} iʔ^{44}/ → [hiʔ^{44}] 'this'

/k^{h}ii^{44} iʔ ^{44}/ → [k^{h}iʔ ^{44}] 'there'

Examples in (57) might be because of the difference between a careful and normal speech or one dialect to another.

5.1.2.4 Vowel coalescence

Coalescence is a term used to refer to the coming together of linguistic units which were originally distinguishable (Crystal 2003:78) or a pattern of merging two segments to become another distinct segment. This rule is called "vocalic alternations" by Osburne (1975) in her Zahao studies and is also called "a diphthong reduction rule" by Chhangte (1989) in her *Mizo syntax*. The pattern of coalescence occurs when diphthongs are followed by another syllable with a consonantal onset[26].

Coalescence rule 1: /ua/ → [ɔ]

This rule occurs when:

(a) a compound noun is composed of a noun + noun sequence as in (58).

(58) /ɾua^{23} kuuŋ^{44}/ → [ɾɔ^{44}.kuuŋ^{44}] 'bamboo tree'

bamboo tree

[26] These coalescence patterns mirror the vowel shortening rules in Sections 5.1.1.1 and 5.1.1.2.

(b) a compound noun is composed of a noun + adjective sequence as in (59).

(59) /$k^{h}ua^{23}$ pii^{44}/ → [$k^{h}ɔ^{44}.pii^{44}$] 'city'

village big

This coalescence rule also occurs when a primary stem with diphthong /ua/ appears in its secondary stem form (see Section 5.2.1.5). (See also vowel shortening rule in Sections 5.1.1.1 and 5.1.1.2).

Coalescence rule 2: /ia/ → [ɛ]

This rule occurs when:

(a) a compound noun is composed of a noun + adjective sequence as in (60).

(60) /sia^{23} pii^{44}/ → [$sɛ^{44}pii^{44}$] 'female mithan'

mithan big

This coalescence rule also occurs when a primary stem with diphthong /ia/ appears in its secondary stem form (see Section

5.2.1.5 Vowel coalescence). (See also vowel shortening rules in Section 5.1.1.1).

Coalescence rule 3: /aw/ →[ɔ]. In his generative phonology, Sanford (1973:55) called this type of rule a coalescence of vowel and consonant. This rule occurs when a negative word is followed by an adverbial particle as in (61). This can be said to be a combination of coalescence and deletion because the /aw/ in a negation word is reduced and the phoneme /i/ in adverbial suffix is deleted.

(61) /$t̪^{h}ɛj^{21}$ law^{21} in^{23}/ → [$t̪^{h}ej^{21}$ $lɔɔn^{23}$] 'not knowing'

know Neg. Adv.

Besides, this rule mainly occurs when a primary stem with /aw/ appears in its secondary stem form (see Section 5.2.1.5).

5.2 Lexically conditioned alternations

In order to study lexically conditioned alternations, it is necessary to know that Falam verbs have two stems, like other Chin languages such as Zahao (Osburn 1975, Yip 2003), Lai (Hyman and Van Bik 2002), Tiddim (Henderson 1965), Daai (Hartman-So 1989), and K'Cho (Kee Shein Mang 2006). Nouns do not have two stems. This analysis will use the terms "primary" and "secondary" to refer to the two different verb stems. Out of 200 verb stems 115 verb stems (57.5%) have their secondary stem forms. The primary verb stem form is found primarily in topic focus (Osburne 1975), independent (Chhangte 1993) or main clauses and the secondary verb stem form is found in non-focus (Osburne 1975), dependent (Chhangte 1993) or subordinate clauses. In an independent clause, a predicate with an absolutive subject is realized as primary stem as in (62) and a predicate with an ergative subject is realized as secondary stem as in (63) as also described in Lai by Kathol and Vanbik (2002).

(62) ka^{21} nuu^{52} tsuu ^{44} ɾɔɔl^{23} a^{21} **suaŋ^{44}** (primary)
my-mother-Abs- food-3S- cook
My mother cooks/is cooking food.

(63) ka^{21} nuu^{52} in^{52} ɾɔɔl^{23} a^{44} **suan^{21}** (secondary)
my –mother-Erg.-food-3S-cook
My mother cooks food.

The relative clause marker /mii^{52}/ other suffixes such as nominalizer /naak^{52}/, causatives /tɛɾ^{23}/, benefactive /sak^{21}/, associative /pii^{23}/ and other compound verb suffixes require the secondary verb stem as in (64):

(64) m̥uu^{52} (primary) /m̥uʔ^{21} (secondary) 'to see'
ka^{21}-**muʔ^{44}**-mii^{52} 'what I saw' (relative clause)
1S-see-one

hua^{44} (primary)/ huat^{52} (primary) ‘to hate’

huat^{52}-ɔɔk^{52}-naak^{52} ‘mutual hatred’ (nominalized verb)

hate-ref-nom.

tlaa^{52} (primary)/tlaak^{52} (secondary) ‘to fall’

tlaak^{52}tɛɾ^{23} ‘ cause to fall’ (causative clause)

fall-cause

suaŋ^{44} (primary)/suan^{21} (secondary) ‘to cook’

suan^{21}sak^{21} ‘cook for somebody’ (benefactive clause)

cook-for

it^{21} (primary)/ iʔ^{21} (secondary) ‘to sleep’

iʔ^{21}.pii^{23} ‘sleep along with’ (associative clause)

sleep-with

The secondary verb structures are also found before adverbial particles, /lɛɛ^{52}/ ‘if’, /n̥uu^{44}.aʔ^{21}/ ‘after’, /l̥an^{21}.aʔ^{21}/ ‘before’, /wɛɛk^{52}.in^{23}/ ‘since’, / ɾaŋ^{21}.aʔ^{44}/ ‘because’, and /t̥ik.aʔ^{21}/ ‘when’ in subordinate clauses, as in (65):

(65) ɾaa^{23} (primary) - ɾat^{21} (secondary) ‘to come’

na^{21}-**ɾat^{44}**-law^{21} lɛɛ^{52} ka^{44}-t̥^{h}in^{21} a^{21}-hɛɛŋ^{52}-jɛt^{21}-d̥iŋ^{52}

you-come-neg. if my-heart-it-angry-very-fut

If you don’t come, I’ll be very angry.

suaŋ^{44} (primary) - suan^{21} (secondary) ‘to cook’

ɾɔɔl^{23} a^{44}-**suan^{21}**- l̥an^{21}-aʔ^{21} puan^{44} a^{21} sɔɔp^{52}

food he-cook-before, clothes he-wash

He did laundry before he cooked (dinner).

The secondary verb stem is also found in a passive sentence as in (66):

(66) suaŋ^{44} (primary) - suan^{21} (secondary) 'to cook'

ɾɔɔl^{23} tsuu^{44} **suan^{21}** a^{21} sii^{52}

food Ab. cook it be

Food is cooked (by someone).

The following table provides a summary of the Falam verb stems, primary and secondary.

Clause Type	**Primary Stem**	**Secondary Stem**
Main Clause	Focus	Non-focus
	Clause with absolutive	Clause with ergative
	Imperative clause	Clause with causative
	Declarative clause	Clause with associative
	Clause with Y/N question	Clause with benefactive
		Passive sentence
		Sentence with indirect object
Subordinate clause		Relative clause
		Nominalized clause
		Adverbial clause
		Indirect object

Table 13. Primary and secondary verb stem distribution

The occurrence of these stems is governed by grammatical conditions, yet they are phonologically related; this relationship is not fully researched here as the focus of this thesis is phonological. The two sets of stems are always phonologically related, and regular patterns of alternations are observed. In the Falam verb stems, some stems remain unalternated with only their pitch pattern alternating in the secondary stems. According to this analysis, low tone syllables ending in sonorants alternate when they appear in a secondary stem but other tone syllables ending in sonorants do not alternate. Rising tone syllables with final stops never alternate in secondary stem form. A primary stem with falling tone that has a short nucleus and ends with a sonorant never alternates in secondary stem form.

As the Falam primary and secondary verb stem formation is already stated above, the following section will discuss segmental alternation in secondary stems and

tone alternations in secondary stems. Unlike other Chin languages, Falam has tertiary[27] verb stems.

5.2.1 Segmental alternations in secondary verb stems

This section presents segmental alternations in secondary stems including nasal alternation, stop alternation, glottalization, vowel shortening, and vowel coalescence.

5.2.1.1 Nasal alternation

This alternation is between a final velar nasal with the primary stem and an alveolar nasal with the secondary stem. This is called nasal assimilation by Connie Champeon[28] (2005:9) in her resolution and data of Falam orthography as in (67). She asserts, "when the root ends in /ŋ/ the ending changes to /n/ when it is followed by a suffix beginning with a nasal (m, n) that requires a rule: /ŋ/→/n/__m, n."

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[27] The tertiary verb stem occurs when there is an indirect object in a subordinate clause. This form normally occurs with verb stems with closed syllables with diphthongs, /ua/ and /ia/, and the diphthongs are coalesced as follows (see also Appendix V):

suaŋ^{44} (primary) - suan^{21}/sɔn^{52} (secondary) 'to cook'

ɾɔɔl^{23} na^{44} **suan^{21}** law^{21} lɛɛ^{52}

my you cook not if

If you don't cook food,.....

ka^{21} nuu^{52} ɾɔɔl^{23} na^{21} **sɔn^{52}** law^{21} lɛɛ^{52}

my mother food you cook not if

If you don't cook food (for my mother),.....

[28] Connie Champeon is one of the Bible consultants who have been helping the preparation of Falam writer's handbook.

(67) tsiiŋ^{23} (primary)- tsiin^{21} (secondary) ‘to grow’

waaj^{21}nim^{44} ka^{44} **tsiin^{21}** mii^{52} a^{21} taw^{21}

maize I grow one it springs out

The maize I grow springs out.

waaj^{21}nim^{44} ka^{44} **tsiin^{21}**-naak^{52} lɛj^{44}lung^{44} a^{44} t^{h}aa^{21}

maize I grow-nom. soil be good

The soil of the maize I grow is good.

As shown in example (67), Falam may seem to have nasal assimilation in a predictable environment but there are still more examples of complex environments of this nasal alternation that contradict the nasal assimilation rule proposed by Champeon, as in (68):

(68) tsiiŋ^{23}(primary) – tsiin^{21} (secondary)‘to grow’

waaj^{21}.nim^{44} nan^{44} **tsiiŋ^{23}** mɔɔ^{21} (primary)

maize you (Pl) grow Qp

Do you grow maize?

waaj^{21}nim^{44} kan^{44} **tsiiŋ^{23}** naan^{44} (primary)

maize we grow but

we grow maize but....

waaj^{21}nim^{44} na^{44} **tsiin^{21}** k^{h}al^{21} lɛɛ^{52} (secondary)

maize you grow even if

even if you grow maize...

waaj^{21}nim^{44} na^{44} **tsiin^{21}** huam^{21} t̬ik^{44}aʔ^{21}(secondary)

maize you grow want time at

when you want to grow maize....

Thus, it can be concluded that Falam has no predictable nasal assimilation pattern but only has stem alternation. More examples of nasal alternation are provided in (69):

(69)	Primary stem	Secondary stem	Gloss
	m̥aŋ^{23}	m̥an^{21}	'to use, to spend
	siaŋ^{23}	sian^{21}	'to allow'
	jaaŋ^{44}	jaan^{21}	'to run'
	suaŋ^{44}	suan^{21}	'to cook'

As seen in (69) this nasal alternation is associated with rising tone and high tone but not low tone and falling tone.

5.2.1.2 Stop alternation

Moira Yip (2003:18), in her *Phonological markedness and allomorph selection in Zahao*, one of the dialects related to Falam, states that "all vowel final primary stems add a final /-t/ in the secondary stem". Falam also has final addition, although some verb stems, /sii^{52}/ 'it be', /t̬ii^{21}/ 'to say' have no addition of final stops, and /-k/ also appears in secondary stems. These stop alternations are called Epenthesis[29] in Osburne's (1975) analysis of Zahao. Final /-t/ additions are shown in (70):

(70)	Primary stem	Secondary stem	Gloss
	t^{h}aa^{21}	t^{h}at^{21}	'to be good'
	tia^{21}	tiat^{52}	'to put on the same side'
	t^{h}ii^{23}	t^{h}iit^{52}	'to sew, to marry'
	ɾaa^{23}	ɾat^{21}	'to come'
	hua^{44}	huat^{52}	'to hate'
	paa^{44}	paat^{52}	'to be thin'

[29] Burquest (1998) states that epenthesis is most common with vowels, where a vowel is inserted to break up a consonant cluster, specifically by placing the clustering consonants into different syllables.

