



**A PHONOLOGICAL ANALYSIS AND COMPARISON
OF TWO KIM MUN VARIETIES IN
LAOS AND VIETNAM**

Eddie Clark

Presented to the Payap University in Partial Fulfillment
of the Requirements for the Degree of

MASTER OF ARTS IN LINGUISTICS
Faculty of Arts

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Kim Mun Varieties in Laos and Vietnam
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Eddie Clark
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ABSTRACT

Kim Mun is a minority language found in China, Laos and Vietnam and belongs to the Mienic branch of the Hmong-Mien language family. This study provides a synopsis of the previous studies on Kim Mun varieties from Yunnan province, Guangxi province, and Hainan Island of China, and an old study of a Vietnam variety. The thesis presents a phonological analysis and comparison of two Kim Mun varieties in Laos and in Vietnam. The comparison reveals that the consonantal and vowel systems hardly differ between the two varieties. The tonal system with eight distinctive tones in each variety is the area of greatest variation between the two varieties. Though there is some noticeable lexical variance, the two varieties of Kim Mun under study are similar enough to use the same grapheme-phoneme relation for literacy development. Furthermore, a literature review on the phonetic feature preglottalization that has been reported for

Kim Mun languages is also provided. The term is used in reference to varying phonetic phenomena only one of which, the laryngeal setting stiff voice, is found in both varieties under study.

ชื่อเรื่อง	การวิเคราะห์ระบบเสียงของวิธภาษากिमมุนสองภาษาใน ประเทศลาวและเวียดนาม
ผู้จัดทำ	นายเอ็ดดี้ คลาด
หลักสูตร	ปริญญาโทสาขาวิชาภาษาศาสตร์ มหาวิทยาลัยพายัพ เชียงใหม่
ชื่ออาจารย์ที่ปรึกษาวิทยานิพนธ์หลัก	ดร.ชikirit ลิว
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จำนวนหน้า	203
คำสำคัญ	กิมมุน, เข้า, สัทวิทยา, ลักษณะการบีบเสียงเสียงก่อน, เสียงแข็ง

บทคัดย่อ

ภาษากิมมุนเป็นภาษาชนกลุ่มน้อยสามารถพบได้ในประเทศสาธารณรัฐประชาชนจีน ลาวและเวียดนาม ภาษากิมมุนจัดอยู่ในตระกูลภาษาม้ง-เมี่ยน สาขาเมียนิก งานชิ้นนี้ได้สรุปการศึกษาที่ผ่านมาเกี่ยวกับวิธภาษากิมมุนต่าง ๆ จากมณฑลยูนนาน กวางสี เกะไหหลำ ประเทศสาธารณรัฐประชาชนจีน และการศึกษาที่ผ่านมาเกี่ยวกับวิธภาษากิมมุนอีกภาษาในเวียดนาม งานชิ้นนี้ได้วิเคราะห์และเปรียบเทียบระบบเสียงระหว่างวิธภาษากิมมุนในลาวกับเวียดนาม จากการเปรียบเทียบพบว่าระบบพยัญชนะและระบบสระของทั้งสองวิธภาษาไม่แตกต่างกันมากนัก หน่วยเสียงวรรณยุกต์ที่มีถึงแปดเสียงในแต่ละวิธภาษาถือเป็นความแตกต่างมากที่สุดระหว่างสองวิธภาษานี้ งานชิ้นนี้นำเสนอไว้ว่าแม้จะมีความแตกต่างทางคำศัพท์อยู่บ้าง แต่ทั้งสองวิธภาษาที่

ศึกษานี้มีความใกล้เคียงกันมากพอที่จะใช้ความสัมพันธ์ทางอักษร-เสียงระบบเดียวกันในการพัฒนาการอ่านออกเขียนได้ในภาษา นอกจากนี้งานชิ้นนี้ยังได้ทบทวนวรรณกรรมเกี่ยวกับ สัทลักษณะการบีบเสียงส่วนหน้าซึ่งพบในภาษากิมมุนด้วย การบีบเสียงส่วนหน้าดังกล่าว เป็นปรากฏการณ์ธรรมชาติทางเสียงซึ่งทำให้เกิดเสียงแข็งที่มาจากกรบีบกล่องเสียง ปรากฏการณ์ดังกล่าวพบในวิธภาษาทั้งสองที่ศึกษาในงานวิจัยนี้

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LIST OF ABBREVIATIONS AND SYMBOLS

KM	Kim Mun
CNE	Contrast in Non-influencing Environments
CIE	Contrast in Identical Environments
CD	Complementary Distribution
C₁	Syllable Initial Consonant
C₂	Syllable Medial Consonant
C₃	Syllable Final Consonant
V₁	First Vowel of the Nucleus
V₂	Second Vowel of the Nucleus
V₃	Third Vowel of the Nucleus
[...]	Phonetic Brackets
/.../	Phonemic Slashes

CHAPTER 1

INTRODUCTION

1.1 Kim Mun Language

Kim Mun is a sub-grouping from a family of languages known as the Hmong-Mien. This language family is sometimes called Miao-Yao, particularly by Chinese linguists, after the Chinese minorities of the same name. Aumann (2000: 2) points out that this name is misleading because some speakers belonging to the Miao minority do not speak a Hmongic language, and many members of the Yao minority do not speak a Mienic language. There is also the She minority with some members speaking the Hmongic language She. Therefore, the names for the two largest branches of this family, Hmong and Mien, are preferred by Western linguists.

Linguists have not been able to agree as to which larger family tree to place the Hmong-Mien language cluster under. Some linguists classified the Hmong-Mien under the Sino-Tibetan language family, and many Chinese classifications still retain this today. Other linguists (Aumann 2000, Aumann and Sidwell 2001) have placed Hmong-Mien as an isolated language family. It appears the Miao-Yao and other such languages were classified

under the Sino-Tibetan family because of their resemblance to Chinese, “but it is now clear that the structural resemblances and shared vocabulary among these languages are areal features rather than shared inheritance from a common ancestor” (Comrie 1990: 799). Still other linguists like Benedict (1975) suspect relationships between the Hmong-Mien and the Austro-Asiatic language family.

One of the two Kim Mun varieties under investigation is also known as Lantien. This name seems to largely be restricted to the Kim Mun living in Laos with about 5,800 speakers. The other Kim Mun variety spoken in Vietnam has about 187,000 speakers (www.joshuaproject.net).

As illustrated in *Figure 1*, Kim Mun, which includes Lao Kim Mun (Lantien), Vietnam Kim Mun, and the three Kim Mun varieties spoken in China, all belong to the Mien-Mun sub-group under the Mienic side of the Hmong-Mien language branch.

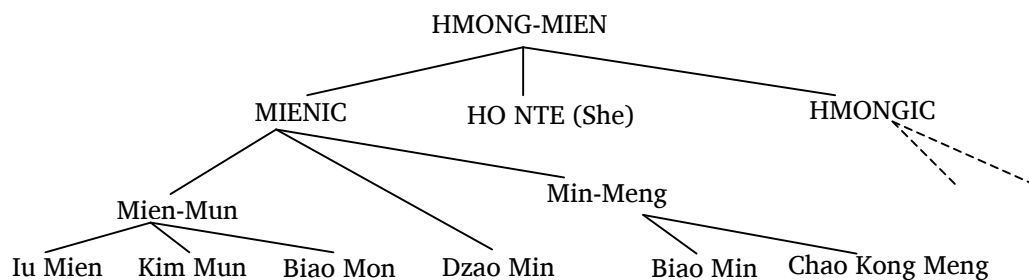


Figure 1. Hmong-Mien Language Family Tree (adapted from Ratliff 1992: 19)

According to Gordon (2005), the Kim Mun and Iu Mien in China are closely related with 78% lexical similarity between the two speech varieties. Furthermore, Kim Mun is 67% lexically similar to Biao Min and 59% lexically similar to Dzao Min. Within the Mienic sub-group, Iu Mien has the most speakers and Kim Mun has the second most speakers. At least in both Laos and Vietnam, many Kim Mun speakers can understand and speak Iu Mien. It appears from this researcher's observations that Iu Mien is more prestigious than Kim Mun. The high lexical similarity of the Kim Mun to Iu Mien in China suggests that the lexical similarity between the three Kim Mun varieties in China, the Vietnam Kim Mun, and the Lao Kim Mun should be even higher.

1.2 Scope of the Study

There are several studies contributing to Kim Mun phonology, such as Edmondson (2007), Mao (2004), He (1999), Liu, et. al. (1998), Chengqian (1991), Shintani (1990), Chang (1966), and Downer (1961). Besides Shintani's brief comments in Japanese comparing the Kim Mun of Hainan and Vietnam (1990), little phonological comparison has been done among this Hmong-Mien language, which is found in the Chinese provinces of Yunnan, Guangxi and Hainan Island, and in Vietnam and Laos. This study presents the phonological analysis and comparison of Lantien, a still

undescribed Kim Mun variety in Laos, and the Kim Mun variety found in Lao Cai, Vietnam, also largely undescribed¹. These varieties will be referred to as Lao Kim Mun and Vietnam Kim Mun in this study.

It is hoped that this comparison will reveal if future language development work such as orthography development, literacy work, and translation can encompass Kim Mun speakers in both Vietnam and Laos. It is also hoped that this study will serve as a springboard for extending language development work to other Kim Mun varieties found throughout China.

An overview of previous research on mainly Chinese Kim Mun phonology including the use of the term preglottalization will be provided. The term preglottalization has been applied to many different phonetic phenomena, therefore making this section in the literature review necessary. Subsequent chapters will provide a synopsis of Kim Mun segments, tones, and syllable structure from Laos and Vietnam, which will in turn be compared. This study ends with a summary of the phonological differences between the Lao

¹ Savina (1926) produced a brief description of the Kim Mun in Vietnam, but his description not only dates back to 1926, but is not extensive. Further complicating matters, Savina used the Vietnamese

and Vietnam varieties as well as a brief conclusion and outlook for future Kim Mun studies.

orthography to transcribe his data, which was not sufficient to capture all the aspects of Kim Mun phonology (Purnell 1970).

CHAPTER 2

GENERAL BACKGROUND

2.1 Kim Mun Origin and Location

While no detailed records of Kim Mun history exist and oral stories of Kim Mun history vary widely, there is some understanding as to the history of the Yao people as a whole, and since the Yao languages form the majority of the Mienic language family, this is relevant information (cf. Figure 1).

According to Schliesinger, it is believed that the ancestors of the Yao people already lived in China 4,000 years ago, though Chinese annals do not mention them any earlier than the fifth century B.C. The Yao are reported to have come from a big mountain range separating the Si-kiang and Yangtze Kiang rivers. This region extends over the provinces of Hubei, Hunan, Guangxi, and Guizhou (2003). Around the thirteenth century A.D. the Yao began to migrate south into modern-day Vietnam where they are called Zao. Besides soil exhaustion, drought, and bandits, possible reasons for their migration could be that the Chinese were confiscating their land (Schliesinger 1998: 86). About four centuries ago the Iu Mien and the Kim Mun began migrating west into Laos. While the Kim Mun only went as far

west as Laos, the Iu Mien also went into Thailand and Myanmar (Schliesinger 2003: 273f). No Kim Mun villages have yet been discovered in Thailand, but some isolated Kim Mun individuals live in Iu Mien villages in Thailand, apparently fleeing the various wars that have plagued Laos².

Today the Kim Mun are found largely in Southern China along the borders between China and Vietnam as well as China and Laos. They are also in Guangxi, China and Hainan Island, China. There also may be a few Kim Mun villages in Northern Myanmar along the China border just south of the Chinese county Xishuangbanna (Chengqian 1991: 48). Kim Mun villages can be found throughout Yunnan Province of China, but apart from the claim by Chengqian there is not yet any evidence to validate whether Kim Mun villages really do exist in Northern Myanmar. In one short visit to the city of Jing Hong in Xishuangbanna close to the Myanmar–China border in 2007, people responded to the researcher’s investigations about the Yao, which include the Kim Mun, that these live farther to the east along the Lao–China border and that people around the Myanmar–China border generally were Tai, not Yao.

² Personal communication with a Kim Mun language consultant from a Mien village in Lampang Province, Thailand.

There are different figures about the population of Kim Mun. Gordon mentions a total of approximately 374,500 people (2005), with about 200,000 Kim Mun located in China (Wang and Mao 1995). According to a 2000 census 61,000 of those Kim Mun in China are located on Hainan Island. Edmondson (2007) finds that there are about 170,000 in Vietnam, and Laos has the least amount of Kim Mun with approximately 4,500 (Chazee 1995 in Gordon 2005). More recent estimates, using the above resources in conjunction with data from the U.N. on population growth, show the following population figures: China 301,000; Vietnam 187,000; Laos 5,800. This makes a total of 493,800 Kim Mun people (www.joshuaproject.net).

The two Kim Mun varieties under study in this thesis may be from a common origin according to Lemoine (2002). Lemoine, in reference to the Kim Mun of Luang Namtha in Laos, states, “they themselves recall their coming from China”. While Lemoine does not list the point of origin, he traces their migration route through Hekou in Yunnan province of China into Lao Cai, Vietnam following the Red River. From Lao Cai, it appears some of the Kim Mun continued their migration route into the province of Phongsaly in Laos and through several regions of Laos before a group of them finally arrived in Luang Namtha. According to Lemoine, the Kim Mun reached the plain at the same time as the arrival of the Tai Dam in 1894. The Kim Mun were

subsequently overpowered by the Tai Dam and were pushed to the outskirts of the Luang Namtha plain. Lemoine also documents that some of the Kim Mun from Luang Namtha migrated to Bokeo province of Laos as early as the Lao civil war in the 1960s. Lemoine asserts that these two groups are “homogenous” (2002: 2).

2.2 Kim Mun Lifestyle

The Kim Mun have long been poor farmers who live in mountainous areas, often near rivers (Mansfield 2000: 35). They like to grow rice or corn, and also their own cotton for making clothes. Like the Iu Mien, the Kim Mun have a good reputation for raising animals like pigs, chickens, ducks, goats, turkeys, small horses, and buffaloes in some lowland areas (Schliesinger 2003: 276). Although the Kim Mun are also known for being good hunters, they do not eat a lot of meat. Their diet normally consists of rice and vegetables.

The Kim Mun are largely polytheistic animists and follow animistic practices along with ancestor worship. They believe in many different spirits, the two most important spirits being the spirit of the house and the spirit of the village. The Kim Mun often offer animal sacrifices to appease the spirits.

The Kim Mun family is strongly patriarchal. In the past it was not uncommon for Kim Mun men, especially for the rich ones, to have six or seven wives. More recently monogamy is practiced more often than polygamy.

Kim Mun houses look very similar to Iu Mien houses, though Kim Mun houses are usually larger. The typical Kim Mun house is made of planks of wood with a dirt floor, except when the house is raised, which is often the case since many Kim Mun villages are settled around rivers. Kim Mun houses have very few windows and a simple roof with a hole in it for smoke to escape from the fire pit, which is used to cook on as well as to keep warm in the cold season. The house is usually one large room that is partitioned off with thin bamboo sheets for each part of the family. Usually the men gather in the center of the house and talk while the women's place is along the edges (Schliesinger 2003).

CHAPTER 3

METHODOLOGY

3.1 Data Sources

There were two different data sources available for this study: digital recordings collected by this researcher in Laos and by Dr. Jerold Edmondson in Vietnam, and various phonological sketches of Kim Mun varieties spoken in China as presented by other researchers.³

The phonological analysis of this thesis is based on a 503-item (Laos) and 441-item (Vietnam) wordlist⁴. The data for the Kim Mun in Laos was collected and recorded in Luang Namtha by this researcher in 2006. Since the only data available for the Vietnam variety was already 80 years old⁵, Dr. Jerold Edmondson kindly provided his digitized recordings and transcription notes of this variety taken in Lao Cai, Vietnam, in 1999. In order to provide maximum consistency, only the author's transcriptions of Edmondson's data were used in this study.

³ The following sources also contain wordlists: Mao (2004) (China, Yunnan and Guangxi Province); Liu, et. al. (1998) (China, Yunnan Province); Shintani (1990) (China, Hainan Island)

⁴ In Laos time for data collection was highly limited due to rice-harvesting season. The data from Vietnam was limited to what this researcher received from Dr. Edmondson.

⁵ Purnell (1970) based on a dictionary by Savina (1927).

The data from the mainland of China, including Yunnan Province and Guangxi Province, came from data published in 2004 (Mao 2004). A further source was discovered through a Chinese resource on Minority Language and Alphabets (Liu, et. al. 1998). Liu, et. al. (1998) does not provide an analysis of Kim Mun, though he does provide a few tables that include initials, finals, and tones. Liu, et. al.'s largest contribution to Kim Mun studies is a 1500-item wordlist from a Kim Mun village named Jianlichuan in Wen Shan District, Funing County, Huajia Township in Yunnan Province. The data collected by Shintani (1990) on Hainan Island was gathered during 1987-88.

Since there are no texts available for this study, grammatically motivated differences could not be taken into consideration. Also, apart from some general background information about the people, this thesis will not include any socio-linguistic aspects because the data sources used for the phonological comparison do not provide this type of information.

3.2 Data Gathering

The 503-item wordlist used for data gathering in Laos was divided into different sections based on semantic domains (cf. Appendix A). The mediating languages used were Lao and Thai. Three male Kim Mun

speakers, approximate ages 23, 25, and 55 years old, first discussed which word in Kim Mun best fit the Lao word.⁶ All three language consultants gave feedback for the transcriptions of the wordlist.⁷ Because the two older Kim Mun speakers considered the articulation of the 23-year old speaker to be the best, only his articulation of the wordlist was recorded and used for further editing of the raw data.

The data from Dr. Edmondson came in the form of digitized recordings organized by semantic domains and Dr. Edmondson's transcription notes.

Data from Dr. Edmondson's work generated a 441-item wordlist (cf.

Appendix A).⁸

3.3 Data Analysis

The data were processed with the computer programs Speech Analyzer⁹ and Praat¹⁰. After inputting the data, the recordings were broken down into individual words, tagged, transcribed, and glossed. Waveforms,

⁶ It was not possible to find more language consultants because it was rice-harvesting season.

⁷ One limitation of this study is that the analysis of Lao Kim Mun is based on only one wordlist.

⁸ One limitation of this study is that the analysis of Vietnam Kim Mun is based on only one wordlist.

⁹ Speech Analyzer is a speech analysis tool that provides pitch listings, sound waves, and spectrograms and has the ability to organize a wordlist for quick and easy reference. All the data are saved directly in the audio file, which makes the audio easy to access when referencing a word in the wordlist.

¹⁰ Praat (version 4.4.31) is a phonetics analysis program created by Paul Boersma and David Weenick. Praat was originally created in 1992 and has undergone many version updates since. Praat provides detail pitch listings for tone analysis among many other features. Pitch listing from Praat were used in conjunction with Microsoft Excel to create tone charts for tonal analysis.

spectrograms, and pitch listings were consulted to verify the transcriptions.

The program Cool Edit Pro 2000¹¹ was used to cut individual words from the word list for analysis. The wordlists obtained through Speech Analyzer were then exported into Phonology Assistant¹² for further analysis.

General phonology following the functional approach (Burquest 2006) was employed for the analysis, description, and comparison of the data.

3.4 Data Transcription

All data from the Lao and Vietnam varieties were transcribed using the International Phonetic Alphabet (IPA), except for alveolo-palatal segments (cf. Section 4.3.2.2 for a discussion of the alveolo-palatal place of articulation and its application to the IPA system). Mao (2004) transcribed the data from Yunnan and Guangxi using the alveolo-palatal segments. The Lao and Vietnam data sets were also transcribed with the alveolo-palatal segments, following Mao.

¹¹ Cool Edit Pro 2000 is audio editing program for editing, converting, and fixing audio files, among other things.

¹² Phonology Assistant is a phonological analysis tool created by SIL International in 2006. It is an upgrade from Speech Manager and was in its beta stage at the time of this analysis.

CHAPTER 4

CURRENT STATE OF RESEARCH ON KIM MUN PHONOLOGY

4.1 Previous Research

Three large works contributing to Kim Mun studies have been written by Mao (2004), Liu, et. al. (1998), and Shintani (1990). Another work contributing to Kim Mun studies is Savina (1926), a French lexicographer who collected data from the Kim Mun of Hái-ninh, Vietnam. His work has been translated into English by Dr. Kawagoe.¹³ However, the transcription method used by Savina at Hái-ninh, Vietnam, was through the Vietnamese script and is very difficult to understand. Purnell (1970) used Savina's data in a 1970 dissertation. Shintani (1990) published a short paper comparing the Mun of Hainan Island to the Mun from Vietnam from the data that Savina (1926) collected:

There is a dictionary on Mun in Vietnam by F. M. Savina (1926) as a good body of data...In comparison with my data from Mun in Hainan

¹³ Dr. Kawagoe is a professor of economics in Hakodate Future University, Hokkaido prefecture in Japan. He speaks Japanese, English, and French and is concerned with human development in Asian countries, and is gifted in translation in several languages. Dr. Kawagoe's translation of Savina's (1926) dictionary is an ongoing work and as such all references to his work have come from personal communication.

Island, basically there is no big difference between the phonological systems in the two varieties.

The only differences are as follows: /p/ and /t/ in Vietnam correspond to the implosives /^ʔb/ and /^ʔd/ in Hainan variety, and /θ/ ('xl' in Savina's transcription, deriving from *s in proto-Miao-Yao) in Vietnam becomes /t/ in Hainan variety.

(Shintani 1990: 8)

Shintani did not find any significant differences between the two varieties, even though the Mun on Hainan Island have been separated from the Mun on the mainland for a couple hundred years.

The following section provides background information on previous research on the Kim Mun. There are four sub-sections organized according to pertinent information regarding vowels, including quality and length; consonants, including syllable onsets and finals; tone, including the eight-tone system from Middle Chinese; and preglottalization.

4.2 Vowels

Vowels described in the literature include six to seven vowels, i.e. three or four unrounded front vowels and three rounded back vowels. Mao (2004) notes a couple allophonic central vowels in the Yunnan and Guangxi varieties in China. Vowel length is considered distinctive in some studies,

whereas other researchers observe that Kim Mun is perhaps losing this feature.

4.2.1 Vowel Quality

For the Yunnan variety, Mao (2004) identifies seven vowels, i.e. four unrounded front vowels /i, e, ε, a/ and three rounded back vowels /u, o, ɔ/. Liu, et. al. (1998) identifies a symmetrical system of six vowels, i.e. three unrounded front vowels /i, ε, a/ and three rounded back vowels /u, o, ɔ/. He (1999) identifies seven vowels, i.e. three unrounded front vowels /i, e, a/, two unrounded central vowels /i̯, ə/, and two rounded back vowels /u, o/. Mao also mentions two vowels functioning as allophones, i.e. the open back unrounded [ʌ] as an allophone of the long /a:/ and the near open central unrounded [ɐ] as a variant of the short /a/.

For the Guangxi variety, Mao (2004) identifies a symmetrical system of six vowels. With the exception of missing the close-mid front unrounded vowel /e/ it is identical with the Yunnan variety. Vowels with similar quality, the near-open front unrounded [æ] and the [E]¹⁴, are considered variants of /ε/. The other two allophones are the open back unrounded [ɑ] as an allophone of /a/ and the open back rounded [ɒ] as a variant of /ɔ/.

¹⁴ The [E] is a front unrounded vowel at exactly the mid-point between /e/ and /ε/.

For the Hainan variety, Shintani (1990) identifies an identical set of the six aforementioned vowels.

4.2.2 Vowel Length

According to He, vowel length is distinctive and widely distributed in the Yunnan variety of Kim Mun from China¹⁵. He identifies five long and five short vowels with the qualities /a, e, i, o, u/. (1999: 336), showing contrast in identical environments in over fifty examples.

Mao (2004) identifies the presence of long and short vowels in the Guangxi variety. Mao and Chou also note that “In some places (e.g., Hunan) the length distinction has been lost completely with single vocalic finals and finals without a coda all pronounced long now” (1972: 241). Shintani also identifies limited contrast of long and short vowels in the Hainan variety: “Short/long vowel opposition is phonemic only when it is followed by another consonant or vowel; in other words, it is not phonemic in an absolute position” (1990: viii). In other words, open syllables with monophthongs in the Hainan variety show no contrast in vowel length.

¹⁵ He (1999) worked with Kim Mun from Yunnan, China, but his work is separate from Mao’s (2004) work from Yunnan, China.

4.2.3 Summary of Vowels

It appears Kim Mun varieties normally have a symmetrical system of three front vowels and three back vowels. The front vowels /i, a/ and the back vowels /u, o, ɔ/ have been documented by each researcher that has previously studied Kim Mun. However, there is a lot more variation with the front vowels /e, ε/. Mao (2004) documents both vowels in the Yunnan variety, but only one of the vowels in the Guangxi variety. Liu, et. al. (1998) only identifies the /ε/ in Yunnan but He (1999) only identifies the /e/ in another location of Yunnan. Liu, et. al. (1998) is the only researcher to document central vowels as phonemes. Furthermore, there is uncertainty as to whether length distinction in Kim Mun is a common feature or a disappearing feature. Refer to Table 5 under Section 4.6 for an overview of all vowels documented in the previous research of Kim Mun.

4.3 Consonants

Generally, there are bilabial /p, p^h, b/, alveolar /t, t^h, d/, alveolo-palatal /t̪, t̪^h, d̪/, and velar /k, k^h, g/ voiced, voiceless and voiceless aspirated stops as well as nasals /m, n, ŋ, ŋ/ reported in Kim Mun. Some researchers observe pre-glottalized plosives or implosives /ʔp, ʔb, ʔt, ʔd/. Kim Mun has a higher functional load on plosives and nasals than on other segments. Next to the glottal stop /ʔ/, voiced and voiceless labiodental fricatives /f, v/, and the

voiceless alveolar sibilant /s/, there are labiovelar /w/, lateral /l/, and palatal /j/ approximants found in Kim Mun. Clusters can be formed with labiovelar, lateral, and palatal approximants. Nasals and voiceless stops occur as finals.

4.3.1 Single Initials

In his study on Hainan Kim Mun, Shintani (1990) postulates three sets of voiced /b, d, g/, voiceless /p, t, k/, and voiceless aspirated /p^h, t^h, k^h/ stops as well as voiced nasals /m, n, ŋ/ with bilabial, alveolar and velar place of articulation. He also observes voiced bilabial and alveolar implosives /^ʔb, ^ʔd/, the glottal stop /ʔ/, labiodental fricatives /v, f/, alveolar sibilant /s/, as well as the lateral approximant /l/. Shintani is the only one to document implosives in Kim Mun.

Guangxi Kim Mun (Mao 2004) shows voiceless aspirated stops /p^h, t^h, t^h, k^h/, voiced stops /b, d, d, g/, and three segments marked in the data with a glottal stop preceding the plosive, /^ʔp, ^ʔp^h, ^ʔt/. Of all the approximants, only the palatal approximant /j/ appears in syllable-initial position. The Guangxi variety also documents the alveolo-palatal stops /t, t^h, d/ and alveolo-palatal nasal /n/, meaning the plosives and nasals have four places of articulation. The alveolo-palatal place of articulation often corresponds to the palatalized

alveolar place of articulation in Shintani's (1990) and Liu, et. al.'s (1998) analyses, i.e. /t̪, d̪, n̪/ with /tj, dj, nj/. The alveolar sibilant /s/ is replaced by the alveolo-palatal fricative /ç/ in the Guangxi variety. The Guangxi variety does not document a lateral alveolo-palatal segment, however the consonant cluster /lj/ may correspond to such a segment.

Yunnan Kim Mun (Mao 2004) also shows the labiovelar /w/ and palatal /j/ approximants in syllable-initial position. It does not have the plosive segments with a preceding glottal stop /^ʔp, ^ʔt/, as found in the Guangxi variety, and it also does not have the voiceless aspirated stops, however it does have the affricates /tθ, dð/ and the alveolo-palatal stops /t̪, d̪/ and nasal /n̪/.

The Yunnan variety from Liu, et. al. (1998) documents the voiced counterpart of the /θ/, the /ð/, whereas in the Guangxi variety, Mao (2004) documents the voiceless fricative /θ/ but not the voiced fricative [ð]. Liu, et. al. (1998) also documents the affricates /ts, dz, tʃ, dʒ/. The Yunnan variety from He (1999) is very similar to that of Liu, et. al.'s study. He does not document the affricates /dz, tʃ, dʒ/, but he does document the affricates /ts, tç, dz/. Liu, et. al. (1998) and He (1999) both documented several affricates that are not recorded in the other varieties.

4.3.2 Consonant Clusters

Syllable onsets have been treated as one unit in the investigated literature. Mao (2004), Liu, et. al. (1998), and Shintani (1990) present all of their data with syllable onsets including both the C₁ and C₂ slots. Chengqian (1991) mention consonant clusters when they address sound changes in Mienic languages in terms of cluster persistence or loss.

Hainan Kim Mun shows clusters formed with plosives and the approximants /l, j, w/ (Shintani 1990). Shintani groups the voiceless bilabial stop with the lateral approximant as a syllable onset /pl/ because in his data the bilabial stop /p/ never occurs by itself.

In his study of Yunnan Kim Mun, He (1999) identifies the consonant clusters /pl, bl, kl, gl/. Yunnan Kim Mun shows clusters formed with the approximants /l, j, w/ and Mao (2004) identifies the consonant clusters /pl, pj, bl, tl, tj, dl, dj, tθj, dθj, kw, kj, gw, gj, mj, nj, ηw, sj, lj, hj/. Guangxi Kim Mun shows clusters formed with the approximants /l, j, w/ and Mao (2004) identifies the consonant clusters /^lp^hl, p^hj, p^hl, bl, bj, kw, kl, kj, k^hw, k^hl, k^hj, gw, gl, gj, mj, nj, ηw, ηj, lj/. Liu, et. al.'s study of Yunnan Kim Mun (1998) shows only /pl, bl/ as consonant clusters. Liu, et. al. does not document clusters with the palatal or labial approximants, but this is due to his transcription method; Liu, et. al. transcribes the palatal approximant [j] and

the labial approximant [w] as the vowels [i] and [u] in all positions except syllable initial.