As seen above, the final /-t/ addition is related to low, high, and rising tones, but the final /-k/ addition is related to falling tone as in (71):

(71)	Primary stem	Secondary stem	Gloss
	wua^{52}	wuak^{52}	‘to beat’
	bia^{52}	biak^{52}	‘to speak’
	maa^{52}	maak^{52}	‘to divorce’
	ɾuu^{52}	ɾuuk^{52}	‘to steal’
	pɛɛ^{52}	pɛɛk^{52}	‘to give’

Also a primary verb with vowel final can instead have a glottal stop in its secondary stem form as in (72):

(72)	Primary stem	Secondary stem	Gloss
	t̪^{h}ii^{23}	t̪^{h}iʔ^{21}	‘to die’
	n̪ii^{23}	n̪iʔ^{21}	‘to laugh’
	m̪uu^{52}	m̪uʔ^{21}	‘to see’

The primary verb stems with final stops /p, t, k/ also alternate with a glottal stop in their secondary stem forms as in (73):

(73)	Primary stem	Secondary stem	Gloss
	t̪^{h}at^{21}	t̪^{h}aʔ^{21}	‘to kill’
	t̪^{h}ɔk^{21}	t̪^{h}ɔʔ^{21}	‘to start, to begin’
	kaap^{52}	kaʔ^{21}	‘to shoot’
	luut^{52}	luʔ^{21}	‘to enter’
	p^{h}iat^{52}	p^{h}iaʔ^{21}	‘to erase, to rub out, to sweep’
	suak^{52}	suaʔ^{21}	‘to come out’

To say that Falam has final epenthesis means there has to be a consistent rule. But the insertion of final /–t/ or /–k/ or /ʔ/ is not clearly predictable. Looking at all examples, (70), (71), (72), and (73) show that Falam has no consistent epenthesis rule but has only stop alternations. The simplest generalization is that a falling tone syllable with vowel final allows the final /k/ addition, while high and rising adds a final /t/, and low sometimes adds /t/, sometimes /ʔ/. Besides, vowel length in primary stems becomes short when the glottal stop is added or when syllable finals are glottalized in the secondary stem forms. However, primary verb stems with diphthongs can survive without alternating their vowel qualities in secondary stems. The glottal final addition and the final glottalization (see below) in secondary stem occurs with primary verb stems that have low and falling tones.

5.2.1.3 Glottalization

Glottalization is a general term for any articulation involving a simultaneous glottal constriction, especially a glottal stop. In Falam, a primary verb stem with low tone that ends with a sonorant final /w, j, ɾ, l/ is glottalized in its secondary stem form as in (74):

(74)	Primary stem	Secondary stem	Gloss
daaj^{21}		daj$\underline{ʔ}^{21}$	‘to be cold’
kaaw^{21}		kaw$\underline{ʔ}^{21}$	‘to be wide’
baal^{21}		bal$\underline{ʔ}^{21}$	‘to be dirty’
t̲aaɾ^{21}		t̲aɾ$\underline{ʔ}^{21}$	‘to be trapped, to be stuck’

As seen in (74), glottalization never allows a long nucleus in secondary stem forms. Also glottalization is associated with low tone syllables with non-nasal sonorant finals. Rising tone syllables (/saɾ^{23}/ ‘to pick up’), falling tone syllable (/bal^{52}/ ‘to destroy’), and high tone syllable (/lɛj^{44}/ ‘to buy’) are not glottalized in their secondary stem forms.

5.2.1.4 Vowel shortening

As seen already in 5.2.1.2, all of the secondary verb stems affected by glottalization also undergo vowel shortening. Another rule of shortening vowels occurs when a low tone syllable with a nasal final that has a long nucleus in primary stem appears in the secondary stem form as in (75):

(75) Primary stem	Secondary stem	Gloss
tsuum^{21}	tsum^{52}	'to pound, to beat'
baaŋ^{21}	baŋ^{52}	'to be tired'
baan^{21}	ban^{52}	'to reach'

As seen above, vowel shortening in secondary stem is associated only with low tone because no other tones have any alternations as in (76):

(76) Primary stem	Secondary stem	Gloss
t̥laaw^{23}	t̥laaw^{21}	'to be lost, to drop'
sɔɔm^{23}	sɔɔm^{21}	'to invite'
saaw^{44}	saaw^{21}	'to be long'
fiiɾ^{44}	fiiɾ^{21}	'to steal, to rob'

5.2.1.5 Vowel coalescence

Primary verb stems with diphthongs, nasal finals and low tones are coalesced in their secondary stem forms as in (77):

(77) Primary stem	Secondary stem	Gloss
lian^{21}	lɛn^{52}	'to be wealthy'
nuam^{21}	nɔm^{52}	'to enjoy, to have fun'
fiaŋ^{21}	fɛŋ^{52}	'to give way'

As shown above, vowel coalescence rule occurs only with low tone. Other tones with diphthongs never have coalesced forms as in (78):

(78) Primary stem	Secondary stem	Gloss
jual^{23}	jual$^{\mathbf{21}}$	'to roll up'
tuam^{44}	t̬uam$^{\mathbf{21}}$	'to scrap'
suak^{52}	suaʔ$^{\mathbf{21}}$	'to get out'

Primary stem				Secondary stem				
Tones	**Rhyme structure**	**Types of nucleus and codas**	**Examples**	**Tones**	**Rhyme structure**	**Types of nucleus and codas**	**Phonological alternation**	**Examples**
Low [21]	VV	long vowel	t^haa^{21} 'to be good'	no alternation	VC	short vowel, stop final	vowel shortening, stop insertion	t^hat^{21} 'to be good'
	VV	diphthong	t̬ia^{21} 'same side'	Falling [52]	VVC	diphthong	no alternation	t̬iat^{52} 'same side'
	V(V)C	short/diphthong, [+nasal] final	jum^{21} 'to believe'	Falling [52]	VC	short vowel [+nasal final]	vowel shortening /coalescence	jum^{52} 'to believe'
	V(V)C	short/long vowel, [+sonorant] final	nɛj^{21} 'to have'	no alternation	VCʔ	short vowel, [+sonorant]+ glottal final	vowel shortening, glottalization	nɛjʔ^{21} 'to have'
	VC	short vowel, [+obstruent] final	tsak^{21} 'to be strong'	no alternation	Vʔ	short vowel, ʔ final	glottal insertion	tsaʔ^{21} 'to be strong'
	V(V)ʔ	short vowel /diphthong, glottal final	fɛʔ^{21} 'to go'	no alternation	V(V)ʔ	short vowel /diphthong	no alternation	fɛʔ^{21} 'to go'
High [44]	VV	long vowel /diphthong	l̥aa^{44} 'to be far'	Falling [52]	VVC	long vowel, stop final	stop insertion	l̥aat^{52} 'to be far'
	V(V)C	[-sonorant] final	ŋ̬ɔɔk^{44} 'to snore'	Low [21]	V(V)C	long vowel, stop final	no alternation	ŋ̬ɔɔk^{21} 'to snore'
	V(V)C	short/long vowel, [+sonorant] final	ɾaŋ^{44} 'to be fast'	Low [21]	V(V)C	short/long vowel, nasal final	nasal alternation	ɾan^{21} 'to be fast'
	VC	short vowel, [+son,-nasal] final	t̬ɛl^{44} 'to participate'	Low [21]	VC	short vowel, [+son,-nasal] final	no alternation	t̬ɛl^{21} 'to participate'

Table 14. A summary of morphophonemic alternations in verb stems

Primary stem				Secondary stem				
Rising [23]	VV	long vowel	$t^{h}ii^{23}$ 'to sew'	Falling [52]	VVC	long vowel, stop final	stop insertion	$t^{h}iit^{52}$ 'to sew'
	V(V)C	long vowel sonorant [-]	$suup^{23}$ 'to reduce'	Low [21]	VVC	no alternation	no alternation	$suup^{21}$ 'to reduce'
	V(V)C	[+nasal] final	$kɛŋ^{23}$ 'to bring'	Low [21]	V(V)C		nasal alternation	$kɛn^{21}$ 'to bring'
	V(V)C [j, w, l, r]		kaw^{23} 'to call'	No alternation	no alternation	no alternation	no alternation	kaw^{23} 'tocall'
Falling [52]	VV	long vowel /diphthong	$k^{h}aa^{52}$ 'to be bitter'	No alternation	VVC	long vowel /diphthong	stop insertion	$k^{h}aat^{52}$ 'to be bitter'
	VV	long V	$m̥uu^{52}$ 'to see'	Low [21]	Vʔ	short vowel, glottal final	glottal insertion, vowel shortening	$m̥uʔ^{21}$ 'to see'
	V(V)C	long vowel/ dipththong [obstruent] final	$waak^{52}$ 'to crawl'	Low [21]	Vʔ	short vowel /diphthong, glottal final	vowel shortening, glottal insertion	waʔ 'to crawl'
	VVC	long vowel, [obstruent] final	$kɔɔk^{52}$ 'to scold'	no alternation	VVC	long vowel, [obstruent] final	no alternation	$kɔɔk^{52}$ 'to scold'
	VC	short vowel, [+nasal] final	$t̥lɛŋ^{52}$ 'to exchange'	no alternation	VC	short vowel, [+nasal] final	no alternation	$t̥lɛŋ^{52}$ 'to exchange'

Table 14. A summary of morphophonemic alternations in verb stems (cont.)

As shown in Table 14, the following generalization can be summarized. Falam has no predictable nasal assimilation pattern but has nasal alternation. Nasal alternation is associated with rising tone and low tone but not low tone and falling tone as in (69). Falam also has final /-t/ and final /-k/ additions in secondary stems. Final /-t/ addition is related to low, high, and rising tones as (70). Final /-k/ addition is related to falling tone as in (71). Also a primary verb with vowel final can instead have a glottal stop in its secondary stem form as in (72).

In Falam, a primary verb stem that ends with a sonorant final /w, j, ɾ, l/ is glottalized in its secondary stem form. The primary verb stems with final stops /p, t, k/ are also alternated to the glottal stop in their secondary stem forms. Glottalization never occurs with a long nucleus in secondary stem forms but may occur with a diphthong. Also glottalization is associated with low tone syllables with sonorant finals (but not nasals) (74) and with falling tone syllables with stop /p, t, k/ finals as seen in Section 6.2, example (88). Most of vowel shortening rules in secondary verb stems are associated with glottalization (see Section 5.2.1.3). Another rule of shortening vowels occurs when a low tone syllable with a nasal final that has long nucleus appears in the secondary stem form as in (75). Primary verb stems with diphthongs and nasal finals are coalesced in their secondary stem forms. The vowel coalescence rule is related only to low tone as in (77). Besides secondary stem formation, Falam has verb stems that require two forms in their secondary stem forms, the second of which is called "tertiary[30]" in this thesis.

[30] There are not many stems that have two forms but few. This stem alternation happens to a syllable with a diphthong closed with velar final that has high tone or rising tone. Diphthongs in the syllables are coalesced and velar nasals alternate to alveolar nasals in secondary stem forms (see Appendix V).

CHAPTER 6

TONE ALTERNATIONS

6.0 Introduction

In the previous description of phonologically conditioned alternations in noun stems (Section 5.1.1.1.) and primary verb stems (Section 5.1.1.2), tone and segmental phonological processes were discussed. This section will describe tone alternations in secondary verb stems. Many tones of the primary stems alternate when they appear in secondary stem forms in ways that are not conditioned by their environments.

6.1 Low tone alternation

Low tone verbs with a nasal final consonant have falling tone in their secondary stem form regardless of whether the primary stem nucleus is long or short as in (79).

(79) Primary stem	Secondary stem	Gloss
laŋ^{21}	laŋ^{52}	'to appear'
baaŋ^{21}	baŋ^{52}	'to be tired'
jum^{21}	jum^{52}	'to believe'
tsuum^{21}	tsum^{52}	'to pound, to beat'

Diphthongs with low tone that are closed with a final nasal in a primary stem have falling tone and diphthongs are coalesced in the secondary stem as in (80):

(80) Primary stem	Secondary stem	Gloss
lian^{21}	lɛn^{52}	'to be wealthy'
t̪^{h}uam^{21}	t̪^{h}ɔm^{52}	'to dress up'
fiaŋ^{21}	fɛŋ^{52}	'to be clear'

Low tone syllables with vowel finals have falling tone and a final /-t/ in their secondary stem forms as in (81):

(81)	Primary stem	Secondary stem	Gloss
ɾii^{21}		ɾiit^{52}	‘to be drunk’
ḍɔɔ^{21}		ḍɔɔt^{52}	‘to be jealous’
paa^{21}		paat^{52}	‘to be like male’
nuu^{21}		nuut^{52}	‘to be like female’
bɛɛ^{21}		bɛɛt^{52}	‘to add’

Syllables with sonorant finals /l, ɾ, w, j/ which are low tone in their primary stem forms retain low tone in secondary stems. It can generally be concluded that low tone with nasal finals and vowel finals have falling tone in secondary stem form.

6.2 High tone alternation

High tone primary verbs are low in their secondary stem forms. This occurs in both closed and dead syllables, whether their nuclei are short or long as in (82). There is no vowel alternation or consonant alternation except nasal alternation (see Section 5.2.1.1).

(82)	Primary stem	Secondary stem	Gloss
ḍaŋ^{44}		dan^{21}	‘to be different’
ṭɛl^{44}		ṭɛl^{21}	‘to participate’
fiiɾ^{44}		fiiɾ^{21}	‘to steal, to rob’
ḍɔɔp^{44}		ḍɔɔp^{21}	‘to jump down’

High tone verbs with open syllables have falling tone and a final /-t/ in their secondary stem forms as in (83):

(83)	Primary stem	Secondary stem	Gloss
jua^{44}		juat^{52}	‘to domesticate’
l̥aa^{44}		laat^{52}	‘to be far’
n̥uu^{44}		n̥uut^{52}	‘to be late’
lɔɔ^{44}		lɔɔt^{52}	‘to be industrious’

As seen in (82), primary stems with high tone closed syllables have low tone in their secondary stem forms and show nasal alternation. Also a high tone syllable with a vowel final has falling tone and a final /-t/ in its secondary stem form as shown in (83).