Chengqian identifies clusters formed with the lateral /l/ when he writes that “the ancient Yao cluster consonants have persisted in certain dialects whereas in others they have already disappeared. For example, Byau Min has preserved *pl, pl', bl, and kl, kl', gl*; Kim Mun *pl, bl, and kl, gl*; however, these cluster consonants have already disappeared in Mien and Yau Min...” (1991: 49).

4.3.2.1 Labialization and Palatalization

There is some evidence that clusters with labiovelar or palatal approximants in related varieties merged to single initials with labialization and palatalization as secondary articulation. Downer (1961) argues that there is some support for labialization and palatalization in Yao languages that could lend to grouping clusters such as /pj/ or /pw/ as one unit.

Kim Mun seems to be unaffected by this sound change. Edmondson (2007), in his studies in Vietnam, recognizes clusters with the approximants /j/ and /w/. In his comparison of Kim Mun with Iu Mien, he observes that “Mun preserves the complex initials *kl-/kj-*, whereas in Mien these have become

palatalized to the affricates *ts-/tʃ* (cf. ‘road’ in Yu Mien *tsau*³ but in Kim Mun of Lao Cai *kjau*³”).

4.3.2.2 Alveolo-Palatal Segments

The alveolo-palatal place of articulation is prevalent in Asia. Mandarin Chinese, Burmese, Thai, and Korean, all four major Asian languages, have alveolo-palatal consonants, which some label as affricates. For this place of articulation, IPA includes symbols for the fricatives /ç, ʒ/ under “other symbols”. Irish also has alveolo-palatal oral and nasal stops and a lateral that are distinctive from their dental and palatal counterparts (International Phonetic Association 1999: 112). There are other Western languages showing this place of articulation (Catalan, cf. Recasens 1984, Polish, cf. Jassem 2003). Because IPA does not have a replete set of symbols for alveolo-palatal consonants, the alveolo-palatal sounds in Irish are captured with diacritics /tʲ, dʲ, nʲ, lʲ/. Mao (2004) and Liu, et. al. (1998) utilize the symbols /ɕ, ʈ, ɳ/ representing alveolo-palatal oral and nasal stops in the Yunnan and Guangxi Kim Mun varieties. Since alveolo-palatal sounds are quite common in Asia and the transcription with diacritics is not very user and reader-friendly, the author is using the symbols of the Chinese researchers in this study.

The alveolo-palatal fricatives in Polish and Russian developed from palatalized alveolar sibilants (cf. Padgett and Zygis 2003). The framework of this study does not allow investigating whether alveolo-palatal consonants in Kim Mun are a result of this kind of sound change, and whether they are phonetically distinct from the reported palatalized segments in previous studies on Kim Mun. These questions need to be answered in future studies.

4.3.3 Finals

In Hainan Kim Mun (Shintani 1990), Yunnan Kim Mun (Mao 2004, He 1999, and Liu, et. al. 1998), and Guangxi Kim Mun (Mao 2004) syllables end with voiceless plosives /p, t, k/ or nasals /m, n, ŋ/ with labial, alveolar, or velar places of articulation.

4.3.4 Summary of Consonants

In all, there are approximately 21 consonants, with the consonants /p, t, k, m, n, ŋ/ serving as finals. Syllable-initial clusters can mainly be formed with /p, b, k, g/ but also with /m, n, ŋ, s, h/ in the C₁ position and /l, j, w/ in the C₂ position. Refer to Table 5 under Section 4.6 for an overview of all consonants documented in the previous research of Kim Mun.

4.4 Tones

Tones in Kim Mun from Vietnam were recorded by Savina (1926). Purnell (1970) transcribes Savina's tones by using simple tone numbers 1 to 6.

Savina himself describes the six tones of Vietnam Kim Mun as plain or equal, rising, descending, acute interrogative, grave interrogative, and grave (1926: 25). Chang (1966: 304) labels Savina's tone transcriptions as high falling-rising, level, rising, falling, low, and low falling-rising tone. A comparison of Chang's examples with the tone numbers that Purnell used in his transcription of Savina's data still does not clarify the tone contour patterns of Savina's data.

In a later study on Hainan Kim Mun, Shintani (1990) documents seven tones /13, 11, 33, 354, 31, 44, 53/ that are dependent on vowel length and syllable structure. He also documents one allotone [45], as a variant of the /44/ in the environment that the syllable is closed and the nucleus is either long or is a vowel cluster.

Kim Mun varieties from Yunnan and Guangxi provinces of China have a significant higher number of tones than reported by Shintani (1990) or Savina (1926). Researchers report up to thirteen tones for the Kim Mun varieties in these two provinces. Mao (2004) reports twelve tones in the Yunnan variety, i.e. /35, 31, 33, 545, 43, 32, 44, 21, 22, 24, 54, 42/ and ten

tones in the Guangxi variety, i.e. /35, 13, 33, 55, 42, 31, 335, 331, 32, 12/.

Liu, et. al. (1998) reports thirteen tones in the variety he studied in Yunnan, i.e. /24, 52, 11, 35, 42, 43, 44, 453, 32, 55, 44, 23, 21/¹⁶, and He (1999) also reports thirteen tones in the variety he studied in Yunnan, i.e. /24, 53, 11, 35, 443, 43, 44, 453, 32, 55, 44, 24, 21/.

Mao (2004), He (1999), Liu, et. al. (1998), and Shintani (1990) all employ the use of the Middle Chinese eight-tone system in their analysis of Kim Mun tones. While in-depth tonal analysis using the eight-tone system is for future Kim Mun studies, a short introduction to this system is provided in the following section in order to help facilitate an understanding of the tonal analysis of the above researchers.

4.4.1 The Eight-Tone System of Middle Chinese

This schema of classifying tones, beginning from Ancient Chinese, had four classes: Ping, Shang, Qu, and Ru. These names were derived from the nature of rhymes from Chinese characters in the Shijing, which is a collection of poems dating back to 1100 to 500 B.C. (Huang and Li 1996). Later in Middle Chinese, each of these tone categories split into two registers: an

¹⁶Liu, et. al. (1998) documents the /44/ tone twice because in his analysis a /44/ tone on a live syllable is distinct from a /44/ on a dead syllable.

upper register, “yin”, and a lower register, “yang”. The yin register is derived from voiceless initials and was marked with a higher tonal onset and the yang register is derived from voiced initials and was marked with a lower tonal onset (Thurgood and LaPolla 2003). This register split created eight tone categories, hence the name “eight” tone system employed by some (Reves, et. al. 1995). This system is illustrated in Table 1.

The four tones from ancient Chinese have also been labeled by some as A (level), B (rising), C (leaving), and D (entering) and then further divided using 1 to refer to tones associated with upper register and 2 to refer to tones associated with lower register (Huang and Li 1996).

Table 1. The Eight-Tone System of Middle Chinese

	Ping (Even) (平)		Shang (Rising) (上)		Qu (Leaving) (去)		Ru (Entering) (入)	
Yin (陰)	1		3		5		7	
Yang (陽)	2		4		6		8	

Each section represents a distinct set of syllable onsets. These syllable onsets developed as consonants merged together. New tones were a result of the loss of consonantal distinctions (Fox 2002). Furthermore, the coda of a syllable also plays a role in the eight-tone system. Sections 1 through 6 are live syllables, while sections 7 and 8 are both dead syllables.

Mao (2004), He (1999), and Liu, et. al. (1998) also make divisions between checked and unchecked syllables. Tones with checked syllables are

represented by odd numbers and tones with unchecked syllables are represented by even numbers. Furthermore, the above researchers also assign multiple tones to the checked tones based on syllable onset. For example, Mao (2004) assigns two tones to the checked syllables represented in section 1 (Ping Yin) for both the Yunnan and Guangxi varieties, /35, 31/ and /35, 13/ respectively. He labels one as tone one (1), and one as tone one prime (1'). This is why the above researchers document more than eight tone contours despite there are only eight categories in the eight-tone system.

4.4.1.1 Drawbacks of the Eight-Tone System

There are two main drawbacks of the eight-tone system: 1) The eight-tone system does not take into account the changing nature of syllable onsets.

2) The eight-tone system often creates tones that are too similar phonetically to contrast, which in turn creates a tone system with more tones than necessary.

The eight-tone system primarily divides tones based on syllable onset; however these syllable onsets have changed over time. Shintani (1990) still attempts to group the data from Hainan into the eight-tone system based on syllable onsets. The results are that his data are not always consistent with

his analysis. For example, Shintani's "tripartition of the tonal system", as he refers to it, is based on the eight-tone system and only documents the /13/ tone occurring on syllables with a voiceless unaspirated onset. Because of the change of Kim Mun onsets over time, this analysis does not hold true in the data showing voiced onsets with the same tone (i.e. 'light' /gwaŋ13/).

Mao (2004), He (1999), and Liu, et. al. (1998) in their use of the eight-tone system, split the Kim Mun tones into many different categories with tones that often vary slightly in phonetic form, but do not appear contrastive. He (1999) mentions there are thirteen contours, nine contours with open syllables and four contours with closed syllables. He further marks sections 1, 3, 5, and 7 as checked tones and divides them into aspirated initials and unaspirated initials. His tonal division seems to describe various environments for tonal sandhi or tonal alternation, however none of the above three researchers, including He, distinguish between the phonologically conditioned environments that lead to tone sandhi or different variations of tones. In looking at the tones documented by Mao (2004), He (1999), and Liu, et. al. (1998) in their analysis of Yunnan and Guangxi varieties of Kim Mun (cf. Section 4.4) it is clear from the close phonetic nature of the tones that further research and analysis of these tonal

systems is necessary to get a proper understanding of the tonemes that exist in these two respective areas.

4.4.1.2 Insight Gleaned from the Eight-Tone System

One valuable insight gained from the use of the eight-tone system is a depiction of the relationship of tones among cognates in related Kim Mun varieties. When comparing the tone systems of various Kim Mun varieties grouped into the eight-tone system, it is clear across one section of the eight-tone system how the tones are represented among cognates in other varieties.

A second insight of the eight-tone system helps shed light on why the Yunnan and Guangxi varieties (Mao 2004, He 1999, and Liu, et. al. 1998) document so many more tones than that of the Lao, Vietnam, and Hainan varieties.

For physiological reasons, a tone on a closed syllable may be realized slightly different than a tone on an open syllable, or as alluded to by Yip (2002) a tone may be realized slightly different depending on voicing quality. It has been the practice of Asian linguists, Chinese linguists in particular, to make tonal distinctions based on syllable type and voicing quality. Most Western linguists group one as the allotone of the other because the tonal difference is dependent on the environment and therefore predictable. This is seen in a related language, Mien, where Chinese linguists classify Mien with 8 tones,

making a distinction on live and dead syllables (cf. Table 2). On the other hand, Western linguists normally classify Mien with 6 tones with two allotones on dead syllables, according to Table 3:

Table 2. Chinese Classification of Mien Tones

Mien Contour	/33/	/31/	/52/	/231/	/24/	/13/	/55/	/12/
8-Tone Category	1	2	3	4	5	6	7	8

Table 3. Western Classification of Mien Tones

Mien Contour	/33/	/31/	/52/	/231/	/24/	/13/
Allotone Contour			/55/			/12/

A further benefit of the eight-tone system could reveal possible historical relations between voicing quality and tones. According to Fox (2002), voice quality often has an impact on the development of a tonal system of a tonal language. There is a possible relation between the tonal system of Kim Mun and the laryngeal setting used in the production of preglottalized plosives as reported in Section 4.5, but investigation of tonal and voice quality is for future Kim Mun studies.

4.4.2 Synopsis of Kim Mun Tones

Extended discussion of this system and other results it may produce, beyond what is already mentioned above, are beyond the scope of this thesis and are for future Kim Mun studies. However a cursory look at this system will provide a superficial look at the tones among cognates in various Chinese

varieties of Kim Mun, as demonstrated in Table 4. Refer to Section 4.4.1 for further explanation of how previous researchers of Chinese Kim Mun employ the below table.

Table 4. Comparison of Kim Mun varieties in China based on the Chinese Eight-Tone System

			Yunnan (Mao 2004)	Yunnan (He 1999)	Yunnan (Liu, et. al. 1998)	Guangxi (Mao 2004)	Hainan (Shintani 1990)
Tone Category			Tone Contour	Tone Contour	Tone Contour	Tone Contour	Tone Contour
Ping (平)	yin (陰)	1	/35/	/24/	/24/	/35/	/13/
		1'	/31/	/53/	/52/	/13/	/11/
	yang (陽)	2	/33/	/11/	/11/	/33/	/33/
Shang (上)	yin (陰)	3	/545/	/35/	/35/	/55/	/354/
		3'	/43/	/443/	/42/	/42/	/354/
	yang (陽)	4	/32/	/43/	/43/	/31/	/31/
Qu (去)	yin (陰)	5	/44/	/44/	/44/	/335/	/44/
		5'	/21/	/453/	/453/	/331/	/31/
	yang (陽)	6	/22/	/32/	/32/	/32/	/53/
Ru (入)	yin (陰)	7a	/24/	/24/	/23/	/35/	/13/
		7b	/54/	/55/	/55/	N/A	/44/
		7a'	/31/	N/A	N/A	/12/	/31/
		7b'	/32/	/44/	/44/	N/A	/11/
	yang (陽)	8a	/42/	N/A	N/A	/32/	[45]
		8b	/21/	/21/	/21/	/32/	/44/

As an example, according to Table 4, when the /35/ tone occurs in the Yunnan variety, among cognates it appears as the /24/ tone (Yunnan), the /35/ tone (Guangxi), and the /13/ (Hainan) as in ‘water’ /wɔm³⁵/ (Yunnan) compared with /wɔm²⁴/ (Yunnan), /wɔm³⁵/ (Guangxi), and /vam¹³/

(Hainan). These tone contours between varieties do not always match up so nicely between cognates, especially on dead syllables, but nevertheless there are general patterns of occurrence between cognates that can be observed between the various varieties. The results that may proceed from applying Lao and Vietnam Kim Mun to the above template is for future Kim Mun tonal studies.

4.5 Preglottalization

This section will give a literature review on the use and meaning of the term preglottalization. This is necessary because this phenomenon is frequently mentioned in literature about Southeast Asian languages, such as Thai (Vaissière 1997; Ladefoged and Maddieson 1996), Tamil (Laver 1994), Mpi (Ladefoged 2005), and Mien (Purnell 1965), to list a few. Kim Mun is one of the languages where this phenomenon is documented, e.g. Mao (2004) in the Guangxi variety of Kim Mun, Shintani (1990) in the Hainan Island variety of Kim Mun, Edmondson in the raw data received from him on the Lao Cai, Vietnam variety of Kim Mun, and finally Purnell (1965) in Mien.

At the outset of this study, it was uncertain whether this phenomenon was a mere matter of pronunciation, an allophonic variant, or a distinctive feature of the Kim Mun in Laos and Vietnam.

The term preglottalization has been widely used, with a whole range of different meanings that are not always explicitly stated. Purnell (1965) documents preglottalization in Mien without further definition. Shintani (1990) and Mao (2004) both report preglottalized segments in Kim Mun, with Shintani documenting voiced preglottalized segments [ʔb, ʔd] in the Hainan variety while Mao records voiceless preglottalized segments [ʔp, ʔt] in the Guangxi variety. Mao vaguely explains preglottalization in a footnote as “Labial, alveolar stops along with glottal stop” (2004: 100) whereas Shintani (1991) applies the term to voiced implosives. Others apply the term to voiceless implosives or more vaguely, non-explosive stops (Clements and Osu 2002). Some researchers have used the term in reference to a sequence of first glottal and then oral closure or constriction (Edmondson 2004; Dimmendaal 1986). Haudricourt (1950) uses the term for any combination of oral and glottal closure, regardless of how the two closures are phased. Goyvaerts (1988) applies preglottalization to stops with minimal implosion, like a weaker variant of implosives. Ladefoged and Maddieson (1996) point out that the term preglottalization has been used for implosives as well as for laryngealized (creaky-voiced) stops. Vaissière (1997) also uses the term glottalized consonants or preglottalization to refer to creaky-voiced stops.

The lack of experimental studies on what researchers label as preglottalization and the often missing distinction of this category cause Clements and Osu to make use of the term glottalization as “some degree of glottal constriction beyond that involved in ordinary modal voicing.” (2002: 312). This would include voiceless implosives, laryngealized as well as preglottalized stops, and “other types.” Together with the aforementioned applications of this term, there are four different possible meanings of the term preglottalization:

- (1) Implosives
- (2) Stiff Voice
- (3) Laryngealization
- (4) Glottalization

Implosives differ from the other phenomena referred to as preglottalization in their manner of articulation; stiff voice and laryngealization are phonation types and glottalization is a consonantal modification through a complete glottal closure at the onset or offset of a consonantal segment. It is obvious that this wide range of uses applied to the term preglottalization causes confusion if the term is not defined by the researcher using it. Therefore, the purpose of this section is to present the varying descriptions of

preglottalized segments as listed above. It is hoped that a suitable and satisfying definition will be arrived at that can be used to describe the different phonetic phenomena that may possibly occur in the Kim Mun varieties under investigation in this study.

4.5.1 Implosives

The following two sections will describe voiced and voiceless implosives.

Implosives are non-pulmonic consonants, i.e. the airflow is not generated by the lungs but by a fast downward movement of the larynx with either lightly or tightly closed vocal folds while an oral closure is formed. This movement enlarges the oral cavity and decreases the air pressure. The air pressure under the glottis increases, causing the lightly closed vocal folds to vibrate as pulmonic air passes through the glottis into the oral cavity. As for voiceless implosives, the glottis is entirely closed. On release of the oral closure, inward airflow fills the relative vacuum (Laver 1980).

4.5.1.1 Voiced Implosives

Shintani refers to “preglottalized or implosive stops” as a feature of all the languages on Hainan Island, including the local Chinese dialect, Hainanese, and the five non-Chinese languages (1991: 1). Shintani claims the voiced implosives of Hainan Kim Mun are originally derived from voiceless

segments. He relates these segments to the Thai initials, transcribing them with the same symbols [ʔb, ʔd] as he used to transcribe the Kim Mun segments. Since Shintani does not differentiate between preglottalized stops and implosives, he obviously considers Thai voiced initials to be implosives. Ladefoged and Maddieson (1996) on the other hand report voiced Thai stops to have stiff voice (cf. Section 4.5.2.1). Furthermore, implosives involve larynx lowering, whereas Edmondson in his study on Sui, a Tai language in China, notices even larynx heightening on the so-called preglottalized segments, which he attributes to the production of certain tones (2004).

Li (1943) already postulated that the voiced plosives in Tai languages were preglottalized. According to Edmondson (2004), Li is perhaps one of the first researchers to put forward the notion of preglottalized segments in Tai and Kam-Sui languages, possibly because of his exposure to Northwest Native American languages containing this feature. Edmondson (2004) later conducted a study using instrumental analysis to prove that Li's preglottalized stops are not implosives but preglottalized in its literal sense, namely as a sequence of a glottal stop and a modal voice plosive (cf. Section 4.5.3).

The reason why researchers might have mistaken voiced stops in Kim Mun or Thai for implosives is that voiced stops can exhibit a slight lowering of the

larynx. Sometimes this larynx lowering is sufficient to rarefy the air in the oral cavity and create some inward airflow on the release of the oral closure (Ladefoged and Maddieson 1996). Vaissière (1997) notes that a lowering of the larynx may assist voicing by causing the vocal folds to slacken.

However, the lowering of the larynx for voiced plosives is a physiological artifact and is to be distinguished from true implosives with a faster and stronger downward movement of the larynx (Catford 1980).

4.5.1.2 Voiceless Implosives

Clements and Osu use the term “preglottalized stops” as a synonym for voiceless implosives or “nonexplosive stops” (2002: 300). Because of the many varying interpretations of the term preglottalization, they settle on the term voiceless implosive for their study on Ikwere, a Niger-Congo language. As pointed out in the previous section, voiceless implosives require a closed glottis, which might be the reason why the term preglottalization has been used for this manner of articulation. There is no evidence in the literature for voiceless implosives in Kim Mun.

4.5.2 Phonation Types

As mentioned earlier, the term preglottalization is also used in reference to the phonation types stiff and creaky voice. Phonation in general describes

the various laryngeal and glottal modifications as pulmonic egressive air passes through the larynx (Ball and Rahilly 1999), with the exception of initiation (implosives, ejectives, clicks) or articulation (glottal stop or fricative) of speech sounds (Crystal 2003). Laver (1980) describes phonation types as a degree of muscular tension of either progressive relaxation or progressive tensing with modal voice, first labeled as such by Hollien (1971), as neutral in relation to muscular tension. The vibration of the vocal folds is “periodic, efficient, and without audible friction” for modal voice (Laver 1980: 94). Ladefoged and Maddieson (1996) refer to modal voice as the most relaxed state of the glottis. Languages only contrast phonation types with more than one degree in the continuum of laryngeal settings (Ladefoged and Maddieson 1996; Vaissière 1997), i.e. modal voice would not contrast with stiff voice but only laryngealization, and stiff voice in turn would be more likely to contrast with slack voice. The possible laryngeal settings form a continuum that may be visible on spectrograms and wave graphs (Laver 1980; Ladefoged and Gordon 2001) but are acoustically similar enough that they do not contrast within a language.

Ladefoged and Maddieson (1996) and Gordon and Ladefoged (2001) pinpoint the controlling mechanism of phonation to a state of the glottis that can be organized on a continuum. This is illustrated in Figure 2.

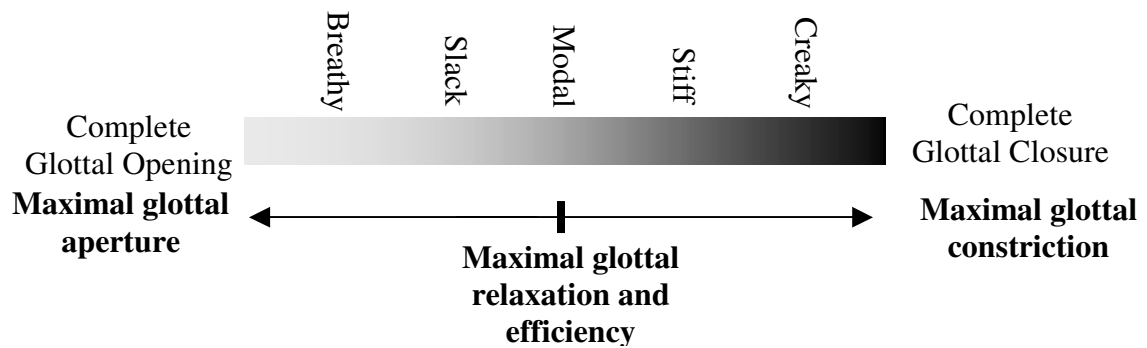


Figure 2. Modes of Phonation

In one direction on the continuum of laryngeal settings the glottis becomes more constricted, with stiffer vocal folds, and the mode of vibration becoming more aperiodic, up to the point of full glottal closure. Edmondson even establishes a continuum for glottal closure, “beginning with moderate glottal stop” to the “production of an epiglottal stop” (2004: 7). In the other direction on the continuum the glottal aperture increases, the vocal folds get looser and eventually produce audible friction, becoming more inefficient (Ladefoged 2005; 1996; 1971; Laver 1980), up to the point where the glottis is too spread to vibrate at all.

Ladefoged and Maddieson demonstrate the five phonation types by documenting the approximate air flow rate for a male speaker without significant supraglottal constriction: Voiceless 1000 ml/s, breathy 500 ml/s; slack 250 ml/s; modal 120 ml/s; stiff voice 100 ml/s; creaky voice even less

than 100 ml/s (1996: 50). Ladefoged and Maddieson point out that the airflow for stiff voice is only slightly lower than for modal voice whereas the airflow of creaky voice differs considerably from the one for modal voice (1996: 48). As already seen in Figure 1, stiff and creaky voice share the feature [+constricted]. Laver describes an “exaggerated laryngeal tension” for creaky voice, as “a combination of extreme adductive tension and extreme medial compression, brought about by over-contraction of the muscle systems” (1980: 130). The reason for this is that creaky voice is produced with a partially closed glottis while only one end of the vocal cords is vibrating very slowly. For stiff voice, on the other hand, no partial glottal closure has been reported, though Kang argues that if the feature [+stiff vocal cords] is apart of the fortis/stiff voiceless plosives in Korean then this may “result in a natural contraction of the vocalis muscles to form a glottal constriction” (2004: 171). Ladefoged (2006) and Vaissière (1997) refer to creaky voice as laryngealized and stiff voice as slightly laryngealized since stiff phonation has less glottal constriction than creaky voice.

The two phonation types that share the feature [+constricted] are stiff voice and creaky voice. Both of them can appear with the label preglottalization and therefore will be discussed in the following section. The application of

the term preglottalization to the phonation type stiff voice will be discussed first, with its voiced and voiceless variant.

4.5.2.1 Stiff Voice

Ladefoged and Maddieson (1996) note that stiff voice segments have a degree of glottal constriction along with a degree of laryngealization due to a possible contraction of the vocalis muscles, which make up the glottal part of each vocal fold. The vocalis muscles contract and stiffen for the laryngeal features [+constricted] and [+stiff]. Kang argues that obstruents produced with stiff phonation are produced with a narrow glottis accompanied with stiff vocal folds, which in turn reduces “the range of glottal widths to the extent that there might be a slight degree of glottal constriction” (2004: 178). Laver documents the muscular tension of the laryngeal system as “progressively boosted beyond the limits for normal voicing”, which results in first the “glottal aperture to be reduced in length” and second for the “upper larynx to begin to be constricted” (1994: 419). Stiff voice also has the feature [-spread] meaning the glottis does not spread at the time of the release as in aspirated stops (Vaissière 1997).

4.5.2.1.1 Voiced Stiff Segments

Vaissière (1997) and Ladefoged and Maddieson (1996) identify stiff voice for Thai voiced plosives. In his study on a Tai language found in China (cf. Section 4.5.3), Edmondson's stroboscopic recordings of the glottis area of his Sui language informant producing preglottalized stops reveal a "closed UNPHONATED state of the glottis" (2004: 7). It appears Edmondson may be referring to neutral voice because he further mentions that there are no recorded instances of preglottalized consonants with creaky voice. Furthermore, Edmondson describes the production of a moderate glottal stop as having a laryngeal setting with a "slight constriction of the whole laryngeal vestibule" (2004: 7). Edmondson's observation of a preconsonantal "moderate" glottal stop and a slight laryngeal constriction seems to suggest that there is a combination of preglottalization and stiff voice present in Sui voiced stops.

The presence of the initial glottal closure before a voiced plosive could be a result of voice onset. Ball and Rahilly (1999) describe the voicing cycle as beginning with a "closed (or nearly closed) glottis, with contact between the edges of the two vocal folds" to "form a barrier to the pulmonic egressive airflow" which results "in a build-up of air pressure in the sub-glottal area". The additional constriction of the laryngeal vestibule mentioned by

Edmondson would add a degree of glottal constriction, with the stiff vocal cords increasing the degree of glottal closure necessary for voicing up to what Edmondson labels as a “moderate” glottal stop. Therefore, Edmondson’s observation of a preconsonantal moderate glottal stop does not preclude the possibility of voiced stiff stops as a feature for the languages in this study; rather his observation of a slight laryngeal constriction somewhat supports the possibility of voiced stiff segments.

4.5.2.1.2 Voiceless Stiff Segments

In the Guangxi variety of Kim Mun, Mao (2004) marks the preglottalized stops only on voiceless initial plosives in the labial and alveolar places of articulation. It is necessary to look at the voiceless counterpart of stiff phonation in order for this analysis to reconcile with Mao’s observations.

Korean has contrast between two voiceless unaspirated plosives in its consonantal repertoire. According to Ladefoged and Maddieson (1996), researchers sometimes refer to this phenomenon as “unaspirated lenis” and “unaspirated fortis”. Purnell (1965) mentions that Mien exhibits fortis on Mien initials. The so-called fortis and lenis plosives in Korean have many observable differences, the most notable of which is “attributed to the laryngeal activity associated with the stiff voice position of the vocal folds”

for fortis plosives, accompanied by a very sharp voice onset of the following vowel (Ladefoged and Maddieson 1996: 56). The sharp voice onset of the following vowel can be explained through the feature [-spread], meaning that the vocal cords are too stiff to vibrate but close enough to immediately vibrate upon release of the oral closure. Vaissière (1997) similarly notes that stiffening of the vocal folds can lead to higher vibration of the vocal folds on the onset of the following vowel.

The vocal folds are not vibrating in the production of a voiceless segment. Therefore, the key factor in the production of voiceless stiff segments seems to be the increased laryngeal muscular tension (cf. Section 4.5.2), regardless of whether the vocal cords are adducted closely enough to vibrate or whether they are stiff enough not to vibrate. Stiff voice therefore is more than a phonation type, it is a laryngeal modification. A necessary additional binary feature to distinguish between voiceless stiff and voiced stiff would then be the feature [+/- voice] next to the features [+ constricted] [-spread] [+ stiff] marking stiff segments.

4.5.2.2 Laryngealization

As mentioned in the beginning of this chapter, the term glottalization does appear in reference to laryngealization or creaky voice. Laryngealization is

a particular type of vocal fold vibration and therefore only occurs on voiced segments. Gordon defines creaky voice as “characterized by irregularly spaced glottal pulses and reduced acoustic intensity relative to modal voice” (2001: 2). It is this state of the glottis producing rapid intermittent glottal closures that may be the reason why creaky voice or laryngealization are being referred to as glottalization. Creaky voice and glottalization are hard to distinguish, but they do have some common characteristics, primarily laryngeal constriction (Laver 1980).

Ladefoged and Maddieson (1996) offer a list of examples of languages, including the Kam-Tai languages Sui and Lungchow, which are reported as having laryngealized stops. They qualify their list by stating that they have not heard all these languages and point out that published descriptions suggest preglottalization as well as implosives for the same languages. Therefore it is not certain that all of these languages exhibit what Ladefoged and Maddieson would call creaky voice. They do mention that Thai voiced stops “are often pronounced with stiff, or even creaky, voice at least during the onset of the closure (1996: 55).