6.3 Rising tone alternation

Rising tone verbs with open syllables, especially /i/, /a/, and /u/ finals, have low tone in their secondary stem form as in (84):

(84)	Primary stem	Secondary stem	Gloss
saa^{23}		sat^{21}	‘to be hoṭ’
puu^{23}		put^{21}	‘to carry on a shoulder’
t̥^{h}ii^{23}		t̥^{h}iʔ^{21}	‘to die’

As in (84) rising tone primary stem verbs that are low in secondary stem can also be high, but this alternation in secondary stem is governed by low tone dissimilation rule in Section 4.1.4. A rising tone verb closed by a sonorant or an oral stop in the primary stem has low tone in its secondary stem as in (85):

(85)	Primary stem	Secondary stem	Gloss
baaŋ^{23}		baan^{21}	‘to stop’
kɛŋ^{23}		kɛn^{21}	‘to hold, to bring ’
sɔɔm^{23}		sɔɔm^{21}	‘to invite’
siaɾ^{23}		siaɾ^{21}	‘to read’,
d̥ɔɔk^{23}		d̥ɔɔk^{21}	‘to drink’
kaat^{23}		kaat^{21}	‘to be barely’

The only segmental alternation occuring in (85) is an alternation of a velar nasal and an alveolar nasal.

Some rising tone verbs with open syllables (e,i, and ɔ finals) have falling tones and a final /-t/ in their secondary stem forms as in (86):

(86) Primary stem	Secondary stem	Gloss
ɾɛɛ^{23}	ɾɛɛt^{52}	'to keep'
fɛʔ^{21}pii^{23}	fɛʔ^{21}piit^{52}	'to go along with'
saw^{21}pɔɔ^{23}	saw^{21}pɔɔt^{52}	'to be proud'

As shown in the above examples, rising tone is generally low in secondary stem whether the syllable is live or dead. Rising tone syllables with vowel finals /e/ or /ɔ/ have falling tone in their secondary stem forms and a final /t/. Also a rising tone primary stem with front high vowel /i/ final is low or falling unpredictably in secondary stem form as shown in (84) and (86).

6.4 Falling tone alternation

Many falling tone verbs with a primary stem closed with a stop have low tone in their secondary forms with accompanying vowel shortening and glottalization as in (87):

(87) Primary stem	Secondary stem	Gloss
ɾuat^{52}	ɾuaʔ^{21}	'to think'
ɾiak^{52}	ɾiaʔ^{21}	'to stay overnight, to spend the night'
saat^{52}	saʔ^{21}	'to chop, to cut'
suut^{52}	suʔ^{21}	'to ask'

As in (87), falling tone verbs that are low in their secondary stems can also have high tone, but this tone change in secondary stems is governed by a tone

dissimilation rule as in Section 4.1.4. Some falling tone verbs closed with stop finals are the same in both primary and secondary forms. This condition may be affected by their nuclei, such as /i/, /e/, and /ɔ/, as in (88):

(88)	Primary stem	Secondary stem	Gloss
	siit^{52}	siit^{52}	'to kick'
	kɔɔk^{52}	kɔɔk^{52}	'to scold'
	ɾɛɛt^{52}	ɾɛɛt^{52}	'to keep'

Falling tone verbs closed with a sonorant or a stop also show no variation in tone. Falling tone verbs with open syllables also have no tone alternation, but there is one open syllable that is low tone in its secondary stem, that is, the word /m̥uu^{52}/ (primary) /m̥uʔ^{21}/ (secondary) 'to see'. The following table illustrates a summary of the Falam tone alternations:

Tone	**Primary stem**	**Secondary stem**
1 Low (L)	21	52
2 High (H)	44	21/52
3 Rising (LH)	23	21/52
4 Falling (HL)	52	21

Table 15. A summary of tone alternation

As shown in Table 15, low tone syllables in primary stems alternate into falling tone. Low tone syllables with stop /p, t, k/ finals and sonorant (but not nasal) finals do not alternate their tones in secondary stems.

High tone primary stem syllables with sonorant finals alternate into low tone in secondary stems. High tone syllables with open syllables alternate with falling tone in their secondary stem forms.

Rising tone syllables, both open and closed with sonorants and stops, in primary stems alternate into low tone in secondary stems. Exceptionally, rising tone syllables with vowel finals (ɛ,i, and ɔ) alternate with falling tone as in (86):

Falling tone syllables with stop /p, t, k/ finals in primary stems alternate with low tone in secondary stems.

CHAPTER 7

CONCLUSION

7.0 Introduction

This chapter consists of two sections: The first section provides a summary of this analysis and the next section provides suggestions for further study.

7.1 Summary

The Chin people originally migrated from China centuries ago and settled around the plain areas, and then moving around the Chin Hills. Falam, the language of the Chin people, is one of the TB language families, Kuki-Chin Sub-group. Falam includes twenty-nine consonant phonemes and five vowel phonemes. Vowel length is contrastive only in closed syllables.

The maximal syllable template of Falam is $(C_1)V_1(V_1)(C_2)(C_3)$ followed by any tone. All consonants can occur word initially, but only ten can occur word finally. There are two diphthongs, /ua/ and /ia/. Monophthongs and diphthongs can occur word initially, word medially, and word finally. There are no consonant clusters except a non-nasal sonorant followed by glottal stop word-finally. Falam word structure consists of one to four syllables, usually one. There are vowel length contrasts. Glottalized syllables are shorter. Long vowels always shorten in glottal rhymes, but diphthongs stay the same. There are no rising or falling tones with glottalized syllables but there are rising and falling tones with stop-final syllables.

The suprasegmental phonology of Falam contains tone, stress, and intonation. The tonal analysis in this thesis is an auditory analysis based on recorded wordlists and text. There are four underlying tones in Falam: low, high, rising, and falling. All consonants can occur with all tones. Tone sandhi also occurs

in Falam with low, rising and falling tones. Of the four phonemic tones, the high tone never undergoes tone sandhi.

There is a relationship between stress and intonation. Stress patterns fall generally upon the second syllable of a compound word consisting of two syllables, and if the word contains more than two syllables, the stress will fall on the last syllable of the word. Being a tonal language, tone is the most fundamental contrastive element in the suprasegmental phonology of Falam. However, intonation is also meaningful in context, often expressing different moods or feelings, such as impatience or excitement.

Falam has morphophonemic alternations. Morphophonemic alternations mostly occur with nouns in compounding, verbs, and some nominal phrases. There are segmental alternations, namely, nasal alternation, stop alternation, final glottalization, and vowel alternation. Two vowel alternation rules are shortening and coalescence. Diphthongs in nouns with open syllables coalesced when they attach to another syllable to create a compound word. Syllables with a diphthong final in verb stems are also coalesced when followed by another syllable. Open syllables which have long vowels become short when they attach to another syllable to create a compound word. Segmental deletion also occurs with functional morphemes, namely, adverbial, locative, and possessive morphemes.

There is lexical alternation of verb stems, primary and secondary. The secondary stems tend to shorten or stay the same, and never lengthen. Segmental shortenings that affect secondary stems generally involve a single change, mostly forced by the impossibility of long vowels in glottalized rhymes. Regarding glottalization, syllables with glottal closure are normally shorter and occur with low tone. It can be concluded that glottalization produces effective vowel shortening. Some nasal syllables also undergo vowel shortening in secondary stem. When a stop is added to an open syllable in secondary stem, many vowels tend to be shorter than their equivalents in open syllables (/raa^{23} – rat^{21}/ ‘to come’). Some vowels in open and closed syllables are the same length, so that

VV and VVC and both are longer than V and VC as in /paa^{44}/(VV) and /paat^{52}/ (VVC), which occurs only with high tone syllables.

There are also three tone alternations: one converts rising tone into low tone in secondary stem when the primary stem syllable is closed and converts into high, low, and falling tone when the primary stem syllable is open. The second tonal alternation involves the replacement of a falling tone by low tone in secondary stem and a low tone by falling tone in secondary stem. The third alternation is one that converts a primary stem with a high tone into a secondary stem with low tone when the syllable is closed and converts into secondary stem with a falling tone when the syllable is open. Rising tones are never found in secondary stems. The glottal stop is almost always associated with low tone. Sonorants that are not nasals are also glottalized while final stops and nasals are not glottalized.

The segmental shape of a syllable in some cases has no effect on its tonal behavior while in other cases there is an interdependence of tonal and segmental alternations. In terms of the tonal independency, rising tone always alternates, regardless of its syllable type. To some extent, final /-t/ occurrence in secondary stem is unpredictable for its relation on tone. The most obvious interdependency is that when tone is invariant, the situation requires segmental alternations such as vowel length, final alternations, glottalization, and diphthong coalescence. Low tone syllables which are glottalized in secondary stem are only found if stems do not end in nasals because nasals are never glottalized in Falam. Moreover, rising tone that alternates low and falling, high tone that alternates low, falling tone that alternates low exist only for consonant final stems, and rising tone that alternates high exists only for vowel final stems. Also there is an interaction between tone alternation and vowel shortening because vowel length stays the same when the whole stem is invariant. Finally, some conclusions can be drawn for syllable types in secondary stems: all syllables are closed, vowels are mostly short, many syllables are glottalized, there is no vowel lengthening, low diphthongs /ua, ia/ are often coalesced, rising tone alternates level tone, there is no addition of rising

tones or high tones, level tones (both low and high) and rising tone alternate falling.

7.2 Suggestion for further study

This analysis is an initial phonological description of Falam. A further acoustic study would be very a helpful tool to be able to further understanding the Falam sound system. Phonological studies in other dialects in Falam, such as Laizo, Sim, Zahao, Khualsim, Ngawn, Tapong, and so on would also be good for further study. A phonological comparison would also be helpful so that the similarities and the differences among those dialects can widely be understood by researchers. The status of glottal stop is still not entirely clear. The historical relationship between primary and secondary verb stems deserves clarification, and would result on a clearer picture of a single underlying form of each lexeme. As an extension from this study, it would be valuable to do a revision of the existing orthography by applying this phonological analysis.

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APPENDIX I

WORDLISTS

Number	Gloss	Phonetic transription	Phonemic transription
1	sky	vaːn^{21}	waan^{21}
2	sun	niː^{23}	nii^{23}
3	moon	tɬ^{h}aː^{21}.piː^{44}	tɬ^{h}aa^{21}.pii^{44}
4	star	aːɾ^{23}.siː^{21}	aaɾ^{23}.sii^{21}
5	cloud	k^{h}ɔ^{44}.d̪uːɾ^{23}	k^{h}ɔ^{44}.d̪uuɾ^{23}
6	mist	tsum^{21}.tsiː^{23}	tsum^{21}.tsii^{23}
7	rain	ɾuaʔ^{21}	ɾuaʔ^{21}
8	rainbow	vaːŋ^{44}.ɾəw^{21}	waaŋ^{44}.ɾaw^{21}
9	lightning	niːm^{21}.tɬ^{h}aː^{44}	niim^{21}.tɬ^{h}aa^{44}
10	thunder	k^{h}ɔ^{44}.ɾiː^{21}	k^{h}ɔ^{44}.ɾii^{21}
11	wind	tɬ^{h}iː^{23}	tɬ^{h}ii^{23}
12	night	zaːn^{21}	jaan^{21}
13	day	suːn^{21}	suun^{21}
14	morning	ziːŋ^{23}	jiiŋ^{23}
15	noon	suːn^{21}.n̪uː^{44}	suun^{21}.n̪uu^{44}
16	yesteray	ma^{21}.niː^{23}	ma^{21}.nii^{23}
17	tomorrow	t̪^{h}aːj^{52}.ziːŋ^{23}	t̪^{h}aaj^{52}.jiiŋ^{23}
18	year	kum^{21}	kum^{21}
19	east	ni^{44}.suaʔ^{44}.lam^{44}	ni^{44}.suaʔ^{44}.lam^{44}
20	west	ni^{44}.tɬaːkˀ^{52}.lam^{44}	ni^{44}.tɬaak^{52}.lam^{44}
21	north	sakˀ^{21}.lam^{44}	sak^{21}.lam^{44}
22	south	tɬ^{h}aŋ^{21}.lam^{44}	tɬ^{h}aŋ^{21}.lam^{44}
23	water	t̪iː^{44}	t̪ii^{44}
24	river	t̪i^{44}.vaː^{23}	t̪i^{44}.waa^{23}
25	sea	t̪i^{44}.pi^{44}.t̪^{h}uan^{21}.t̪^{h}um^{23}	t̪i^{44}.pi^{44}.t̪^{h}uan^{21}.t̪^{h}um^{23}
26	earth, soil	lej^{44}.luŋ^{44}	lɛj^{44}.luŋ^{44}
27	mud	tsiaɾ^{21}.bɛːkˀ^{44}	tsiaɾ^{21}.bɛɛk^{44}
28	dust	lej^{44}.vutˀ^{21}	lɛj^{44}.wut^{21}
29	stone	luŋ^{44}.t̪əw^{23}	luŋ^{44}.t̪aw^{23}
30	sand	vun^{21}.nɛːl^{44}	wun^{21}.nɛɛl^{44}
31	lime(for betel chew)	t^{h}uŋ^{44}	t^{h}uŋ^{44}
32	gold	suj^{44}	suj^{44}