Edmondson (2004) who notices initial glottal stops on Sui voiced plosives, remarks that pre-consonantal glottal stops exclude laryngealization. Gordon (2001) mentions that the laryngealization of consonants often spreads to the

following vowels which is not reported for Kim Mun or found in any of the Tai languages their voiced stops are being compared to. Edmondson's and Gordon's observation allow the exclusion of laryngealization as a possible feature for Kim Mun voiced stops.

4.5.3 Glottalization

Laver (1980) mentions that glottalization has been used as a cover term for a wide variety of phenomena. Ladefoged lists such phenomena as “ejectives, implosives, laryngealized sounds, and pulmonic articulations accompanied by glottal stops” (1971: 28). This section will focus on pulmonic articulations accompanied by glottal stops. There are two forms of glottalization: preglottalized segments, which start with glottal closure, and postglottalized segments, which are followed by a glottal stop.

According to Edmondson (2004), Li (1943) documented “strongly preglottalized” stops in Tai languages. Edmondson also claims this feature for the Tai language Sui found in the Guizho and Guangxi provinces of China. Some literature on this language reports a slight implosive onset for the preglottalized stops, a physiological artifact accompanying voiced stops (cf. Section 4.5.1.1), but Edmondson cannot find any larynx lowering and airflow evidence for implosives. Sui stops are literally pre-glottalized as they

are “formed from a sequence of moderate glottal stop released into a voiced nasal, a voiced fricative, a voiced stop or voiced approximant including vowels, similar to their description by Li Fang Kuei (1943)” (2004: 16). Therefore, the consonantal modification of preglottalization should be considered as a possible feature for the languages in this study.

In Lao and Vietnam Kim Mun, there are glottal closures following syllable-final vowels, approximants and nasals. These syllable-final glottal stops always accompany certain tones (cf. Sections 5.1.3 and 6.1.3) and therefore are interpreted as a suprasegmental feature.

4.5.4 Possible Laryngeal Settings in Kim Mun

As discussed in Section 4.5, preglottalized plosives have been interpreted various ways in the literature, such as implosives (Clements and Osu 2002; Shintani 1991), as a sequence of glottal stop followed by a pulmonic consonant (Edmondson 2004; Dimmendaal 1986), or laryngealization (Vaissière 1997; Ladefoged and Maddieson 1996). The previous discussion of the features different researchers assign to what may be called preglottalization leads to the following possible laryngeal settings for Lao and Vietnam Kim Mun:

(1) Implosives

As pointed out in Section 4.5.1.1, Shintani mentions voiced implosives in his study on Kim Mun (1991), comparing them to Thai initials. The results of Edmondson's (2004) airflow studies on Sui, a related language, preclude preglottalization as implosive. Other researchers like Ladefoged and Maddieson (1996) identify stiff voice for Thai initials. These studies suggest that voiced implosives are unlikely to occur in Lao and Vietnam Kim Mun, and indeed this analysis does not find implosives in either Lao or Vietnam Kim Mun.

(2) Stiff Voice

Vaissière (1997) and Ladefoged and Maddieson (1996) identify stiff voice for Thai voiced plosives that Shintani compared his Kim Mun stops to. Accordingly, stiff voice is a possible feature for the voiced stops of Lao and Vietnam Kim Mun. Since Mao (2004) marks the preglottalized stops only on voiceless initial plosives in Guangxi Kim Mun, stiff voice might be a feature of voiceless Kim Mun stops too.

(3) Laryngealization (Creaky Voice)

Stiff consonants are characterized as slightly laryngealized and difficult to distinguish from laryngealized segments (Ladefoged and Maddieson 1996).

Gordon notes that the creaky voice of consonants is often carried into the following vowel onset (2001). This is not reported for the Tai languages being referred to as containing laryngealized stops. Together with Edmondson (2004) noticing initial glottal stops on Sui voiced plosives—which excludes laryngealization—there is not sufficient reason to consider creaky voice as a possible feature for Kim Mun voiced stops.

(4) Preglottalization

Li (1943) reconstructs preglottalized stops in Proto-Tai. In his instrumental analysis, Edmondson (2004) later also reports this feature for the Kam-Tai language Sui and also documents it in the raw data provided for this analysis from Lao Cai, Vietnam. Therefore, preglottalization must be included as a possible feature for Kim Mun.

With implosives and laryngealization being ruled out as possible features in Kim Mun, stiff phonation and preglottalization are two possible features that may explain the production of initial plosives in Lao and Vietnam Kim Mun. Refer to Roman numeral IV under Section 4.6 for the final forecast used in this analysis. Neither Shintani (1991) with implosives nor Mao (2004) with preglottalized segments offer evidence of contrast with modal stops.

Accordingly, the laryngeal setting accompanied with preglottalized segments is not expected to be contrastive, but most likely an areal feature.

4.6 Summary and Forecast

Table 5 provides a linear comparison of the Chinese varieties of Kim Mun studied under Mao (2004), He (1999), Liu, et. al. (1998), and Shintani (1990). It can be observed that He's (1999) and Liu, et. al.'s (1998) analysis of Kim Mun in Yunnan are quite similar, while Mao's (2004) analysis of Kim Mun in Yunnan differs slightly, i.e. fewer initials and more consonant clusters. Liu, et. al.'s (1998) analysis contains the fewest consonant clusters because he transcribed the ambiguous vowels /i, u/ without further analysis as to whether they have phonological status as the approximants /j, w/. The vowel systems reported by Mao (2004) and Liu, et. al. (1998) are quite similar, whereas the vowel system reported by He (1999) differs the most from any other researcher.

Mao's (2004) analysis of Yunnan and Guangxi Kim Mun do not differ significantly from Shintani's (1990) analysis of Hainan, though the initials reported by Mao (2004) in the Guangxi variety are the most diverse of any other variety. The initials of Hainan are the most similar to that of the Guangxi variety, especially when taking into account that what Shintani

(1990) labels as a palatalized segment /tj, t^hj, dj, nj/ may correspond to the alveolo-palatal place of articulation recorded by Mao (2004) in the Yunnan and Guangxi varieties. The area with the most consistency between these various studies in China is that of the finals, which report no variation.

Table 5. Summary of Chinese Varieties of Kim Mun

	Hainan KM (Shintani 1990)	Yunnan KM (Mao 2004)	Yunnan KM (He 1999)	Yunnan KM (Liu, et. al. 1998)	Guangxi KM (Mao 2004)
Single Initials	p ^h , b, ^ʔ b, t ^h , d, ^ʔ d, k, k ^h , g, m, n, ŋ, f, v, s, h, ʔ, l	p, b, t, d, t̚, d̚, k, tθ, dθ, g, m, n, n̄, ŋ, f, v, s, h, l, j, w	p, b, t, d, k, g, ts, tɕ, dz, m, n, n̄, ŋ, f, v, θ, θ̚, ɕ, x, w, j, l	p, b, t, d, k, g, ts, dz, tʃ, dʒ, m, n, n̄, ŋ, f, v, θ, θ̚, ɕ, h, w, j, l	^ʔ p, p ^h , ^ʔ p ^h , b, ^ʔ t, t ^h , d, t̚, t̚ ^h , d̚, k, k ^h , g, m, n, n̄, ŋ, f, v, θ, ɕ, h, l, j
Clusters	pl, p ^h l, bl, pj, p ^h j, bj, tj, t ^h j, dj, kj, k ^h j, gj, kw, k ^h w, gw, kl, k ^h l, gl, mj, nj, ŋj, ŋw, lj	pl, pj, bl, tl, tj, dl, dj, tθj, dθj, kw, kj, gw, gj, mj, nj, ŋw, sj, lj, hj	pl, bl, kl, gl	pl, bl	^ʔ pl, p ^h j, p ^h l, bl, bj, kw, kl, kj, k ^h w, k ^h l, k ^h j, gw, gl, gj, mj, nj, ŋw, ŋj, lj
Finals	p, t, k, m, n, ŋ	p, t, k, m, n, ŋ	p, t, k, m, n, ŋ	p, t, k, m, n, ŋ	p, t, k, m, n, ŋ
Vowels	i, e, a, u, o, ɔ	i, e, ɛ, a, u, o, ɔ	i, e, a, i, ə, u, o	i, ɛ, a, u, o, ɔ	i, ɛ, a, u, o, ɔ
Tones	13, 11, 33, 354, 31, 44, 53	35, 31, 33, 545, 43, 32, 44, 21, 22, 24, 54, 42	24, 53, 11, 35, 443, 43, 44, 453, 32, 55, 44, 24, 21	24, 52, 11, 35, 42, 43, 44, 453, 32, 55, 44, 23, 21	35, 13, 33, 55, 42, 31, 335, 331, 32, 12

Shintani (1990) did not find significant differences between Hainan Kim Mun and Vietnam Kim Mun, despite Hainan Kim Mun being separated from the mainland for an extended period of time. According to Shintani, Hainan

Kim differs in that the voiceless plosives /p/ and /t/ in Vietnam correspond to what Shintani labels as voiced implosives /²b/ and /²d/ in the Hainan variety, and the /θ/ in Vietnam becomes /t/ in the Hainan variety. These two differences are minor, so it is rather likely that the Kim Mun variety found in neighboring Laos will not differ significantly from the Vietnam Kim Mun. Based on the research on Kim Mun reviewed in the previous sections, the following expectations apply in the analysis of the Lao and Vietnam varieties of Kim Mun.

I. Consonants

A. Clusters

For all three Chinese varieties consonant clusters are documented, which is also claimed to be a Kim Mun feature by Edmondson (2007) and Chengqian (1991). Consequently, consonant clusters will most likely be found in the Lao and Vietnam varieties as well. He (1999), Liu, et. al. (1998), and Shintani (1990) show that the C₁ position is restricted largely to plosives and a few nasals, and while Mao (2004) shows a similar restriction, he does record a few fricatives occurring in the C₁ position. Each of the varieties demonstrated a more consistent

restriction on the C₂ position, i.e. only the approximants /j, w, l/.

Similar restrictions are expected to be true for Laos and Vietnam.

B. Initials

Both the Yunnan and Guangxi varieties (Mao 2004) have four places of articulation for plosives and nasals. The Guangxi variety also records one alveolo-palatal fricative. He (1999) and Liu, et. al. (1998) record the alveolo-palatal place of articulation with affricates and fricatives, though not with plosives. Shintani (1990) is the only researcher not to record the alveolo-palatal place of articulation, but this may be a result of his transcription method. Each of the varieties demonstrated a high functional load on plosives and nasals. It is therefore expected that the Lao and Vietnam varieties will have a similar consonantal system and will contain four places of articulation as reported by Mao (2004), He (1999), and Liu, et. al. (1998).

C. Finals

All three varieties have either voiceless plosives or nasals as finals, so it is expected that the finals of the Lao and Vietnam varieties will be the same.

II. Vowels

A. Symmetry

The Kim Mun varieties of Hainan Island (Shintani 1990), Guangxi (Mao 2004), and Yunnan (Liu, et. al. 1998) all have a simple symmetrical vowel system of three front vowels with three back vowels. The Yunnan variety reported by Mao (2004) differs slightly with one extra front vowel. The Yunnan variety reported by He (1999) differs the most. Therefore, it is likely that the Lao and Vietnam varieties of Kim Mun will exhibit a similar vowel system. Mao (2004) did find some central vowels that were allophones that may lend to the central vowels reported by He (1999), so it is possible that some central vowels may show up in either the Lao or Vietnam varieties.

B. Length

All three Chinese Kim Mun varieties (Hainan, Yunnan, and Guangxi) show distinctive vowel length. While Mao (2004) argues that the long-short vowel distinction tends to disappear in Kim Mun, He (1999) calls it common and widely distributed. It is therefore uncertain whether there will be many examples of quantitative vowel contrast discovered in either the Lao or Vietnam variety.

III. Tones

The Hainan variety documented seven tones with one allotone by Shintani (1990), and the Yunnan and Guangxi varieties documented twelve and ten tones respectively by Mao (2004) and thirteen tones in the Yunnan variety as reported by He (1999) and Liu, et. al. (1998). Much of the tonal variety goes back to different syllable structures, namely open and closed syllables with varying onsets, which could be analyzed as tonal sandhi or tonal alteration. Therefore, it is uncertain how many tones may exist in the Lao and Vietnam varieties, but it is certain that both varieties will have a high functional load on tone as in the other varieties.

IV. Preglottalization

The moderate glottal stop preceding voiced plosives as documented by Edmondson (2004) can be interpreted as a physiological artifact with voiced stiff plosives (Ball and Rahilly 1999). This is in line with what Purnell (1965) labels preglottalization and with Edmondson's research on Sui (2004). This laryngeal setting would also account for the segments Mao (2004) documents in the Guangxi variety of Kim Mun. It further corresponds to the fortis segments documented in Mien by Purnell (1965)

who lists preglottalization on voiced segments and fortis on voiceless segments.

Based on the previous research on preglottalized segments, this study identifies stiff voice for both voiced and voiceless stops as present in both Lao and Vietnam Kim Mun. Following Ladefoged and Maddieson (1996), stiff voice will be transcribed with a subscript *v* for voiced stops [b_v] and an asterisk for voiceless stops [p*].

CHAPTER 5

PHONOLOGICAL DESCRIPTION OF KIM MUN, LAOS VARIETY

5.1 Inventory of Phonemes

This section will provide an analysis and description of the phonemes in the Lao variety of Kim Mun and will be organized by consonants, vowels, and tones. A distribution of phonemes will follow.

5.1.1 Consonants

The Lao variety of Kim Mun has twenty-one distinctive consonants with four major places of articulation which can be slightly modified according to specific places of articulation, i.e. labial includes bilabial and labiodental segments, pre-palatal includes dental and alveolar segments, palatal includes alveolo-palatal and palatal segments as well as the alveolar sibilant¹⁷, and post-palatal includes velar and glottal segments. The consonantal inventory is represented in Table 6 and will be exemplified in the following sections.¹⁸

¹⁷ The alveolar sibilant sounds like the English /s/ which is produced through an alveolar constriction and groove in the alveolo-palatal area with an alveolar release (cf. Ladefoged/Maddieson 1996: 146f)

¹⁸ The major places of articulation labeled pre-palatal and post-palatal are phonological categories not phonetic categories.

Table 6. Inventory of Consonantal Phonemes in Lao Kim Mun

Place Manner	Labial	Pre- Palatal	Palatal	Post- Palatal
Plosives	p b	t d	t̚ d̚	k g
Fricatives	f v	θ ð	s	h
Nasals	m	n	ɲ	ŋ
Approximants		l	j	w

As already mentioned in Section 4.3.2.2, the Chinese symbols are used following Mao (2004) for alveolo-palatal stops in both the Lao and the Vietnam data. Evidence of contrast is provided in Appendix B.

5.1.1.1 Plosives

There are sets of voiced and voiceless plosives in all four possible major places of articulation for a total of eight plosives. Initial bilabial, alveolar, and alveolo-palatal plosives in Lao Kim Mun have stiff voice. This means they exhibit audible sharp vowel onsets as typical for laryngeal constriction when following both voiced and voiceless segments. Only voiceless plosives occur syllable-final and are unreleased in this position, see Figure 3. There is no alveolo-palatal unreleased final stop.