33	silver	ŋuːn^{23}	ŋuun^{23}
34	iron	t̪^{h}iːɾ^{44}	t̪^{h}iiɾ^{44}
35	mountain	tɬaːŋ^{23}	tɬaaŋ^{23}
36	cave	puːk$^{˥52}$	puuk^{52}
	Plants, Food		
37	forest	t̪uː$^{\mathbf{21}}$	t̪uu$^{\mathbf{21}}$
38	tree	t̪^{h}iŋ^{44}.kuːŋ^{44}	t̪^{h}iŋ^{44}.kuuŋ^{44}
39	branch	t̪^{h}iŋ^{44}.ŋ̊ɛː^{23}	t̪^{h}iŋ^{44}.ŋ̊ɛɛ^{23}
40	tree bark	t̪^{h}iŋ^{44}.hɔːŋ^{23}	t̪^{h}iŋ^{44}.hɔɔŋ^{23}
41	thorn	l̥iŋ^{23}	l̥iŋ^{23}
42	root	t̪^{h}iŋ^{44}.ɾ̥am^{44}	t̪^{h}iŋ^{44}.ɾ̥am^{44}
43	leaf	t̪^{h}iŋ^{44}.n̥aʔ^{21}	t̪^{h}iŋ^{44}.n̥aʔ^{21}
44	flower	paŋ^{44}.paɾ^{21}	paŋ^{44}.paɾ^{21}
45	fruit	t̪^{h}iŋ^{44}. t̪^{h}ɐj^{44}.ɾaʔ^{21}	t̪^{h}iŋ^{44}. t̪^{h}ɛj^{44}.ɾaʔ^{21}
46	seed	tsiː.^{52}muː^{52}	tsii.^{52}muu^{52}
47	grass	ɾ̥am^{21}	ɾ̥am^{21}
48	bamboo	ɾua^{23}	ɾua^{23}
49	bamboo shoot	ɾɔ^{44}.kuːŋ^{44}	ɾɔ^{44}.kuuŋ^{44}
50	mushroom	paː^{44}	paa^{44}
51	cane/rattan	nuaŋ^{44}/tɬaʔ^{21}	nuaŋ^{44}/tɬaʔ^{21}
52	kapok	paːŋ^{21}.pat$^{˥44}$	paaŋ^{21}.pat^{44}
53	sugarcane	fuː^{23}	fuu^{23}
54	betelnut	kuam^{21}	kuam^{21}
55	opium	biŋ^{44}	biŋ^{44}
56	liquor	zuː^{23}	juu^{23}
57	banana(fruit)	ban^{21}l̥aː^{44}	ban^{21}l̥aa^{44}
58	papaya(fruit)	n̥uː^{44}n̥uːn^{21}	n̥uu^{44}n̥uun^{21}
59	mango(fruit)	haːj^{23}	haaj^{23}
60	jackfruit (fruit)	kɔːl^{21} t̪aːt$^{˥52}$	kɔɔl^{21} t̪aat^{52}
61	coconut(fruit)	uŋ^{44}.ɾaʔ^{21}	uŋ^{44}.ɾaʔ^{21}
62	eggplant(fruit)	bɔk$^{˥21}$bɔːn^{21}	bɔk^{21}bɔɔn^{21}
63	peanut	miː^{21}pɛː^{44}	mii^{21}pɛɛ^{44}
64	ginger	t̪^{h}iːŋ^{23}	T̪^{h}iiŋ^{23}
65	garlic	la^{21}sun^{44}	la^{21}sun^{44}
66	corn	vaj^{21}.niːm^{44}	waj^{21}.niim^{44}
67	red pepper, chili	n̥ak$^{˥21}$.p^{h}ɛk$^{˥21}$	n̥ak^{21}.p^{h}ɛk^{21}
68	paddy rice	faːŋ^{23}	faaŋ^{23}
69	cooked rice	buʔ^{21}	buʔ^{21}
70	rice husk	faːŋ^{21}.hiː^{44}	faaŋ^{21}.hii^{44}
71	salt	tsiː^{21}	tsii^{21}

	Animals		
72	animal	ɾam^{21}saː^{52}	ɾam^{21}saa^{52}
73	tiger	pɔː^{21}.piː^{44}	Pɔɔ^{21}.pii^{44}
74	bear	sa^{21}.vɔm^{23}	sa^{21}.wɔm^{23}
75	deer	zuk$^{˥21}$.nɛːŋ^{23}	juk^{21}.nɛɛŋ^{23}
76	monkey	zɔːŋ^{23}	Jɔɔŋ^{23}
77	gibbon	huː^{21}həw^{52}	huu^{21}haw^{52}
78	rabbit	sa^{21}bɛk$^{˥21}$	sa^{21}bɛk^{21}
79	procupine	sa^{21}p^{h}uː^{44}	sa^{21}p^{h}uu^{44}
80	rat	ziːŋ.^{23}n̥am^{21}	jiiŋ.^{23}n̥am^{21}
81	dog	uj^{44}.tsəw^{44}	uj^{44}.tsaw^{44}
82	to bark	bəw^{52}	baw^{52}
83	to bite	kɛːw^{52}	kɛɛw^{52}
84	cat	zɔʔ^{21}.t̪ɛː^{44}	Jɔʔ^{21}.t̪ɛɛ^{44}
85	pig	vɔk$^{˥21}$	wɔk^{21}
86	cow	tsɔː^{44}	tsɔɔ^{44}
87	milk	n̥ɔːj^{52}	n̥ɔɔj^{52}
88	buffalo	naː^{44}	naa^{44}
89	horn	kiː^{52}	kii^{52}
90	tail	mej^{44}	mɛj^{44}
91	elephant	vuːj^{23}	wuuj^{23}
92	elephant tusk	vuːj^{23}.həw^{21}	wuuj^{23}.haw^{21}
93	bird	vaː^{21} t̪ɛː^{44}	waa^{21} t̪ɛɛ^{44}
94	bird’s nest	vaː^{21} t̪ɛ^{44}.buː^{52}	waa^{21} t̪ɛ^{44}.buu^{52}
95	wing	tɬ^{h}aː^{21}	tɬ^{h}aa^{21}
96	feather	vaː^{21} t̪ɛ^{44}.n̥ul^{44}	waa^{21} t̪ɛ^{44}.n̥ul^{44}
97	to fly	zam^{23}/zuaŋ^{23}	jam^{23}/juaŋ^{23}
98	egg	t̪iː^{44}	t̪ii^{44}
99	chicken	aːɾ^{23}	aaɾ^{23}
100	duck	ɾam^{21}.paj^{21}	ɾam^{21}.paj^{21}
101	fish	ŋaː^{52}	ŋaa^{52}
102	snake	ɾuːl^{23}	ɾuul^{23}
103	house lizard	t̪^{h}im^{44}. d̪iː^{21}	t̪^{h}im^{44}. d̪ii^{21}
104	turtle	tsum^{44}.k^{h}ɛːŋ^{21}	tsum^{44}.k^{h}ɛɛŋ^{21}
105	crocodile	t̪iː^{44}.saːɾ^{21}.t̪am^{21}	t̪ii^{44}.saaɾ^{21}.t̪am^{21}
106	frog	bu^{44}.tɬak$^{˥44}$	bu^{44}.tɬak^{44}
107	insect	tsuː^{21}.tsik$^{˥44}$.k^{h}aːɾ^{44}.bɔːk$^{˥21}$	tsuu^{21}.tsik^{44}.k^{h}aaɾ^{44}.bɔɔk^{21}
108	spider	maj^{21}.mɔm^{52}	maj^{21}.mɔm^{52}
109	spider web	maj^{21}.mɔm^{52} ɾaːŋ^{44}	maj^{21}.mɔm^{52} ɾaaŋ^{44}
110	louse (head)	ɾ̥ik$^{˥21}$	ɾ̥ik^{21}

111	termite	sun^{21}.ɾuːl^{44}	sun^{21}.ɾuul^{44}
112	cockroach	tsuk$^{\neg 21}$tsuː^{23}	tsuk^{21}tsuu^{23}
113	snail	k^{h}aːɾ^{44}.k^{h}ɛm^{21}	k^{h}aaɾ^{44}.k^{h}em^{21}
14	mosquito	fik$^{\neg 21}$.faː^{52} /kɔːŋ^{52}.saːŋ^{23}	fik^{21}.faa^{52} /kɔɔŋ^{52}.saaŋ^{23}
115	bee	k^{h}uaj^{23}	k^{h}uaj^{23}
116	fly	t̪^{h}əw^{21}. t̪^{h}ɛː^{23}	t̪^{h}aw^{21}. t̪^{h}ɛɛ^{23}
117	butterfly	p^{h}i^{21}.l̥ip$^{\neg 21}$	p^{h}i^{21}.l̥ip^{21}
118	scorpion	tɬaːŋ^{23}kaj^{21}.kuaŋ^{23}	tɬaaŋ^{23}kaj^{21}.kuaŋ^{23}
	Body		
119	head	luː^{23}	luu^{23}
120	face	m̥aːj^{44}	m̥aaj^{44}
121	brain	tɬ^{h}uak$^{\neg 52}$	tɬ^{h}uak^{52}
122	hair	sam^{44}/m̥ul^{44}	sam^{44}/m̥ul^{44}
123	forehead	tsal^{21}	tsal^{21}
124	eyebrow	mit$^{\neg 21}$.kiːl^{23}	mit^{21}.kiil^{23}
125	eye	mit$^{\neg 21}$	mit^{21}
126	eyelid	mit$^{\neg 21}$.vun^{44}	mit^{21}.wun^{44}
127	nose	n̥aːɾ^{21}	n̥aaɾ^{21}
128	cheek	biaŋ^{23}	biaŋ^{23}
129	ear	n̥aː^{23}	n̥aa^{23}
130	mouth	kaː^{23}	kaa^{23}
131	tongue	lej^{23}	lɛj^{23}
132	saliva	tsiːl^{23}	tsiil^{23}
133	tooth	haː^{23}	haa^{23}
134	gums	ha^{44}.niː^{52}	ha^{44}.nii^{52}
135	chin	k^{h}a^{21}.bɛː^{52}	k^{h}a^{21}.bɛɛ^{52}
136	beard	m̥uːɾ^{21}.m̥ul^{44}	m̥uuɾ^{21}.m̥ul^{44}
137	to shave (beard)	mɛːt$^{\neg 52}$	mɛɛt^{52}
138	back	zaːŋ^{23}	zaaŋ^{23}
139	abdomen	pum^{21}	pum^{21}
140	navel	laj^{23}	laj^{23}
141	heart	luŋ^{23}	luŋ^{23}
142	lungs	tsuap$^{\neg 52}$	tsuap^{52}
143	liver	t̪^{h}in^{21}	t̪^{h}in^{21}
144	intestines	ɾil^{23}	ɾil^{23}
145	hand	kut$^{\neg 21}$	kut^{21}
146	elbow	kiːw^{21}	kiiw^{21}
147	armpit	zak$^{\neg 21}$	jak^{21}
148	palm	za^{44}.p^{h}ak$^{\neg 44}$	ja^{44}.p^{h}ak^{44}
149	finger	zuŋ^{44}	juŋ^{44}

150	fingernail	˧tin^{44}	˧tin^{44}
151	buttocks	˧tɔ^{44}.tsɔɾ^{52}	˧tɔ^{44}.tsɔɾ^{52}
152	leg	kɛː^{21}	kɛɛ^{21}
153	thigh	kɔːŋ^{52}	kɔɔŋ^{52}
154	knee	k^{h}uːk$^{˥52}$	k^{h}uuk^{52}
155	calf	p^{h}ej^{21}.uːm^{21}	p^{h}ɛj^{21}.uum^{21}
156	shin	ŋal^{23}	ŋal^{23}
157	foot	kɛ^{21}.za^{44}.p^{h}ak$^{˥44}$	kɛ^{21}.ja^{44}.p^{h}ak^{44}
158	heel	kɛ^{21}.˧diːl^{23}	kɛ^{21}.˧diil^{23}
159	bone	ɾuʔ^{21}	ɾuʔ^{21}
160	rib	ˬŋaːk$^{˥52}$	ˬŋaak^{52}
161	flesh	˧ti^{52}.saː^{52}	˧ti^{52}.saa^{52}
162	fat	˧t^{h}aːw^{21}	˧t^{h}aaw^{21}
163	skin	vun^{44}	jun^{44}
164	blood	˧t^{h}iː^{44}	˧t^{h}ii^{44}
165	sweat	tɬ^{h}an^{21}	˧tɬ^{h}an^{21}
166	pus	ˬma^{44}.ˬnaːj^{23}	ˬma^{44}.ˬnaaj^{23}
167	excrement	ɛːk$^{˥52}$	ɛɛk^{52}
168	urine	zun^{21}/zin^{21}	jun^{21}/jin^{21}
	People		
169	man	pa^{21}.tsaŋ^{44}	pa^{21}.tsaŋ^{44}
170	woman	nu^{21}.pi^{44}.nuː^{52}	nu^{21}.pi^{44}.nuu^{52}
171	person	miː^{52}	mii^{52}
172	father	paː^{52}	paa^{52}
173	mother	nuː^{52}	nuu^{52}
174	child	naːw^{21}haːk$^{˥52}$	naaw^{21}haak^{52}
175	son-in-low	˧tu^{21}.pa^{21}	˧tu^{21}.pa^{21}
176	husband	pa^{21}.sal^{44}	pa^{21}.sal^{44}
177	wife	nu^{21}.piː^{44}	nu^{21}.pii^{44}
178	widow	nu^{21}.ˬmɛj^{21}	nu^{21}.ˬmɛj^{21}
179a	brother (elder of f)	uː ^{23} (paː)	uu^{23}
179b	borther (elder of m)	uː^{23}	uu^{23}
179c	sister (elder of f)	uː^{23}	uu^{23}
179d	sister (elder of m)	uː^{23}	uu^{23}
180a	brother (yngr of f)	naːw^{23}	naaw^{23}
180b	brother(yngr of m)	naːw^{23}	naaw^{23}
180c	sisster (yngr of f)	naːw^{23}	naaw^{23}
180d	sisster (yngr of m)	naːw^{23}	naaw^{23}
181	friend	ɾual^{23}	ɾual^{23}
182	name	ˬmin^{23}	ˬmin^{23}

	Home		
183	village	$k^{h}ua^{23}$	$k^{h}ua^{23}$
184	road, path	$lam^{44}.zi\text{ː}n^{21}$	$lam^{44}.jiin^{21}$
185	boat	$l\text{ɔː}ŋ^{21}$	$l\text{ɔɔ}ŋ^{21}$
186	house	in^{44}	in^{44}
187	door	$sa\text{ː}ŋ^{44}.ka\text{ː}^{44}$	$saaŋ^{44}.kaa^{44}$
188	window	$\underset{\sim}{t}uk^{\neg 21}.vi\text{ɾ}ʔ^{21}$	$\underset{\sim}{t}uk^{21}.wi\text{ɾ}ʔ^{21}$
189	roof	$\underset{\sim}{d}i^{44}.p^{h}un^{21}$	$\underset{\sim}{d}i^{44}.p^{h}un^{21}$
190	area uner house	$in^{44}.\underset{\sim}{n}uaj^{52}$	$in^{44}.\underset{\sim}{n}uaj^{52}$
191	wall of house	$p^{h}a\text{ɾ}^{52}$	$p^{h}a\text{ɾ}^{52}$
192	mat	$p^{h}\text{ɛ}\text{ɾ}^{23}$	$p^{h}\text{ɛ}\text{ɾ}^{23}$
193	pillow	$lu^{44}.k^{h}am^{21}$	$lu^{44}.k^{h}am^{21}$
194	blanket	$puan^{44}$	$puan^{44}$
195	clothing	$sin^{52}.f\text{ɛ}n^{21}$	$sin^{52}.f\text{ɛɛ}n^{21}$
196	to weave (cloth)	$\underset{\sim}{t}aʔ^{21}$	$\underset{\sim}{t}aʔ^{21}$
197	to dye (cloth)	$but^{\neg 21}$	but^{21}
198	loincloth	$bia\text{ɾ}^{23}$	$bia\text{ɾ}^{23}$
199	trousers	$b\text{ɔː}ŋ^{44}.bi^{21}.sa\text{ː}w^{44}$	$b\text{ɔɔ}ŋ^{44}.bi^{21}.saaw^{44}$
200	to sew	$t^{h}i\text{ː}^{23}$	$t^{h}ii^{23}$
201	needle	$t^{h}im^{23}$	$t^{h}im^{23}$
202	comb	$\underset{\sim}{t}^{h}a\text{ː}j^{21}.\ \underset{\sim}{t}^{h}iʔ^{44}$	$\underset{\sim}{t}^{h}aaj^{21}.\ \underset{\sim}{t}^{h}iʔ^{44}$
203	ring (finger)	$zuŋ^{44}.\underset{\sim}{ɾ}u\text{ː}k^{\neg 52}$	$juŋ^{44}.\underset{\sim}{ɾ}uuk^{52}$
204	paper, cord	$tsa^{44}.\underset{\sim}{n}aʔ^{44}$	$tsa^{44}.\underset{\sim}{n}aʔ^{44}$
205	pot (cooking)	$b\text{ɛ}\text{ː}l^{23}$	$b\text{ɛɛ}l^{23}$
206	coconutshell ladle	$uŋ^{44}.\text{ɾ}aʔ^{21}$	$uŋ^{44}.\text{ɾ}aʔ^{21}$
207	mortar	sum^{44}	sum^{44}
208	pestle	$suk^{\neg 21}.\underset{\sim}{l}u\text{ː}m^{44}$	$suk^{21}.\underset{\sim}{l}uum^{44}$
209	spoon	$ha\text{ː}j^{21}$	$haaj^{21}$
210	plate	$pa^{21}.ka\text{ː}n^{44}$	$pa^{21}.kaan^{44}$
211	firewood	$\underset{\sim}{t}iʔ^{21}.\ \underset{\sim}{t}^{h}iŋ^{44}$	$\underset{\sim}{t}iʔ^{21}.\ \underset{\sim}{t}^{h}iŋ^{44}$
212	fire	$mej^{44}.sa\text{ː}^{23}$	$m\text{ɛ}j^{44}.saa^{23}$
213	ashes	$vut^{\neg 21}.za\text{ː}m^{23}$	$wut^{21}.jaam^{23}$
214	smoke	$mej^{44}.k^{h}u\text{ː}^{52}$	$m\text{ɛ}j^{44}.k^{h}uu^{52}$
215	candle	$p^{h}a^{21}.z\text{ɔː}ŋ^{44}\ d\text{ɛː}n^{21}$	$p^{h}a^{21}.j\text{ɔɔ}ŋ^{44}\ d\text{ɛɛ}n^{21}$
216	drum	$k^{h}uaŋ^{23}$	$k^{h}uaŋ^{23}$
217	gong	$\underset{\sim}{d}a\text{ɾ}^{21}.k^{h}uaŋ^{44}$	$\underset{\sim}{d}a\text{ɾ}^{21}.k^{h}uaŋ^{44}$
218	bow, crossbow	$\underset{\sim}{t}^{h}al^{44}.k^{h}u\text{ː}k^{\neg 52}$	$\underset{\sim}{t}^{h}al^{44}.k^{h}uuk^{52}$
219	arrow	$\underset{\sim}{t}^{h}al^{44}.fuŋ^{44}$	$\underset{\sim}{t}^{h}al^{44}.fuŋ^{44}$
220	spear	$f\text{ɛ}j^{44}$	$f\text{ɛ}j^{44}$
221	knife	$na\text{ː}m^{44}$	$naam^{44}$

	Verbs		
222	to hear	ŋaːj^{23}	ŋaaj^{23}
223	to smell	n̥iːm^{21}	n̥iim^{21}
224	to see	m̥uː^{52}	m̥uu^{52}
225	to wink	mit$^{˥21}$.sin^{52}	mit^{21}.sin^{52}
226	to weep	tap$^{˥21}$	tap^{21}
227	to eat	ej^{23}	ɛj^{23}
228	to swallow	d̥ɔlʔ^{21}	d̥ɔlʔ^{21}
229	to be hungry	ɾil^{21}.ɾɔːŋ^{44}	ɾil^{21}.ɾɔɔŋ^{44}
230	to be full	pum^{21}.puaɾ^{23}	pum^{21}.puaɾ^{23}
231	to be thirsty	t̥i^{44}.haːl^{44}	t̥i^{44}.haal^{44}
232	to drink	in^{23}	in^{23}
233	to be drunk	ɾiː^{21}	ɾii^{21}
234	to vomit	luak$^{˥52}$	luak^{52}
235	to spit	pʰuj^{52}	pʰuj^{52}
236	to cough	kʰuʔ^{21}	kʰuʔ^{21}
237	to sneeze	n̥ap$^{˥21}$. d̥ɔp$^{˥21}$	n̥ap^{21}. d̥ɔp^{21}
238	to yawn	haʔ^{21}.ham^{21}	haʔ^{21}.ham^{21}
239	to breathe	t̥ʰɔ^{21}. t̥hɔː^{21}	t̥ʰɔ^{21}. t̥ʰɔɔ^{21}
240	to blow	sɛːm^{21}/pʰɔː^{21}	sɛɛm^{21}/pʰɔɔ^{21}
241	to suck	zuːk$^{˥21}$/ d̥ɔːp$^{˥23}$	juuk^{21}/ d̥ɔɔp^{23}
242	to lick	liak$^{˥52}$	liak^{52}
243	to smile	n̥iː^{23}/m̥aːj^{44}.pan^{23}	n̥ii^{23}/m̥aaj^{44}.pan^{23}
244	to laugh	n̥iː^{23}	n̥ii^{23}
245	to speak	sim^{23}/tɔŋ^{52}	sim^{23}/tɔŋ^{52}
246	to tell	sim^{23}	sim^{23}
247	to shout	aːw^{23}	aaw^{23}
248	to answer	lɛt$^{˥21}$	lɛt^{21}
249	to lie, to fib	buːm^{23}	buum^{23}
250	to sing	l̥a ^{44}.saː^{21}	l̥a ^{44}.saa^{21}
251	to think	ɾuat$^{˥52}$	ɾuat^{52}
252	to know	t̥ʰej^{21}	t̥ʰɛj^{21}
253	to forget	ŋilʔ^{21}	ŋilʔ^{21}
254	to choose	ɾ̥il^{23}	ɾ̥il^{23}
255	to love	d̥uʔ^{21}	d̥uʔ^{21}
256	to hate	hua^{44}	hua^{44}
257	to wait	ŋaːk$^{˥52}$	ŋaak^{52}
258	to count	siaɾ^{23}	siaɾ^{23}
259	to be afraid	tiʔ^{21}	tiʔ^{21}
260	to be angry	t̥ʰin^{21}.hɛːŋ^{52}	t̥ʰin^{21}.hɛɛŋ^{52}

261	to sleep	it˥˩	it^{21}
262	to snore	ŋɔːk˥˧	ŋɔɔk^{44}
263	to dream	maŋ^{44}.man^{52}	maŋ^{44}.man^{52}
264	to hurt	l̥iam^{21}/tuaʔ^{21}.mɔʔ^{21}	l̥iam^{21}/t̪aʔ^{21}.mɔʔ^{21}
265	medicine	siː^{23}	sii^{23}
266	to itch	t̪^{h}ak˥˩ (t̪^{h}ak˥˩. t̪^{h}ak˥˩)	t̪^{h}ak^{21} (t̪^{h}ak^{21}. t̪^{h}ak^{21})
267	to scratch	k^{h}ɛwʔ^{21}/ k^{h}ɔjʔ^{21}	k^{h}ɛwʔ^{21}/ k^{h}ɔjʔ^{21}
268	to shiver	k^{h}uɾ^{21}	k^{h}uɾ^{21}
269	to die	t̪hiː^{23}	t̪hii^{23}
270	ghost	tɬaː^{32}	tɬaa^{32}
271	to sit	t̪əw^{23}	t̪aw^{23}
272	to stand	d̪iŋ^{23}	d̪iŋ^{23}
273	to kneel	k^{h}uːk˥˧.bil^{44}	k^{h}uuk^{52}.bil^{44}
274	to walk	fɛʔ^{21}	fɛʔ^{21}
275	to crawl	vaːk˥˧	waak^{52}
276	to come	ɾaː^{23}	ɾaa^{23}
277	to enter	luːt˥˧	luut^{52}
278	to return	kiːɾ^{44}	kiiɾ^{44}
279	to push	nam^{44}/ t̪uːl^{44}	nam^{44}/ t̪uul^{44}
280	to pull	d̪iːɾ^{21}	d̪iiɾ^{21}
281	to kick	siːt˥˧	siit^{52}
282	to throw	d̪ɛːŋ^{23}/l̥ɔn^{52}	d̪ɛɛŋ^{23}/l̥ɔn^{52}
283	to fall	tɬaː^{52}	tɬaa^{52}
284	to swim	lɛwʔ^{21}	lewʔ^{21}
285	to float	p^{h}uan^{21}	P^{h}uan^{21}
286	to sink	pil^{23}	pil^{23}
287	to flow	luaŋ^{23}	luaŋ^{23}
288	to give	pɛː^{52}	pɛɛ^{52}
289	to tie	k^{h}it˥˩/tɛːm^{23}/ʂ̪ɛːŋ^{23}	k^{h}it^{21}/tɛɛm^{23}/ʂ̪ɛɛŋ^{23}
290	to wipe	n̥uːl^{23}	n̥uul^{23}
291	to rub, to scrub	p^{h}iat˥˧	p^{h}iat^{52}
292	to wash	k^{h}ɔlʔ^{21}	k^{h}ɔlʔ^{21}
293	to launder	sɔːp˥˧	sɔɔp^{52}
294	to bathe	k^{h}ɔlʔ^{21}(tak˥˩.sa^{52})	k^{h}ɔlʔ^{21}(tak^{21}.sa^{52})
295	to hit	paʔ^{21}/k^{h}ɔːŋ^{23}	paʔ^{21}/k^{h}ɔɔŋ^{23}
296	to split	t^{h}ɛn^{23}	t^{h}ɛn^{23}
297	to cut (hair)	mɛːt˥˧	mɛɛt^{52}
298	to stab	sun^{21}	sun^{21}
399	to grind	ɾial^{23}	ɾial^{23}
300	to plant	ciːŋ^{23}/p^{h}un^{44}	ciiŋ^{23}/p^{h}un^{44}