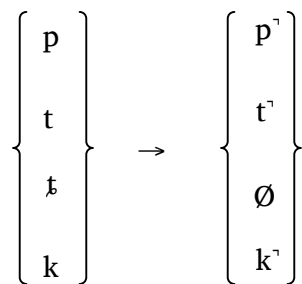


Figure 3. Final Plosives in Lao Kim Mun

The alveolo-palatal plosive deviates from this pattern, as it does not occur syllable-final. There are two possible reasons for this behavior, one of which is that the stop might not be clearly audible in this position because the alveolo-palatal release is the strongest audible feature for this place of articulation. The other reason is that alveolo-palatal segments are phonologically ambiguous. They can be analyzed as a single alveolo-palatal stop, a palatalized alveolar stop, or as a sequence of alveolar stop and palatal approximant. For the latter two possible readings, the release into an approximant or fricative would be missing because of the word-final unreleased realization of plosives.

For the present analysis, the ambiguity is supported in that the two alveolar plosives never appear in a consonant cluster preceding either the palatal or labiovelar approximant whereas both the bilabial plosives and the velar plosives exhibit this behavior (cf. Section 5.2.3). Kim Mun nasals provide clearer evidence on this issue (cf. Section 5.1.1.3). The alveolo-palatal nasal

stop can only be interpreted as a single, non-palatalized phonological unit since the other nasal stops do not form clusters or undergo palatalization. Thus the phonological principle of symmetry allows the same interpretation for the alveolo-palatal oral stops.

The glottal stop also occurs syllable final. In this environment the glottal stop is a phonetic feature of certain tones (cf. Section 5.1.3) and has no phonemic status as a consonant. Therefore syllables that end with the glottal stop will still be considered open syllables rather than closed. The glottal stop also occurs syllable initial as a predictable vowel onset, as in #187 'duck' [ʔa:p¹⁵³]. Since there is no contrast, the syllable-initial glottal closure before vowels is interpreted as the phonetic feature of abrupt onset of voicing (cf. Bussmann 1996).

The contrastive plosives with examples and their exact phonetic description are listed below.

/p/ stiff voiceless bilabial plosive [p* ~ p^ˀ]

Examples:

/pəj⁵³/ 'to know'

/pɛ²¹/ 'white'

/tɔp³¹/ 'bean'.

The stiff voiceless bilabial stop is not released if in syllable-final position.

/b/ stiff voiced bilabial plosive [b]

Examples:

/blan³³/ 'to play'

/bjet³¹/ 'tongue'

/bjo³¹/ 'to float'

/t/ stiff voiceless alveolar plosive [t* ~ tʰ]

Examples:

/təj³³/ 'tail'

/tu²¹/ 'turtle'

/set³⁵/ 'to itch'

The stiff voiceless alveolar stop is not released if in syllable-final position.

/d/ stiff voiced alveolar plosive [d]

Examples:

/dəj²¹/ 'porcupine'

/du⁵³/ 'to be deep'

/dɔp²¹/ 'to taste'

/tʃ/ stiff voiceless alveolo-palatal plosive [tʃ*]

Examples:

/tʃe³³/ 'paper; cord'

/tʃɛŋ³³/ 'frog'

/tʃup³⁵/ 'to pound (garlic)'

/ɕ/ stiff voiced alveolo-palatal plosive [ɕʰ]

Examples:

/ɕim³³/ ‘thorn’

/ɕu²¹/ ‘scissors’

/ɕam²¹/ ‘dark’

/k/ voiceless velar plosive [k ~ kʰ]

Examples:

/kim³¹/ ‘forest’

/kəj³⁵/ ‘to hammer’

/tɔk²¹/ ‘cup’

The stiff voiceless velar stop is not released if in syllable-final position.

/g/ voiced velar plosive [g]

Examples:

/guŋ³¹/ ‘sky’

/gju³¹/ ‘to wither’

/gaj¹³/ ‘cover’

As a summary, both voiced and voiceless plosives in Lao Kim Mun exhibit the laryngeal setting stiff voice. Thus stiff voice is not distinctive and more likely to be an areal feature as the incidences of stiff voice in neighboring Tai languages suggest. Voiceless stops also occur syllable-final, in which case they have no audible release.

The alveolo-palatal plosives identified in the data are usually transcribed as affricates in other Mainland Southeast Asian languages. However, in the Lao variety of Kim Mun there is little friction in the production of the

alveolo-palatal segments, therefore they are analyzed as plosives in this study rather than affricates. Furthermore, there are no reported stiff alveolo-palatal plosives or affricates in the literature; however the alveolo-palatal plosives in the Lao Variety of Kim Mun are produced with a sharp vowel onset, which is characteristic of a laryngeal setting associated with stiff voice (cf. Section 4.5.2.1.2).

5.1.1.2 Fricatives

There are two sets of voiced and voiceless fricatives in the labial and pre-palatal places of articulation, as well as a voiceless alveolar sibilant and a voiceless glottal fricative, for a total of six fricatives. Consonants with this manner of articulation occur only syllable-initial. The contrastive fricatives with examples and their exact phonetic description are listed below.

/f/ voiceless labiodental fricative [f]

Examples:

/fəj¹³/ ‘to sleep’

/fun⁵³/ ‘to give’

/fa:³³/ ‘father’

The voiceless labiodental fricative occurs only twenty-three times in the wordlist and its environment is largely restricted to preceding the open central vowel /a/. This limited occurrence is explained through the reconstructed Proto-Mienic labiodental and alveolar fricatives *f and *s that

have merged to the voiceless interdental fricative /θ/ in Mun (L-Thongkum 1993: 181). The words in which the voiceless labiodental fricative is found therefore are likely to be loanwords or underwent some newer sound change.

/v/ voiced labiodental fricative [v]

Examples:

/van¹³/ ‘cloud’

/toŋ³¹van¹³/ ‘sugar’

/wɔm⁵³vəj¹³/ ‘boiling water’

The voiced labiodental fricative rarely occurs in the data, only five times in three different morphemes. In four instances it precedes the open central vowel /a/ like its voiceless counterpart, and in one instance it precedes the mid central vowel /ə/. Furthermore, the occurrence is limited to the rising tone /13/. Since the voiced labiodental fricative contrasts with its voiceless counterpart in the words /wɔm⁵³vəj¹³/ ‘boiling water’ vs. /fəj¹³/ ‘to sleep’ as well as /van¹³/ ‘cloud’ vs. /fan³³/ ‘to shoot’, it cannot be ignored as a phoneme of its own.

/θ/ voiceless dental fricative [θ]

Examples:

/θim³⁵/ ‘needle’

/θi⁵³/ ‘he/she/it’

/θəj³⁴¹/ ‘to sit’

/ð/ voiced dental fricative [ð]

Examples:

/tə.ðaj³³/ ‘tools’

/ɔu²¹ðɛm³¹/ ‘knife’

/ðɛŋ³³ðo²¹/ ‘to be smooth’

The voiced dental fricative occurs only four times in the data, but with three occurrences in contrastive environments.

/s/ voiceless alveolar fricative [s]

Examples:

/sin¹³/ ‘to shiver’

/səj³³/ ‘child’

/si³⁵/ ‘weather’

/h/ voiceless glottal fricative [h]

Examples:

/həj¹¹/ ‘easy’

/hu³⁵/ ‘to be thick’

/hɔp³⁵/ ‘to suck’

To summarize the occurrence of fricatives in Lao Kim Mun, there are four voiceless fricatives. Two of them, the labiodental and the dental one, have voiced counterparts that are contrastive but rarely occur. Generally, voiceless fricatives appear to be favored.

5.1.1.3 Nasals

The Lao Kim Mun variety shows four nasals, one for each major place of articulation. Except for the alveolo-palatal nasal, which is found only as a syllable onset, all nasals occur in syllable-initial and syllable-final position.

Examples of all four nasals with subsequent description are listed below.

/m/ bilabial nasal [m]

Examples:

/min³⁵/ ‘face’

/ma:³¹/ ‘to grind’

/məj³⁵/ ‘oil’

/n/ alveolar nasal [n]

Examples:

/ni¹¹/ ‘to be heavy’

/nɛŋ³³/ ‘to squeeze’

/bin⁵³/ ‘to be drunk’

/ɲ/ alveolo-palatal nasal [ɲ]

Examples:

/ɲin³³/ ‘to eat’

/ɲe³¹/ ‘to think’

/ɲo³¹/ ‘you (2s)’

As mentioned in Section 5.1.1.1, alveolo-palatal segments are ambiguous and could be analyzed as palatalized or as a sequence of segments following the palatal approximant instead of a separate place of articulation. However,

since there is no evidence of the clusters [mj, ɲj] (cf. Section 5.2.3), there is no motivation for the alveolo-palatal nasal to be interpreted as palatalized or followed by a palatal approximant. Therefore, the alveolo-palatal place of articulation for nasals is distinctive in Lao Kim Mun.

/ŋ/ velar nasal [ŋ]

Examples:

/ŋɔŋ³³bu¹¹/ ‘buffalo’

/ŋo³⁴¹sap³¹la:n³¹/ ‘50 (persons)’

/pɔŋ³³/ ‘to be full’

The velar nasal occurs one hundred forty-six times in the data, and with the exception of three instances, it is always syllable final. In syllable-final position it is preceded by any possible vowel, whereas in syllable-initial position it is found only with back vowels (close-mid /ɔ/ twice and open-mid /o/ once). Since it contrasts with the other three nasals in this position, it is considered a phoneme.

As a summary, Lao Kim Mun nasals are found both syllable-initial and syllable-final. Like its oral counterpart, the alveolo-palatal nasal stop only occurs syllable-initial. The velar nasal mainly occurs syllable-final.

5.1.1.4 Approximants

There are three approximants in three places of articulation. The labiovelar and palatal ones are central approximants and the alveolar approximant is a lateral. These contrastive approximants with examples are listed below.

/w/ voiced labial approximant [w]

Examples:

/wa³⁴¹/ ‘urine’

/pow³³/ ‘axe’

/bwe¹³/ ‘to dream’

The labiovelar approximant occurs syllable-initial, medial, and final.

/l/ voiced alveolar lateral approximant [l]

Examples:

/lut³⁵/ ‘peel’

/lu³⁵/ ‘to be big’

/lɔm³⁵/ ‘to stab’

The alveolar lateral approximant occurs syllable-initial and medial but not as a final.

/j/ voiced palatal approximant [j]

Examples:

/pjɔm³³/ ‘to blow’

/ja:ŋ³¹/ ‘to walk’

/ne³³/ ‘this’

The palatal approximant occurs as the medial consonant in clusters as well as in syllable-initial and syllable-final position.

To give a short summary of the occurrence of the three approximants in Lao Kim Mun, they all occur syllable-initial and are used as the medial consonant in clusters. The alveolar lateral approximant cannot occur syllable-final. This position appears to be reserved for oral and nasal stops and the central approximants.

5.1.2 Vowels

The Lao variety of Kim Mun has three front vowels, two mid vowels, and three back vowels for a total of eight distinctive vowel qualities. Each of these vowels show environmentally conditioned variation in length, dependent on the word structure discussed in Section 5.2. Only for the open central unrounded vowel /a/ is duration contrastive in a few instances. With the long open central vowel there is a total of nine distinctive vowels, as shown in Figure 4.

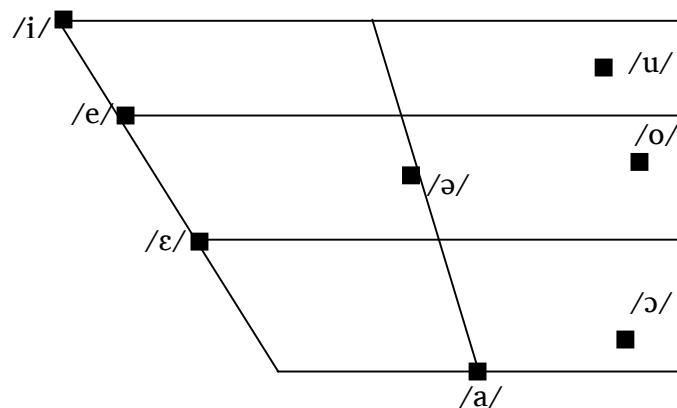


Figure 4. Distribution of Phonemic Vowels in Lao Kim Mun

The environmental conditions for long and short vowels are discussed in Section 5.1.2.4. Evidence of contrast is provided in Appendix C.

There are no diphthongs identified for the Lao variety of Kim Mun. The only possible vowels that could fill the V_2 position in Lao Kim Mun are the ambiguous closed front and back vowels [i] and [u]. The interpretation of these vowels as labiovelar and palatal syllable final approximants /j/ and /w/ is called for in this analysis because there are other closed syllables, formed with unambiguous voiceless plosives and nasals.

The following sections provide examples and a description for each vowel.

5.1.2.1 Front Vowels

/i/ close front unrounded vowel [i ~ ɪ]

Examples:

/im⁵³/ ‘to be bitter’

/min³⁵/ ‘face’

/θi⁵³/ ‘he/she/it’

The close front unrounded vowel /i/ shows four instances of realization as a near-close near-front unrounded [ɪ] in closed syllables ending on voiceless stops.

Examples for the occurrence of this allophone are [p*it⁵³sap³¹] ‘eighty’,

[bɔŋ²¹br̥³¹t*ɰ³⁴¹] ‘lightning’, [wit⁵³] ‘to dig’, and [ɰ̥p²¹məj²¹] ‘to wink’.

/i/ → [ɪ]/ __C [-continuant] [-sonorant] #
[i] elsewhere

/e/ close-mid front unrounded vowel [e ~ eʲ]

Examples:

/fe⁵³fa:n¹³/ ‘west’

/tɛ³³/ ‘paper, cord’

/pje³³doŋ⁵³/ ‘hair’

The close-mid front unrounded vowel /e/ does not occur in closed syllables,

it is restricted to open initial and medial syllables of compound words, e.g.

[ɸlɑw³¹tʰe⁵³tiw³³] ‘wine’. If the open syllable occurs in final position, or in

monosyllabic words without final consonants, it is realized with a palatal-off

glide [eʲ], as in [tʰe³³] ‘paper, cord’ or [tʰe³⁵pʰje³³] ‘to cut hair’. Evidence

of this is found in words like [pʰje³³] ‘head’ vs. [pʰje³³ɗoŋ⁴¹²] ‘hair’ or

[pʰje³³ɗja:n³³] ‘bald’.

/e/ → [eʲ]/ _#

[e] _ .CV(C)#

/ɛ/ open-mid front unrounded vowel [ɛ]

Examples:

/pɛ²¹/ ‘white’

/θɛn⁵³/ ‘betelnut’

/sɛt³⁵/ ‘to itch’

The open-mid front unrounded vowel /ɛ/ is strongly restricted to closed

syllables with orally articulated consonants as in [θɛn⁴¹²] ‘betelnut’, [ɸjɛt³¹]

‘tongue’ and [pʰɛw³³] ‘wrong’, as well as syllables that end with the tonal

feature glottal stop, as in [p*εʔ²¹] ‘white’. There are only a few instances of this vowel occurring in open syllables and with final approximants.