301	to dig	laj^{21}	laj^{21}
302	to bury (a corpse)	pʰuːm^{23}/vuːj^{23}	pʰuum^{23}/wuuj^{23}
303	to winnow (rice)	sɛːp˥^{23}	sɛɛp^{23}
304	to dry (sth.)	pʰəw^{23}	pʰaw^{23}
305	to pound (rice)	d̪ɛːŋ^{23}/pʰɔm^{52}	d̪ɛɛŋ^{23}/pʰɔm^{52}
306	to cook (rice)	suaŋ^{44}	suaŋ^{44}
307	to boil (sth.)	səw^{23}	saw^{23}
308	to burn	uɾ^{23}/nɔːk˥^{52}	uɾ^{23}/nɔɔk^{52}
309	to extinguish (fire)	mit˥^{21}/pʰalʔ	mit^{21}/pʰalʔ
310	to work	tuan^{44}	tuan^{44}
311	to play	lɛk˥^{21}	lɛk^{21}
312	to dance	laːm^{23}	laam^{23}
313	to shoot	kaːp˥^{52}	kaap^{52}
314	to hunt	pɛːl^{44}	pɛɛl^{44}
315	to kill	t̪ʰat˥^{21}	t̪ʰat^{21}
316	to fight	d̪əw^{23}	d̪aw^{23}
317	to buy	lej^{44}	lɛj^{44}
318	to sell	zuaɾ^{23}	juaɾ^{23}
319	to exchange	tɬʰɛŋ^{52}	tɬʰɛŋ^{52}
320	to pay	pɛː^{52}/ɾuːl^{21}	pɛɛ^{52}/ɾuul^{21}
321	to steal	fiːɾ^{44}/ɾuː^{52}	fiiɾ^{44}/ɾuu^{52}
	Numbers		
322	one (person)	(mi) pa^{21}.kʰat˥^{21}	(mi) pa^{21}.kʰat^{21}
323	two (persons)	pa^{21}.n̪iʔ^{21}	pa^{21}.n̪iʔ^{21}
324	three (persons)	pa^{21}.t̪ʰum^{23}	pa^{21}.t̪ʰum^{23}
325	four (persons)	pa^{21}.liː^{23}	pa^{21}.lii^{23}
326	five (persons)	pa^{21}.ŋaː^{23}	pa^{21}.ŋaa^{23}
327	six (persons)	pa^{21}.ɾuk˥^{21}	pa^{21}.ɾuk^{21}
328	seven (persons)	pa^{21}.sa^{21}.ɾiʔ^{21}	pa^{21}.sa^{21}.ɾiʔ^{21}
329	eight (persons)	pa^{21}.ɾiat˥^{52}	pa^{21}.ɾiat^{52}
330	nine (persons)	pa^{21}.kua^{44}	pa^{21}.kua^{44}
331	ten (persons)	pa^{21}.r̥aː^{23}	pa^{21}.r̥aa^{23}
332	hundred (persons)	za^{21}.kʰat˥^{21}	za^{21}.kʰat^{21}
333	thousand (persons)	t̪ʰɔːŋ^{44}.kʰat˥^{21}	t̪ʰɔɔŋ^{44}.kʰat^{21}
334	to be many	t̪am^{44}	t̪am^{44}
335	all	zaː^{21}.t̪ɛː^{44}	jaa^{21}.t̪ɛɛ^{44}
336	some	r̥ɛːk˥^{52}.kʰat˥^{21}	r̥ɛɛk^{52}.kʰat^{21}
337	to be few	mal^{44}.t̪ɛ^{44}	mal^{44}.t̪ɛɛ^{44}
338	half a unit	r̥ɛːk˥^{52}	r̥ɛɛk^{52}
	Dimentions		

339	to be big	˩tuːm^{23}	˩tuum^{23}
340	to be small	fa^{44}˩tɛː^{44}	fa^{44}˩tɛɛ^{44}
341	to be long	saːw^{44}	saaw^{44}
342	to be short (length)	˩tɔːj^{44}	˩tɔɔj^{44}
343	to be tall	saːŋ^{23}	saaŋ^{23}
344	to be short (height)	niam^{44}	niam^{44}
354	to be thick	saʔ^{21}	saʔ^{21}
346	to be thin	paː^{44}	paa^{44}
347	to be fat	˩tʰaːw^{23}	˩tʰaaw^{23}
348	to be skinny	tɔːl^{23}	tɔɔl^{23}
349	to be wide, broad	kaːw^{21}	kaaw^{21}
350	to be narrow	fiak˥^{52}	fiak^{52}
351	to be deep	˩tʰuːk˥^{52}	˩tʰuuk^{52}
352	to be shallow	puan^{21}	puan^{21}
353	to be round	pum^{23}/˩luːm^{44}	pum^{23}/˩luːm^{44}
354	to be full	kʰat˥^{21}	kʰat^{21}
355	right side	vɔɾʔ^{21}.lam^{44}	wɔɾʔ^{21}.lam^{44}
356	left side	kɛʔ^{21}.lam^{44}	kɛʔ^{21}.lam^{44}
357	to be straight	˩diŋ^{52}	˩diŋ^{52}
358	to be far	˩laː^{44}	˩laa^{44}
359	to be near	naːj^{44}	naaj^{44}
360	this	hiː^{44} (hi^{44})	hii^{44} (hi^{44})
361	that	kʰiː^{44} (kʰi^{44})	kʰii^{44} (kʰi^{44})
	Appearance		
362	black	˩dum^{23}	˩dum^{23}
363	white	ɾaːŋ^{23}/vaːɾ^{23}	ɾaaŋ^{23}/waaɾ^{23}
364	red	sen^{23}	sɛn^{23}
365	green	˩iŋ^{23}	˩iŋ^{23}
366	yellow	aːj^{21}.ɾɛː^{44}	aaj^{21}.ɾɛɛ^{44}
367	to be dirty	baːl^{21}	baal^{21}
368	to be new	˩tʰaɾ^{23}	˩tʰaɾ^{23}
369	to be old	˩taɾ^{23}/˩lun^{21}	˩taɾ^{23}/˩lun^{21}
370	to be dark	˩tʰim^{23}	˩tʰim^{23}
371	to be bright	tlɛːw^{52}	tlɛɛw^{52}
372	to be the same	baŋ^{21}	baŋ^{21}
373	to be different	˩daŋ^{44}	˩daŋ^{44}
	Taste/Feel		
374	to be sweet	tɬʰum^{23}	tɬʰum^{23}
375	to be sour	˩tʰuːɾ^{44}	˩tʰuuɾ^{44}
376	to be bitter	kʰaː^{52}	kʰaa^{52}

377	to be spicy, hot	$\underset{\cdot}{t}^{h}ak^{˥21}$	$\underset{\cdot}{t}^{h}ak^{21}$
378	to be rotten	$tɔ{:}t^{˥52}$/ $\underset{\cdot}{t}^{h}u{:}^{52}$	$tɔɔt^{˥52}$/ $\underset{\cdot}{t}^{h}uu^{52}$
379	to be swell	$tɬ^{h}iŋ^{23}$	$tɬ^{h}iŋ^{23}$
38o	to be dry	$tsa{:}ɾ^{23}$/$ɾəw^{23}$	$tsaaɾ^{23}$/$ɾaw^{23}$
381	to be wet	$tsiaɾ^{44}$/$tsi{:}n^{44}$	$tsiaɾ^{44}$/$tsin^{44}$
382	to be hot	$sa{:}^{23}$	saa^{23}
383	to be cold	$\underset{\cdot}{d}a{:}j^{21}$	$\underset{\cdot}{d}aaj^{21}$
384	to be sharp	$\underset{\circ}{ɾ}iam^{23}$	$\underset{\circ}{ɾ}iam^{23}$
385	to be blunt	$bi{:}l^{21}$	$biil^{21}$
386	to be heavy	$ɾit^{˥21}$	$ɾit^{21}$
387	to be hard	$hak^{˥21}$	hak^{21}
388	to be smooth	$na{:}l^{44}$	$naal^{44}$
	Other qualities		
389	to be fast	$ɾaŋ^{44}$	$ɾaŋ^{44}$
390	to be slow	$fu{:}ŋ^{44}$	$fuuŋ^{44}$
391	to be strong	$tsak^{˥21}$	$tsak^{21}$
392	to be weak	$\underset{\cdot}{d}ɔɾ^{21}$	$\underset{\cdot}{d}ɔɾ^{21}$
393	to be tired	$ba{:}ŋ^{21}$	$baaŋ^{21}$
394	to be blind	$mit^{˥21}.tsɔ{:}^{52}$	$mit^{21}.tsɔɔ^{52}$
395	to be deaf	$\underset{\circ}{ŋ}a^{44}.sɛ{:}t^{˥52}$	$\underset{\circ}{ŋ}a^{44}.sɛɛt^{52}$
396	to be bald	$tsal^{21}.ŋɔlʔ^{21}$	$tsal^{21}.ŋɔlʔ^{21}$
397	to be naked	$\underset{\cdot}{t}ak^{˥21}.lɔ{:}ŋ^{52}$	$\underset{\cdot}{t}ak^{21}.lɔɔŋ^{52}$
398	to be good	$t^{h}a{:}^{21}$	$t^{h}aa^{21}$
399	to be bad	sia^{52}	sia^{52}
400	to be correct	$\underset{\cdot}{d}ik^{˥21}$	$\underset{\cdot}{d}ik^{21}$
401	to be wrong	$sual^{44}$	$sual^{44}$
	Question Words		
402	when	$ziaŋ^{52}.\ \underset{\cdot}{t}ik^{˥21}.aʔ^{21}$	$jiaŋ^{52}.\ \underset{\cdot}{t}ik^{21}.aʔ^{21}$
403	where	$k^{h}uj^{21}.aʔ^{44}$	$k^{h}uj^{21}.aʔ^{44}$
404	who	$zəw^{52}$	jaw^{52}
405	what	$ziaŋ^{52}$	$jiaŋ^{52}$
406	how many	$ziaŋ^{52}.zat^{˥21}$	$jiaŋ^{52}.jat^{21}$
407	stream	$\underset{\cdot}{t}i^{44}.va{:}^{23}$	$\underset{\cdot}{t}i^{44}.waa^{23}$
408	wet rice field	$lej^{44}.kuaŋ^{23}$	$lɛj^{44}.kuaŋ^{23}$
409	to be ripe	$\underset{\circ}{m}in^{23}$	$\underset{\circ}{m}in^{23}$
410	rice seedling	$fa{:}ŋ^{21}.tsi{:}^{52}$	$faaŋ^{21}.tsii^{52}$
411	pangolin	$sa^{21}.p^{h}u{:}^{44}$	$sa^{21}.p^{h}uu^{44}$
412	crested	$suaŋ^{23}$	$suaŋ^{23}$
413	water leech	$\underset{\circ}{ŋ}i{:}t^{˥52}$	$\underset{\circ}{ŋ}iit^{52}$
414	land leech	$tsa{:}ŋ^{21}.vat^{˥21}$	$tsaaŋ^{21}.wat^{21}$

415	earthworm	tsaŋ^{44}.tsɛːl^{21}	tsaŋ^{44}.tsɛɛl^{21}
416	I (1s)	kej^{44}.maʔ^{21}	kej^{44}.maʔ^{21}
417	thou (2s)	naŋ^{44}.maʔ^{21}	naŋ^{44}.maʔ^{21}
418	he/she/it	a^{21}.maʔ^{44}	a^{21}.maʔ^{44}
419	we (1p)	kan^{44}.maʔ^{21}	kan^{44}.maʔ^{21}
420	you (2p)	nan^{44}.maʔ^{21}	nan^{44}.maʔ^{21}
421	they	an^{44}.maʔ^{21}	an^{44}.maʔ^{21}
422	sleeping area	iʔ^{21}.naːk$^{˥52}$.kʰaːn^{44}	iʔ^{21}.naak^{52}.kʰaan^{44}
423	to take	laː^{52}	laa^{52}
424	to disappear	l̥əw^{21}	l̥aw^{21}
425	to split w/a knife	pʰɛl^{23}	pʰɛl^{23}
426	to bend	kɔːj^{21}/kual^{21}	kɔɔj^{21}/kual^{21}
427	to lift	kʰaːj^{23}/tsɔːj^{23}	kʰaaj^{23}/tsɔɔj^{23}
428	to do/make	t̬uaʔ^{21}	t̬uaʔ^{21}
429	don't do it	t̬uaʔ^{21}.l̥aʔ^{21}	t̬uaʔ^{21}.l̥aʔ^{21}
430	half a quantity	ʔ̥ɛːk$^{˥52}$	ʔ̥ɛɛk^{52}
431	to be disgusting	hua^{44}/niŋ^{44}	hua^{44}/niŋ^{44}
432	to be warm	l̥um^{23}	l̥um^{23}
433	to be cold	d̬aːj^{21}	d̬aaj^{21}
434	to be difficult	haɾ^{23}	haɾ^{23}
435	to be easy	ɔl^{23}	ɔl^{23}
436	to loose	d̬ɔɾ^{21}/kaːŋ^{44}	d̬ɔɾ^{21}/kaaŋ^{44}
	Additional wordlists		
435	onion	piat$^{˥52}$/kʰa^{52}.suan^{21}.sɛn^{23}	piat^{52}/kʰa^{52}.suan^{21}.sɛn^{23}
436	ground potato	baː^{44}	baa^{44}
437	to break (law, regulation)	buaɾ^{23}/paʔ^{21}.bal^{52}	buaɾ^{23}/paʔ^{21}.bal^{52}
438	to take hard	taŋ^{23}	taŋ^{23}
439	to get down	tum^{44}	tum^{44}
440	to reduce	tʰum^{44}	tʰum^{44}
441	to confront	t̬ɔːŋ^{21}	t̬ɔɔŋ^{21}
442	to punch	t̬ʰɔːŋ^{21}	t̬ʰɔɔŋ^{21}
443	to play (music)	t̬um^{44}	t̬um^{44}
445	to seedling	təw^{23}	taw^{23}
446	bowel	kʰəw^{23}	kʰaw^{23}
447	to call	kəw^{23}	kaw^{23}
448	to be green (fruit)	kuʔ^{21}	kuʔ^{21}
449	to leak (water)	d̬ɔk$^{˥21}$	d̬ɔk^{21}
450	to point	t̬ɔk$^{˥21}$	t̬ɔk^{21}
451	to be slippery	naːl^{44}	naal^{44}
452	to kiss	n̥am^{21}	n̥am^{21}

453	to trust	ŋat˥^{21}.san^{52}/ɾin^{52}.san^{52}	ŋat^{21}.san^{52}/ɾin^{52}.san^{52}
454	torch	faːɾ^{23}	faaɾ^{23}
455	to visit (patient)	vɛʔ^{21}	wɛʔ^{21}
456	to fly	zuaŋ^{23}	juaŋ^{23}
457	to be	siː^{52}	sii^{52}
458	to receive (portion)	tsəw^{23}	tsaw^{23}
459	to be late	tɬaːj^{44}	tɬaaj^{44}
460	to cause to fall	tɬ^{h}aː^{52}	tɬ^{h}aa^{52}
461	to take	laː^{52}	laa^{52}
462	school	tɬɔːŋ^{21}	tɬɔɔŋ^{21}
463	heaven	van^{21}tsuŋ^{44}	wan^{21}tsuŋ^{44}
464	to imitate	tsɔːŋ^{23}	tsɔɔŋ^{23}
465	chest	taːŋ^{23}	taaŋ^{23}
466	to be sick	naː^{23}	naa^{23}
467	to be round	l̥uːm^{44}	l̥uum^{44}
468	negation marker	l̥əw^{21}	l̥aw^{21}
469	to climb up	kaːj^{23}	kaaj^{23}
470	to scold	ɾ̥əw^{23}	ɾ̥aw^{23}
471	to sleep at night	ɾiak˥^{52}	ɾiak^{52}
472	to be lost	l̥əw^{21}	l̥aw^{21}
473	to wear	ɾ̥uː^{52}	ɾ̥uu^{52}
474	to be roar	ɾ̥uːm^{44}	ɾ̥uum^{44}
475	to overflow	liam^{44}	liam^{44}
476	to grow	t^{h}aŋ^{23}	t^{h}aŋ^{23}
477	to last long	ɾej^{23}	ɾɛj^{23}
478	to go towards home	tɬuŋ^{44}	tɬuŋ^{44}
479	to fight	d̥əw^{23}	d̥aw^{23}
480	to travel, to visit	tɬɔːŋ^{23}	tɬɔɔŋ^{23}
481	scrotum	t̥il^{44}	t̥il^{44}
482	to participate	t̥ɛl^{44}	t̥ɛl^{44}
483	upper throat	iɾ^{23}	iɾ^{23}
484	to make, to mold	ɛɾ^{23}	ɛɾ^{23}
485	to be curled	kiɾ^{44}	kiɾ^{44}
486	to apply (blanket)	sin^{52}	sin^{52}
487	to mingle, to mix	tsɔk˥^{21}	tsɔk^{21}
488	to begin	t̥^{h}ɔk˥^{21}	t̥^{h}ɔk^{21}
489	key	t̥ɔʔ^{21}	t̥ɔʔ^{21}
490	to help	bɔːm^{21}	bɔɔm^{21}
491	to meet	t̥ɔŋ^{23}	t̥ɔŋ^{23}
492	to make stand upright	t̥uŋ^{23}	t̥uŋ^{23}

493	to put upside down	$k^hup^{\neg 21}$	k^hup^{21}
494	to be enough, to be full of	$k^h\text{ɔ}p^{\neg\ \ 21}$	$k^h\text{ɔ}p^{21}$
495	to invite	$s\text{ɔ}\text{ː}m^{23}$	$s\text{ɔɔ}m^{23}$
496	to be needed	$tu\text{ː}l^{44}$	$tuul^{44}$
497	to invade	$si\text{ː}m^{44}$	$siim^{44}$
598	to cover	$si\text{ː}n^{21}$	$siin^{21}$
599	to distribute	$s\text{ɛ}m^{21}$	$s\text{ɛ}m^{21}$
500	at the bottom of	$\underset{\cdot\cdot}{d}\text{ɛ}\text{ŋ}^{52}$	$\underset{\cdot\cdot}{d}\text{ɛ}\text{ŋ}^{52}$
501	a piece of	$b\text{ɛ}l^{44}$	$b\text{ɛ}l^{44}$
502	to hang	$\underset{\cdot\cdot}{t}a\text{ː}r^{23}$	$\underset{\cdot\cdot}{t}aar^{23}$
503	to run	$za\text{ː}\text{ŋ}^{44}$	$jaa\text{ŋ}^{44}$
504	penis	$za\text{ŋ}^{44}$	$ja\text{ŋ}^{44}$
505	to forbid	k^ham^{23}	k^ham^{23}
506	a gorge	$k^ha\text{ː}m^{21}$	k^haam^{21}
507	to buckle a belt	$k^hap^{\neg\ 21}$	k^hap^{21}
508	a pan	$k^ha\text{ː}p^{\neg 52}$	k^haap^{52}
509	to fail	$su\text{ŋ}^{44}$	$su\text{ŋ}^{44}$
510	to pour	$su\text{ː}\text{ŋ}^{44}$	$suu\text{ŋ}^{44}$
511	shoes	$bu\text{ː}t^{\neg 52}$	$buut^{52}$
512	to hold up	$s\text{ɔ}m^{52}$	$s\text{ɔ}m^{52}$
513	to be fatty	$l\text{ɔ}m^{52}$	$l\text{ɔ}m^{52}$
514	to take over	$l\text{ɔ}\text{ŋ}^{23}$	$l\text{ɔ}\text{ŋ}^{23}$
515	to praise	$l\text{ɔ}\text{ː}m^{21}$	$l\text{ɔɔ}m^{21}$
516	winter	$t\text{ɬ}^ha^{21}\underset{\cdot\cdot}{t}a\text{ŋ}^{23}$	$t\text{ɬ}^ha^{21}\underset{\cdot\cdot}{t}a\text{ŋ}^{23}$
517	to be stubborn	$\text{ŋ}al^{23}$	$\text{ŋ}al^{23}$
518	plural marker	$\text{ŋ}aj^{44}$	$\text{ŋ}aj^{44}$
519	to flee	$t\text{ɬ}a\text{ː}n^{44}$	$t\text{ɬ}aan^{44}$
520	to be lost (portion)	$tsa\text{ː}n^{44}$	$tsaan^{44}$

APPENDIX II

SECONDARY VERB STEMS

Number	Gloss	Primary stem	Secondary stem
137	to shave (beard)	mɛɛt^{52}	mɛʔ^{21}
197	to dye (cloth)	but^{21}	buʔ^{21}
200	to sew	tʰii^{23}	tʰit^{52}
223	to smell	n̥iim^{21}	n̥im^{52}
224	to see	m̥uu^{52}	m̥uʔ^{21}
226	to weep	tap^{21}	taʔ^{21}
229	to be hungry	ɾil^{23}.ɾɔɔŋ^{23}	ɾil^{23}.ɾɔɔn^{21}
237	to sneeze	n̥ap^{21}. d̥ɔp^{21}	n̥ap^{21}. d̥ɔʔ^{21}
239	to breathe	t̥ʰɔ^{21}. t̥hɔɔ^{21}	t̥ʰɔ^{21}. t̥hɔɔt^{52}
240	to blow	sɛɛm^{21}/pʰɔɔ^{21}	sɛm^{52}/pʰɔɔt^{52}
242	to lick	liak^{52}	liaʔ^{21}
243	to smile	n̥ii^{23}	n̥iʔ^{21}
244	to laugh	n̥ii^{23}	n̥iʔ^{21}
248	to answer	lɛt^{21}	lɛʔ^{21}
250	to sing	l̥a ^{44}.saa^{21}	l̥a ^{44}.sak^{21}
251	to think	ɾuat^{52}	ɾuaʔ^{21}
256	to hate	hua^{44}	huat^{52}
257	to wait	ŋ̥aak^{52}	ŋ̥aʔ^{21}
261	to sleep	it^{21}	iʔ^{21}
264	to hurt	l̥iam^{21}	l̥ɛm^{52}
266	to itch	t̥ʰak^{21} (t̥ʰak^{21}. t̥ʰak^{21})	t̥ʰaʔ^{21} (t̥ʰak^{21}. t̥ʰaʔ^{21})
268	to shiver	kʰuɾ^{21}	kʰuɾʔ^{21}
269	to die	t̥hii^{23}	t̥hiʔ^{21}
272	to stand	d̥iŋ^{23}	d̥in^{21}
275	to crawl	waak^{52}	waʔ^{21}
276	to come	ɾaa^{23}	ɾat^{21}
277	to enter	luut^{52}	luʔ^{21}
282	to throw	d̥ɛɛŋ^{23}/l̥ɔn^{52}	d̥ɛɛn^{21}
283	to fall	tɬaa^{52}	tɬaak^{52}
285	to float	pʰuan^{21}	pʰɔn^{52}
287	to flow	luaŋ^{23}	luan^{21}
288	to give	pɛɛ^{52}	pɛɛk^{52}
289	to tie	kʰit^{21}/ɾ̥ɛɛŋ^{23}	kʰiʔ^{21}/ɾ̥ɛɛn^{21}

291	to rub, to scrub	$p^{h}iat^{52}$	$p^{h}ia?^{21}$
295	to hit	$k^{h}ɔɔŋ^{23}$	$k^{h}ɔɔn^{21}$
297	to cut (hair)	mɛɛt^{52}	mɛʔ^{21}
300	to plant	tsiiŋ^{23}	tsiin^{21}
301	to dig	laj^{21}	lajʔ^{21}
306	to cook (rice)	suaŋ^{44}	suan^{21}/sɔn^{52}
308	to burn	nɔɔk^{52}	nɔʔ^{21}
309	to extinguish (fire)	mit^{21}	miʔ^{21}
311	to play	lɛk^{21}	lɛʔ^{21}
313	to shoot	kaap^{52}	kaʔ^{21}
315	to kill	$t̬^{h}at^{21}$	$t̬^{h}aʔ^{21}$
320	to pay	pɛɛ^{52}/ɾuul^{21}	pɛɛk^{52}/ɾulʔ^{21}
321	to steal	fiiɾ^{44}/ɾuu^{52}	fiiɾ^{21}/ɾuuk^{52}
340	to be small	fa^{44}.$t̬ɛɛ^{44}$	fa^{44}.$t̬ɛɛt^{52}$
343	to be tall	saaŋ^{23}	saan^{21}
346	to be thin	pa^{44}	paat^{52}
349	to be wide, to be broad	kaaw^{21}	kawʔ^{21}
350	to be narrow	fiak^{52}	fiaʔ^{21}
351	to be deep	$t̬^{h}uuk^{52}$	$t̬^{h}uʔ^{21}$
352	to be shallow	puan^{21}	pɔn^{52}
354	to be full	$k^{h}at^{21}$	$k^{h}aʔ^{21}$
358	to be far	$l̥aa^{44}$	$l̥aat^{52}$
363	to be white	ɾaaŋ^{23}	ɾan^{21}
365	to be green	$ɾ̥iŋ^{23}$	$ɾ̥in^{21}$
367	to be dirty	baal^{21}	balʔ^{21}
373	to be different	$d̬aŋ^{44}$	$d̬an^{21}$
376	to be bitter	$k^{h}aa^{52}$	$k^{h}aat^{52}$
377	to be spicy, hot	$t̬^{h}ak^{21}$	$t̬^{h}aʔ^{21}$
378	to be rotten	tɔɔt^{52}/ $t̬^{h}uu^{52}$	tɔʔ^{21}/ $t̬^{h}uut^{52}$
379	to be swell	$tɬ^{h}iŋ^{23}$	$tɬ^{h}in^{21}$
382	to be hot	saa^{23}	sat^{21}
385	to be blunt	biil^{21}	bilʔ^{21}
386	to be heavy	ɾit^{21}	ɾiʔ^{21}
387	to be hard	hak^{21}	haʔ^{21}
389	to be fast	ɾaŋ^{44}	ɾan^{21}
390	to be slow	fuuŋ^{44}	fuun^{21}
391	to be strong	tsak^{21}	tsaʔ^{21}
392	to be weak	$d̬ɔɾ^{21}$	$d̬ɔɾʔ^{21}$
393	to be tired	baaŋ^{21}	baŋ^{52}
394	to be blind	mit^{21}.tsɔɔ^{52}	mit^{21}.tsɔɔt^{52}