The strong restrictions for each of the close-mid and open-mid front vowels /e/ and /ɛ/ seem to suggest that these vowels are merging, with the open-mid only occurring in closed syllables. If this merge does get completed, the Lao Kim Mun vowel system will look more similar to the one recorded by Mao (2004) in the Guangxi variety of Kim Mun. The allophonic variation would most likely look about like this:

/e/ → [e]/ __.CV(C)#
 [eⁱ]/ __#
 [ɛ]/ __ C#

As long as there is contrast of close-mid and open-mid /e/ and /ɛ/ in open word-final syllables and with final approximants, like in /a³³**pe**⁵³la:n³¹/ ‘100 persons’ vs. /pε²¹/ ‘white’ or /**te**³⁵pje³³/ ‘to cut (hair)’ vs. /pε²¹/ ‘brother (elder of f)’, the open-mid unrounded front vowel must be interpreted as an individual phoneme.

/ə/ mid central unrounded vowel [ə]

Examples:

/məj⁴³/ ‘bee’

/kjət²¹/ ‘to laugh’

/səm⁵³/ ‘gold’

The mid central unrounded vowel appears in any possible environment. In minor syllables it occurs as an extra short reduced vowel [ə̃] where it is not contrastive, see Section 5.1.2.4 on vowel length below.

5.1.2.2 Central Vowels

/a/ open central unrounded vowel [a]

Examples:

/man³⁵/ ‘who?’

/ma³¹gɔŋ¹³/ ‘to be bad’

/fat²¹/ ‘to see’

As Pullum and Ladusaw (1996) point out, IPA still has no symbol for this vowel which is transcribed with a symbol of its own, the small capital [A], by many Sinologists and Russian linguists. In this study, the lower-case [a] is being used for the central a-variant, which is quite common in Asia (cf. IPA 1999 for Thai, Cantonese, Korean, Japanese, and Hindi).

/a:/ long open central vowel [a:]

In the Lao data there are three instances of contrast between long and short open central vowels that cannot be explained by the vowel-length conditioning word structure. These are the words /han¹¹/ ‘to hate’ vs. /ha:n¹¹/ ‘sweat’, /daw³³/ ‘salt’ vs. /da:w³³/ ‘long’, and /man¹¹/ ‘slow’ vs. /ma:n¹¹/ ‘ghost’. The only feature they share is the final consonantal sonorants. Even though this contrast does get neutralized as soon as the

syllable is compounded with other following morphemes, the long open central vowel has to be included in the phoneme inventory.

5.1.2.3 Back Vowels

/u/ close back rounded vowel [u]

Examples:

/buj³⁵/ ‘rice husk’

/tuŋ³¹ɗɔm¹³/ ‘pillow’

/pu³⁴¹/ ‘hand’

/o/ close-mid back rounded vowel [ɔ ~ ɔ^w]

Examples:

/mə.nɔj³⁵mot²¹təj²¹/ ‘the sun sets’

/hɔ³³ɗo²¹/ ‘to be correct’

/pje³³doŋ⁵³/ ‘hair’

The close-mid back vowel is lowered, resembling more of an open-mid back vowel. Like the close-mid front vowel /e/, the close-mid back vowel /o/ is restricted to open initial and medial syllables of compound words, as in [t*ɔ³⁴¹sɔ^{w354}] ‘smoke’. In word-final open syllables, or in monosyllabic words without final consonants, it is realized with a labiovelar off-glide [ɔ^w], as in [p*luŋ³¹ɓlɔ^{wɔ³⁴¹}] ‘butterfly’, [ɓuŋ²¹ɓit⁻³¹t*ɔ^{wɔ³⁴¹}] ‘lightning’ or [t*ɔ^{wɔ³⁴¹}] ‘fire’.

/o/ → [ɔ^w]/ _#

[ɔ]/ _ .CV(C)#

/ɔ/ open-mid back rounded vowel [ɐ]

Examples:

/pɔŋ³³/ ‘to be full’

/nɔm⁵³/ ‘seed’

/θɔ²¹/ ‘to be few’

The open-mid back vowel is pronounced more like a near-open back vowel.

Unlike the aforementioned close-mid back vowel /o/, the open-mid rounded back vowel does not display the same behavior as its front counterpart. It is found in every possible environment.

5.1.2.4 Vowel Length

This section describes allophonic vowel length in Lao Kim Mun. Semantically reduced minor syllables in Lao Kim Mun contain a non-contrastive extra-short schwa, such as in [b̥ǎ.g]ɔj⁴¹²] ‘shadow’, [m̥ǎ.nɔj³⁵⁴] ‘sun’, and [k̥ǎ.dəŋ³³] ‘eggplant’. They will be discussed in Section 5.2.2.

With the exception of the open central vowel /a/, vowel length is not contrastive in Lao Kim Mun and therefore not marked in the data. The general word pattern shows initial and medial syllables with short vowels, and a long vowel in the final syllable. If such a word-pattern conditioned syllable-final vowel is combined with other syllables so that it is no longer final, the vowel undergoes neutralization, as Shintani (1990: viii) describes it in the Hainan Island variety, and changes from long to short. There is one

exception in the data to this rule, i.e. [t*ɰŋ³¹vən²¹³] ‘sugar’, with a long vowel in the first syllable. Interestingly, for ‘white sugar’

[t*ɰŋ³¹vən³³p*ɛʔ²¹] the vowel length does alternate from long to short.

There are no further data available that would offer any possible explanation for this exception.

Table 7 demonstrates the alternation of long to short vowels.

Table 7. Alternation of Long to Short Vowels in Lao Kim Mun

‘sun’ vs ‘the sun rises’	[mǎ.nɰj ³⁵⁴] → [mǎ.nɰj ³⁵ sɑ:w ¹³]
‘wind’ vs ‘storm’	[ɰ̣!ɑ:w ²¹³] → [ɰ̣!aw ³³ kjaʔ ⁵³]
‘earth, soil’ vs ‘mud’	[ni: ³⁵⁴] → [ni ³⁵ p*amʔ ²¹]

When a syllable is moved from final syllable to initial or medial syllable, not only neutralization of vowel length but also tone neutralization can take place. This will be discussed in the following section.

5.1.3 Tones

Kim Mun languages, including the varieties under study, show lexically distinctive tone with varying pitch patterns. For Lao Kim Mun, eight tones have been identified, i.e. two level tones, five contour tones, and one complex tone, with the latter tonal annotation following Yip (2002). The two level tones have a falling and a rising equivalent. Tonal alteration does

occur for the high falling, mid rising, and low rising tones. For an overview, see Table 8.

Table 8. Lao Kim Mun Tone Schema

Tone	Chao Tone Number	Example
Mid	/33/	/təj ³³ / ‘tail’
Low	/11/	/tup ³⁵ məj ¹¹ / ‘to pound (rice)’
High Falling	/53/	/pəj ⁵³ / ‘to know’
Mid Falling	/31/	/məj ³¹ / ‘you’ (2 nd sg)’
Low Falling	/21/	/məi ²¹ / ‘eye’
Mid Rising	/35/	/məj ³⁵ / ‘oil’
Low Rising	/13/	/fəj ¹³ / ‘to sleep’
Mid Rising-Falling	/341/	/məj ³⁴¹ / ‘bee’

The Lao Kim Mun tones and their phonetic features will be presented in the following three sections.

5.1.3.1 Level Tones

The two level tones in Kim Mun are mid and low tones. Level tones never occur with final plosives. In word-final syllables, the low level tone exhibits a word-final glottal stop.

/33/ mid level tone [33]

Examples:

/tɨm³³dai³¹/ ‘deer’

/pu³³/ ‘to burn’

/bin³³/ ‘coffin’

The mid tone is pronounced with modal voice.

/11/ low level tone [11]

Examples:

/sa:m¹¹/ ‘blood’

/θuj¹¹/ ‘to move’

/ni¹¹/ ‘to be heavy’

The low tone is pronounced with breathy voice and shows word final glottalization. The word final glottalization might be an artifact of the accompanying breathy phonation, which in turn can be interpreted as a form of dissimilation to make the distinction between the low tone and the low falling tone clearer.

5.1.3.2 Contour Tones

There are five contour tones in Kim Mun, three falling and two rising tones.

Contrary to the level tones, contour tones do occur with syllable-final plosives, with the exception of the low rising tone. Similar to the low tone, there is word-final glottalization of the high falling and low falling tones, but not for every syllable type. Three of the contour tones i.e. high falling, mid rising, and low rising tones exhibit tone alteration.

/53/ high falling contour tone [53 ~ 412]

Examples:

/ban³¹de⁵³/ ‘hammer’

/səm⁵³/ ‘gold’

/θin⁵³taw¹³/ ‘star’

The high falling tone is pronounced with modal voice. Non-final syllables bearing this tone exhibit a lengthened rhyme. In monosyllabic words ending on vowels the tone is glottalized, shortening the syllable. With word-final oral plosives /p/ and /t/ the vowel remains long, as in [n^jɛ:p⁻⁵³] ‘flower petal’.

In word-final open syllables or word-final syllables ending on consonantal sonorants, like nasals and central approximants, the high falling tone is in free variation with the high falling-rising allotone [412], with lower pitch and a subsequent minor raise instead of a glottal stop, as in [gɔj⁴¹²] ‘clothing’. During the recording of the wordlist when the language informant would repeat a word three times, he would sometimes alternate between the high falling tone /53/ and the high falling-rising allotone [412].

/53/ → [53 ~ 412]/_(C [+sonorant]) #
[53] elsewhere

/31/ mid falling contour tone [31]

Examples:

/dum³¹nɔj³⁵/ ‘noon’

/nɛ³¹/ ‘to think’

/tap³¹/ ‘to bite’

The mid falling tone is pronounced with modal voice.

/21/ low falling contour tone [21]

Examples:

/dəj²¹/ ‘porcupine’

/tu²¹/ ‘turtle’

/dup²¹/ ‘skin’

The low falling tone has a slightly creaky or stiff voice. There is word final glottalization, often shortening the syllable. In addition to the bilabial and alveolar final stops that occur with high falling and mid falling tones, the low falling tone also occurs with a final velar stop /k/.

/35/ mid rising contour tone [35 ~ 354]

Examples:

/la:ŋ³⁵/ ‘ropes’

/du⁵³**kuk**³⁵/ ‘monkey’

/ni³⁵pam²¹/ ‘mud’

The mid rising tone is pronounced with modal voice and has a slight drop in pitch on final syllables ending with vowels or consonantal sonorants, such as in #005 [la:³⁵⁴] ‘moon’. The mid rising tone occurs on syllables with all three possible final plosives /p, t, k/. In this environment, the final drop in pitch is missing.

/35/ → [354]/ _C [+sonorant]#

→ [354]/ _#

[35] elsewhere

/13/ low rising contour tone [13 ~ 213 ~ 33]

Examples:

/bu¹³/ ‘to tell’

/nam¹³/ ‘to be cold’

/oj¹³/ ‘to love’

The low rising tone is pronounced with modal voice. In non-word final syllables, there is what Shintani (1990) calls tone neutralization where only the target pitch level is produced. This is probably the outcome of non-final vowel shortening. Evidence of this is found in examples like [gjaŋ²¹³] ‘tree’ vs. [gjaŋ³³ɗup²¹] ‘tree bark’, or [ɕi̯a:w²¹³] ‘wind’ vs. [ɕi̯aw³³kjaʔ⁵³] ‘storm’. After syllable-initial voiced plosives, there is a slight raise in pitch of the vowel onset, as in [t*ʊŋ³¹ɕi̯ɒm²¹³] ‘pillow’. As noted in 4.5.2.1.2, this phenomenon has been observed for voiceless stiff plosives in Korean (Ladefoged and Maddieson 1996). Since syllable-initial stops in Lao Kim Mun have stiff voice too, the higher fundamental frequency at the vowel onset is regarded an articulatory artifact of the voiced stiff vowels. It is not observed for the voiceless stiff plosives. An explanation for this discrepancy is lacking.

/13/ → [213]/ C[-sonorant + voiced]_

→ [33]/ _(C)(C)V(C)#

[13] elsewhere

5.1.3.3 Complex Tones

There is one complex tone in Lao Kim Mun, the convex tone /341/. The convex tone refers to a mid rising-falling tone (Yip 2002).

/341/ mid rising-falling tone [341]

Examples:

/klim³⁴¹/ ‘to lick’

/wɔm⁵³nɔ³⁴¹/ ‘stream’

/tɔ³⁴¹so³⁵/ ‘smoke’

The mid rising-falling tone is pronounced with modal voice, and begins at about the pitch level of the mid tone and rises slightly lower than the high falling tone before dropping in pitch to that of a low tone. The mid rising-falling tone has word final glottalization. Word-final syllables that generally show non-contrastive length are shortened, which is a result of glottal constriction (Yip 1995).

5.1.3.4 Tone Summary

The tonal behavior for Kim Mun can be summarized as follows:

Table 9. Tonal Impact on the Lao Kim Mun Syllable

Tone	Impact on Syllable
Mid /33/	Modal voice Long and short vowels => No impact on vowel length
Low /11/	Breathy voice Word-final glottalization Mostly long vowels => Tendency to lengthen vowels
High Falling /53/	Modal voice Postglottalization on open syllables and final sonorants => Shorter rhyme. Absence of glottal stop => Longer rhyme. Long and short vowels => No impact on vowel length
Mid Falling /31/	Modal voice Mostly long vowels => Tendency to lengthen vowels
Low Falling /21/	Slightly creaky voice Word-final glottalization Mostly short vowels => Tendency to shorten vowels
Mid Rising /35/	Modal voice Long and short vowels => No impact on vowel length
Low Rising /13/	Modal voice Long and short vowels => No impact on vowel length
Mid Rising-Falling /341/	Modal voice Word-final glottalization Always short vowels => Shortens vowels

Tones in Lao Kim Mun are accompanied with predictable phonation types.

The mid, high falling, mid falling, mid rising, low rising, and mid rising-falling tones show non-distinctive modal voice. The low tone exhibits breathy voice. The low falling tone is pronounced with a slightly creaky voice. The creaky voice may be an outcome of a following glottal stop. Furthermore, only the mid rising-falling tone occurs with only short vowels.

A summary of all the tones and allotones in the Lao variety is provided in Table 10. The abbreviation Ms. stands for monosyllabic and Son. stands for sonorants. Evidence of tonal contrast is also provided in Appendix D.