395	to be deaf	n̥a^{44}.sɛɛt^{52}	n̥a^{44}.sɛʔ^{21}
398	to be good	t^{h}aa^{21}	t^{h}at^{21}
399	to be bad	sia^{52}	siat^{52}
423	to take	laa^{52}	laak^{52}
424	to disappear	l̥aw^{21}	l̥awʔ^{21}
426	to bend	kɔɔj^{21}/kual^{21}	kɔjʔ^{21}/kɔlʔ^{21}
431	to disgusting	hua^{44}/niŋ^{44}	Huat^{52}/nin^{21}
433	to be cold	d̤aaj^{21}	d̤ajʔ^{21}
436	to be loose	kaaŋ^{44}	kan^{21}
438	to take hard	taŋ^{23}	tan^{21}
441	to confront	t̤ɔɔŋ^{21}	t̤ɔŋ^{52}
442	to punch	t̤^{h}ɔɔŋ^{21}	t̤^{h}ɔŋ^{52}
447	to call	kaw^{23}	kɔʔ^{21}
450	to be sick	naa^{23}	nat^{21}
456	to fly	j̤uaŋ^{23}	j̤uan^{21}
460	cause to fall	tɬ^{h}aa^{52}	tɬ^{h}aak^{52}
464	to imitate	tsɔɔŋ^{23}	tsɔɔn^{21}
471	to sleep at night	ɾiak^{52}	ɾiaʔ^{21}
472	to be lost	l̥aw^{21}	l̥awʔ^{21}
473	to wear	ɾ̥uu^{52}	ɾ̥uuk^{52}
476	to grow	t^{h}aŋ^{23}	t^{h}an^{21}
478	to go towards home	tɬuŋ^{44}	tɬun^{21}
480	to travel, to visit	tɬɔɔŋ^{23}	tɬɔɔn^{21}
488	to mingle, to mix	tsɔk^{21}	tsɔʔ^{21}
489	to begin	t̤^{h}ɔk^{21}	t̤^{h}ɔʔ^{21}
491	to help	bɔɔm^{21}	bɔm^{52}
492	to meet	t̤ɔŋ^{23}	t̤ɔn^{21}
493	to make stand upright	t̤uŋ^{23}	t̤un^{21}
494	to put upside down	k^{h}up^{21}	k^{h}uʔ^{21}
495	to be enough, to be full of	k^{h}ɔp^{21}	k^{h}ɔʔ^{21}
499	to cover	siin^{21}	sin^{52}
504	to run	j̤aaŋ^{44}	j̤aan^{21}
510	to fail	suŋ^{44}	sun^{21}
511	to pour	suuŋ^{44}	suun^{21}
516	to take over	lɔŋ^{23}	lɔn^{21}
513	to run, to leak (water)	d̤ɔk^{21}	d̤ɔʔ^{21}

APPENDIX III

VERBS THAT ALTERNATE ONLY TONES (NOT SEGMENTS) IN SECONDARY STEMS

Number	Gloss	Primary stem	Secondary stem
222	to hear	ŋaaj^{23}	ŋaaj^{21}
227	to eat	ɛj^{23}	ɛj^{21}
230	to be full	pum^{21}.puaɾ^{23}	pum^{21}.puaɾ^{21}
231	to be thirsty	n̰ti^{44}.haal^{44}	n̰ti^{44}.haal^{21}
232	to drink	in^{23}	in^{21}
247	to shout	aaw^{23}	aaw^{21}
249	to lie, to fib	buum^{23}	buum^{21}
254	to choose	ɾ̥il^{23}	ɾ̥il^{21}
258	to count	siaɾ^{23}	siaɾ^{21}
262	to snore	ŋ̊ɔɔk$^{˥44}$	ŋ̊ɔɔk^{21}
271	to sit	n̰taw^{23}	n̰taw^{21}
273	to kneel	k^{h}uuk$^{˥52}$.bil^{44}	k^{h}uuk^{52}.bil^{21}
278	to return	kiiɾ^{44}	kiiɾ^{21}
279	to push	nam^{44}/ n̰tuul^{44}	nam^{21}/ n̰tuul^{21}
290	to wipe	n̰̊uul^{23}	n̰̊uul^{21}
296	to split	t^{h}ɛn^{23}	t^{h}ɛn^{21}
298	to stab	sun^{21}	sun^{52}
299	to grind	ɾial^{23}	ɾial^{21}
302	to bury (a corpse)	p^{h}uum^{23}/vuuj^{23}	p^{h}uum^{21}/wuuj^{21}
303	to winnow (rice)	sɛɛp$^{˥23}$	sɛɛp^{21}
304	to dry (sth.)	p^{h}aw^{23}	p^{h}aw^{21}
307	to boil (sth.)	saw^{23}	saw^{21}
310	to work	tuan^{44}	tuan^{21}
312	to dance	laam^{23}	laam^{21}
314	to hunt	pɛɛl^{44}	pɛɛl^{21}
316	to fight	d̰aw^{23}	d̰aw^{21}
317	to buy	lɛj^{44}	lɛj^{21}
318	to sell	juaɾ^{23}	juaɾ^{21}
334	to be many	n̰tam^{44}	n̰tam^{21}
339	to be big	n̰tuum^{23}	n̰tuum^{21}
341	to be long	saaw^{44}	saaw^{21}

342	to be short (length)	ˌtɔɔj^{44}	ˌtɔɔj^{21}
344	to be short (height)	niam^{44}	niam^{21}
347	to be fat	ˌt^{h}aːw^{23}	ˌt^{h}aaw^{21}
348	to be skinny	tɔɔl^{23}	tɔɔl^{21}
353	to be round	pum^{23}/l̥uum^{44}	pum^{21}/l̥uːm^{21}
359	to be near	naajˈ^{44}	naaj^{21}
362	to be black	ɖum^{23}	ɖum^{21}
364	to be red	sɛn^{23}	sɛn^{21}
368	to be new	ˌt^{h}aɾ^{23}	ˌt^{h}aɾ^{21}
369	to be old	ˌtaɾ^{23}/l̥un^{21}	ˌtaɾ^{21}l̥un^{52}
370	to be dark	ˌt^{h}im^{23}	ˌt^{h}im^{21}
372	to be the same	baŋ^{21}	baŋ^{52}
374	to be sweet	tɬ^{h}um^{23}	tɬ^{h}um^{21}
375	to be sour	ˌt^{h}uuɾ^{44}	ˌt^{h}uuɾ^{21}
380	to be dry	tsaaɾ^{23}/ɾaw^{23}	tsaaɾ^{21}/ɾaw^{21}
381	to be wet	tsiaɾ^{44}/tsiin^{44}	tsiaɾ^{21}/tsiin^{21}
384	to be sharp	ɾ̥iam^{23}	ɾ̥iam^{21}
388	to be smooth	naal^{44}	naal^{21}
401	to be wrong	sual^{44}	sual^{21}
409	to be ripe	m̥in^{23}	m̥in^{21}
425	to split w/a knife	p^{h}ɛl^{23}	p^{h}ɛl^{21}
427	to lift	k^{h}aaj^{23}/tsɔɔj^{23}	k^{h}aaj^{21}tsɔɔj^{21}
432	to be warm	l̥um^{23}	l̥um^{21}
434	to be difficult	haɾ^{23}	haɾ^{21}
435	to be easy	ɔl^{23}	ɔl^{21}
437	to break (law,regulation)	buaɾ^{23}	buaɾ^{21}
439	to get down	tum^{44}	tum^{21}
440	to reduce	t^{h}um^{44}	t^{h}um^{21}
443	to play (music)	ˌtum^{44}	ˌtum^{21}
445	to seedling	taw^{23}	taw^{21}
451	to be slippery	naal^{44}	naal^{21}
452	to kiss	ŋ̥am^{21}	ŋ̥am^{52}
457	to be	sii^{52}	sii^{21}
458	to receive (portion)	tsaw^{23}	tsaw^{21}
459	to be late	tɬaaj^{44}	tɬaaj^{21}
467	to be round	l̥uum^{44}	l̥uum^{21}
469	to climb up	kaaj^{23}	kaaj^{21}
470	to scold	ɾ̥aw^{23}	ɾ̥aw^{21}
474	to be roar	ɾ̥uum^{44}	ɾ̥uum^{21}
475	to overflow	liam^{44}	Liam^{21}

477	to last long	ɾɛj^{23}	ɾɛj^{21}
479	to be warm	l̥um^{23}	l̥um^{21}
483	to participate	t̪ɛl^{44}	t̪ɛl^{21}
485	to make, to mold	ɛɾ^{23}	ɛɾ^{21}
486	to be curled	kiɾ^{44}	kiɾ^{21}
496	to invite	sɔɔm^{23}	sɔɔm^{21}
497	to be needed	tuul^{44}	tuul^{21}
498	to invade	siim^{44}	Siim^{21}
500	to distribute	jɛm^{21}	jɛm^{52}
503	to hang	t̪aaɾ^{23}	t̪aaɾ^{21}
518	to be stubborn	ŋ̟al^{23}	ŋ̟al^{21}
520	to flee	tɬaan^{44}	tɬaan^{21}
521	to be lost (portion)	tsaan^{44}	tsaan^{21}

APPENDIX IV

NON ALTERNATING VERBS

Number	Gloss	Primary stem	Secondary stem
82	to bark	baw^{52}	baw^{52}
83	to bite	kɛɛw^{52}	kɛɛw^{52}
234	to vomit	luak^{52}	luak^{52}
235	to spit	pʰuj^{52}	pʰuj^{52}
241	to suck	juuk^{52}	juuk^{52}
255	to love	ḍuʔ^{21}	ḍuʔ^{21}
259	to be afraid	tiʔ^{21}	tiʔ^{21}
260	to be angry	ṭʰin^{21}.hɛɛŋ^{52}	ṭʰin^{21}.hɛɛŋ^{52}
263	to dream	maŋ^{44}.man^{52}	maŋ^{44}.man^{52}
267	to scratch	kʰɛwʔ^{21}/ kʰɔjʔ^{21}	kʰɛwʔ^{21}/ kʰɔjʔ^{21}
274	to walk	fɛʔ^{21}	fɛʔ^{21}
281	to kick	siit^{52}	siit^{52}
292	to wash	kʰɔlʔ^{21}	kʰɔlʔ^{21}
293	to launder	sɔɔp^{52}	sɔɔp^{52}
294	to bathe	kʰɔlʔ^{21}(tak^{21}.sa^{52})	kʰɔlʔ^{21}(tak^{21}.sa^{52})
319	to exchange	tɬʰɛŋ^{52}	tɬʰɛŋ^{52}
354	to be thick	saʔ^{21}	saʔ^{21}
357	to be straight	ḍiŋ^{52}	ḍiŋ^{52}
371	to be bright	tlɛɛw^{52}	tlɛɛw^{52}
400	to be correct	ḍik^{21}	ḍik^{21}
428	to do/make	ṭuaʔ^{21}	ṭuaʔ^{21}
448	to be green(fruit)	kuʔ^{21}	kuʔ^{21}
449	to be thick	saʔ^{21}	saʔ^{21}
453	to trust	ŋat^{21}.san^{52}/ɾin^{52}.san^{52}	ŋat^{21}.san^{52}/ɾin^{52}.san^{52}
501	at the bottom of	ḍɛŋ^{52}	ḍɛŋ^{52}
508	to buckle a belt	kʰap^{21}	kʰap^{21}

APPENDIX V

TERTIARY VERB STEMS

Number	Primary stems	Secondary stems	Tertiary stems	Gloss
1	luaŋ^{23}	luaŋ^{23}	lɔn^{52}	'to flow'
4	zuaŋ^{23}	juaŋ^{23}	jɔn^{52}	'to fight, to jump'
5	kiaŋ^{44}	kian^{21}	kɛn^{52}	'to give way'
6	siaŋ^{23}	sian^{21}	sɛn^{52}	'to let use'
7	suaŋ^{44}	suan^{21}	sɔn^{52}	'to cook'

RESUME

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