Table 10. Lao Kim Mun Tonal Summary

Tones/Allotones		Syllable Structures	Syllable Positions	Types of Codas	Examples		
L e v e l	Mid /33/	V	Initial		#247	flesh	/a ³³ da:j ⁵³ /
		C ₁ V	Initial		#321	smell	/si ³³ da:ŋ ⁵³ /
			Medial		#297	ring (finger)	/mun ³³ se ³³ geŋ ¹³ /
			Final		#195	spider	/kjiŋ ⁵³ na: ³³ /
		C ₁ C ₂ V	Initial		#210	hair	/pje ³³ doŋ ⁵³ /
			Medial		#104	green bean	/tə.bwe ³³ miŋ ⁵³ /
	Final			#100	pumpkin	/gjaŋ ³³ kwa: ³³ /	
	Low /11/	C ₁ V	Initial		#351	to forget	/no ¹¹ ko ³³ /
			Final		#176	buffalo	/ŋoŋ ³¹ bu ¹¹ /
		C ₁ VC ₃	Ms		#361	medicine	/ma: ¹¹ /
Initial			Son	#041	sea	/koj ¹¹ lu ³⁵ /	
		Ms	Son	#305	to move	/θuj ¹¹ /	
C o n t o u r	High Falling /53/	C ₁ V	Initial		#320	to hear	/tu ⁵³ nuŋ ³³ /
			Medial		#236	finger nail	/pu ³⁴¹ do ⁵³ waj ¹³ /
			Final		#312	hammer	/ban ³³ de ⁵³ /
			Ms		#304	candle	/tə ⁵³ /
		C ₁ C ₂ V	Initial		#090	watermelon	/kwa ⁵³ θa:j ⁵³ /
			Final		#212	eyebrow	/məj ²¹ jap ³⁵ pje ⁵³ /
			Ms	p/m	#187	duck	/a:p ⁵³ /
		C ₁ VC ₃	Initial	p/t/m/n/ŋ	#227	heart	/θim ⁵³ ta:w ³¹ /
			Medial	p/t/m/n/ŋ	#028	morning	/bu.dom ⁵³ təŋ ¹³ /
			Final	p/t/m/n/ŋ	#330	to drink	/həp ³⁵ wəŋ ⁵³ /
			Ms	p/t/m/n/ŋ	#390	to dig	/wit ⁵³ /
		C ₁ C ₂ VC ₃	Initial	Son	#223	chin	/klaŋ ⁵³ ŋam ³⁴¹ /
			Final	Son	#489	naked	/tə ³³ blan ⁵³ /

Tones/Allotones	Syllable Structures	Syllable Positions	Types of Codas	Examples		
-Allotone [412]	C ₁ V	Ms		#186	chicken	[tʰ*e ⁴¹²]
	C ₁ C ₂ V	Ms		#200	snail	[kwe ⁴¹²]
	C ₁ VC ₃	Final	m/n/ŋ	#031	tomorrow	[saŋ ³¹ ɗəm⁴¹²]
		Ms	m/n/ŋ	#139	to steam	[sa:ŋ ⁴¹²]
	C ₁ C ₂ VC ₃	Final	n/ŋ	#008	shadow	[bə ³¹ glɔj⁴¹²]
		Ms	n/ŋ	#177	horn	[kɔŋ ⁴¹²]
Mid Falling /31/	C ₁ V	Initial		#491	to be bad	/ma ³¹ gɔŋ ¹³ /
		Medial		#258	we	/pan ³¹ ti ³¹ doj ³¹ /
		Final		#248	fat	/məj ³⁵ pi ³¹ /
	C ₁ C ₂ V	Initial		#380	to swim	/kjo ³¹ wɔm ⁵³ /
		Final		#069	branch	/gjaŋ ¹³ gwa: ³¹ /
		Ms		#462	to be dirty	/klu ³¹ /
	VC ₃	Ms	p	#141	to bake	/up ³¹ /
	C ₁ VC ₃	Initial	p/t/m/n/ŋ	#089	pineapple	/dum ³¹ daw ³⁴¹ pjo ³³ /
		Medial	p/t/m/n/ŋ	#091	apple	/mak ²¹ pom ³¹ pjo ³³ /
		Final	p/t/m/n/ŋ	#074	flower	/gjaŋ ³³ faŋ ³¹ /
		Ms	p/t/m/n/ŋ	#067	forest	/kim ³¹ /
	C ₁ C ₂ VC ₃	Initial	t/n/ŋ	#204	butterfly	/pluŋ ³¹ blo ³⁴¹ /
Ms		t/n/ŋ	#470	to be spicy	/bjat: ³¹ /	
Low Falling /21/	C ₁ V	Initial		#309	knife	/ɗu ²¹ ðem ³¹ /
		Ms		#458	white	/pɛ ²¹ /
		Ms		#021	hail	/pjɔ ²¹ /
	C ₁ C ₂ V	Ms	p/t/k/Son	#369	to kneel	/kwe ²¹ /
		Medial	p/t/k/Son	#102	carrot	/tə.bak ²¹ pjo ³³ /
	C ₁ VC ₃	Final	p/t/k/Son	#404	to exchange	/tiŋ ³¹ wan ²¹ /
		Ms	p/t/k/Son	#465	to be dark	/ɗam ²¹ /
C ₁ C ₂ V C ₃	Ms	p/t/ŋ/j	#341	to smile	/kjət ²¹ /	
Mid Rising /35/	C ₁ V	Initial		#043	mud	/ni ³⁵ pam ²¹ /
		Medial		#054	earthquake	/guŋ ³¹ ni ³⁵ tɔŋ ³⁴¹ /
	C ₁ VC ₃	Initial	p/t/k/Son	#211	forehead	/min ³⁵ dup ²¹ /
		Medial	p/t/k/Son	#212	eyebrow	/məj ²¹ jap ³⁵ pje ⁵³ /
		Final	p/t/k	#046	pebble	/gjaw ⁵³ θaj ⁵³ nɔt ³⁵ /
		Ms	p/t/k	#362	to itch	/set ³⁵ /

Tones/Allotones		Syllable Structures	Syllable Positions	Types of Codas	Examples		
	-Allotone [354]	C ₁ V	Final		#093	peanut	[t*ɔ̌.ɸwe ⁱ³³ ni ³⁵⁴]
			Ms		#459	red	[θi ³⁵⁴]
		C ₁ C ₂ V	Ms	Son	#293	trousers	[kwa: ³⁵⁴]
		C ₁ VC ₃	Final	Son	#222	gums	[n ⁱ ɛ ³¹ lɔŋ ³⁵⁴]
			Ms	Son	#208	face	[min ³⁵⁴]
		C ₁ C ₂ VC ₃	Final	Son	#203	fly	[kjin ⁵³ gjam ³⁵⁴]
			Ms	Son	#229	liver	[gjan ³⁵⁴]
	Low Rising /13/	C ₁ V	Final		#500	where	/jam ⁵³ ti ¹³ /
		C ₁ VC ₃	Final	Son	#285	roof	/pjaw ³³ tun ¹³ /
			Ms	Son	#384	to hit	/pa:n ¹³ /
C ₁ C ₂ VC ₃		Final	Son	#194	tadpole	/tɛŋ ³³ plɔŋ ¹³ /	
		Ms	Son	#478	to be blunt	/plun ¹³ /	
-Allotone [213]	C ₁ V	Ms		#278	name	[ɸu ²¹³]	
	C ₁ VC ₃	Final	Son	#056	cliff	[gjaw ⁵³ ɸɛŋ ²¹³]	
		Ms	Son	#376	to pull	[ɸan ²¹³]	
	C ₁ C ₂ VC ₃	Final	Son	#155	tree shade	[gjan ³³ glɔm ²¹³]	
		Ms	Son	#068	tree	[gjan ²¹³]	
-Allotone [33]	C ₁ VC ₃	Medial	Son	#113	white sugar	[t*ɔŋ ³¹ van ³³ p*ɛ ²¹]	
	C ₁ C ₂ VC ₃	Initial	Son	#155	tree shade	[gjan ³³ glɔm ²¹³]	
C o m p l e x	Mid Rising- Falling /341/	C ₁ V	Final		#431	all	/θɔŋ ³³ du ³⁴¹ /
			Ms		#254	urine	/wa ³⁴¹ /
		C ₁ C ₂ V	Final		#204	butterfly	/pluŋ ³¹ blo ³⁴¹ /
		C ₁ VC ₃	Final	Son	#143	to set table	/bin ³³ toŋ ³⁴¹ /
			Ms	Son	#145	to dip	/nam ³⁴¹ /
	C ₁ C ₂ VC ₃	Ms	Son	#188	fish	/bjaw ³⁴¹ /	

The interaction of Lao Kim Mun tones and phonotactics will be described under the Lao Kim Mun syllable structure in Sections 5.2.5 through 5.2.7.

5.2 Syllable and Word Structure

This section will provide an overview of the syllable structure of the Kim Mun variety in Laos. Lao Kim Mun words are made up by one major syllable or a combination of one possible minor syllable and up to four major syllables.¹⁹ The most frequent word length is one to two syllables. Syllables can be open and closed. The Lao Kim Mun word structure is (C.)C₁(C₂)V(C₃)T, with the non-distinctive vowel in the possible word-initial minor syllable not being marked.

5.2.1 Major Syllables

There are no phonotactic restrictions discovered on major syllables or their combinations to compound words. There are three open and three closed syllables, with single initial consonants or consonant clusters formed with voiceless plosives and central and lateral approximants. The syllable-final position is restricted to nasals and central approximants. Closed syllables with initial clusters have no syllable-final plosives but only sonorant consonantal finals. For the most basic syllable template V the vowel is preglottalized and as such, it follows the CV pattern on the phonetic

¹⁹ This analysis is limited to a wordlist with minimal access to native speakers, therefore a more detailed analysis of the syllable and word structure using criteria such as Kroeger (2005) is for future Kim Mun studies.

level. Table 11 provides a general overview of the Lao Kim Mun major syllable structure.

Table 11. Lao Kim Mun Syllable Template

Syllable Types	Onset	Rhyme		Examples		
		Nucleus	Coda			
Open Syllable		V		/a ³¹ la:n ³¹ /	1 person	#407
	C ₁	V		/na: ³¹ /	tooth	#221
	C ₁ C ₂	V		/klu ³¹ /	to be dirty	#462
Closed Syllable		V	C ₃	/a:p ⁵³ /	duck	#187
	C ₁	V	C ₃	/tɔk ²¹ /	cup	#151
	C ₁ C ₂	V	C ₃	/klum ³⁵ /	lungs	#228

The most common syllable template is the C₁VC₃T, occurring a total of 460 out of 817 times in the data. The next most common syllable pattern is C₁VT, occurring 184 times.

5.2.2 Minor Syllables

Lao Kim Mun has minor syllables. These are also referred as to pre-syllables, sesquisyllables, or reduced syllables. Minor syllables are semantically and phonologically reduced syllables that can precede certain major syllables. According to Matisoff (2003), minor syllables in Tibeto-Burman languages were productive morphemes at some point but lost their distinctive meaning over time. In Mien, Purnell (1965) documents three kinds of minor syllables. One of them, labeled as “neutral minor syllables”, which exhibits “unstable tone and no independent meaning” (1965: 14),

seems to be present in Lao Kim Mun occurring on cognates. Their shape is restricted to a number of oral and nasal stops followed by a shortened schwa with no distinctive tone. The pitch level of pre-syllables is that of about mid range. There are three instances of shortened syllables with the close back vowel /u/, i.e. /bǔ.dom⁵³tɔn¹³/ ‘morning’, /bǔ.gɔŋ⁵³ha:w³¹/ ‘thunder’ and /bǔ.tɔŋ⁵³/ ‘nose’.

Semantically, there may be three different minor syllable domains discovered in the data of Lao Kim Mun.

bǎ- used with darkness

/bǎ.ɖam²¹/ ‘night’

/bǎ.gloj⁵³/ ‘shadow’

tǎ- used with vegetables

/tǎ.bwe³³miŋ⁴¹²/ ‘green bean’

/tǎ.bak²¹pjo³³/ ‘carrot’

/tǎ.bwe³³ni³⁵/ ‘peanut’

/tǎ.bwe³³ŋa:³¹/ ‘soybean sprout’

kǎ- used with body parts

/kǎ.ɖap³¹di³³/ ‘armpit’

/kǎ.da:j³³/ ‘buttocks’

Further examples not grouped into semantic domains include:

/mǎ.nɔŋ³⁵/ ‘day’

/mǎ.nɔm³¹/ ‘ear’

/dǎ.maj³³nup³⁵/ ‘to be weak’

/sǎ.bla:w³¹/ ‘termite’

/tǎ.beŋ³¹kɔt³⁵/ ‘cave’

/tǎ.ðaj³³/ ‘tool’

/tǎ.kun⁵³/ ‘spoon’

/tǎ.kon⁵³kja:ŋ⁵³/ ‘soy sauce’

/kǎ.dun³¹/ ‘house lizard’

/kǎ.daŋ³³/ ‘eggplant’

5.2.3 Consonant Clusters

There are three types of consonant clusters found in the Lao Kim Mun data, consisting of an initial bilabial or velar stop following an approximant as illustrated in Table 12.

Table 12. Initial Consonant – Medial Consonant Sequences in Lao Kim Mun

C ₁ \ C ₂	p	b	k	g
l	+	+	+	+
w		+	+	+
j	+	+	+	+

As can be observed from Table 12 there is a gap for the cluster

/pw/. However, since the data corpus is rather restricted and due to

symmetry, this cluster is likely to be part of Lao Kim Mun phonotactics.

5.2.4 Consonant – Vowel Sequences

There are no obvious restrictions on vowels following initial consonants and medial consonants. The strongest limitation is found with the velar nasal that precedes only close-mid and open-mid back vowels, and with the glottal fricative, which is not found with front vowels. Other than that, every place of articulation for vowels does occur with every place and manner of articulation for the consonants preceding them. Table 13 illustrates the consonant-vowel-sequences accounted for in Lao Kim Mun.

Table 13. Consonant – Vowel Sequences in Lao Kim Mun

$C_{1/2}$ v	p	b	m	w	f	v	θ	ð	t	d	n	l	s	ʃ	ʒ	ɲ	j	k	g	ŋ	h
i	+	+	+	+			+		+	+	+	+	+	+	+	+	+	+			
e	+			+	+		+		+		+	+	+				+	+			
ɛ	+	+	+	+			+	+		+	+		+	+	+	+	+	+		+	
a	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+
ə	+	+	+		+	+	+		+	+			+	+			+	+			+
u	+	+	+		+		+		+	+	+	+	+	+	+	+	+	+	+		+
o	+		+				+	+	+	+		+	+	+	+	+	+	+		+	+
ɔ	+	+	+	+			+		+	+	+	+	+	+	+	+	+	+	+	+	+

It can be observed that the close-mid front vowel /e/ is the most restricted vowel. This is due to its limited occurrence in open syllables, only the open-mid front /ɛ/ can be followed by syllable-final consonants (cf. Section 5.1.2). The most restricted consonants are the voiced fricatives, with the labiodental one merely occurring with the two central vowels, and the voiced

dental fricative preceding only the open-mid front vowel and open central vowel /ɛ/ and /a/.

The only vowel without hardly any sequential limitations is the open central vowel /a/. It can occur after any consonant except the velar nasal /ŋ/, which is the most restricted consonant, usually occurring syllable final.

5.2.5 Syllable Onset – Tone Patterns

The mid tone /33/ is the most flexible tone as it can occur after every possible syllable onset. The three contour tones high, mid, and low falling also have almost no restrictions. The low level and low rising tones /11/ and /13/ show more limitations than the other tones, but without any noticeable pattern. The restrictions on the voiced fricatives /f/ and /ð/ and velar nasal /ŋ/ are caused by their rare occurrence in the data. With the exception of the voiceless dental fricative /θ/, the mid-rising falling tone /341/ does not occur after fricatives.

Table 14 illustrates the tonal distribution with initial consonants in Lao Kim Mun.

Table 14. Syllable Onset – Tone Patterns in Lao Kim Mun

$C_{1/2}$ T	p	b	m	w	f	v	θ	ð	t	d	n	l	s	ʃ	ʈ	ɳ	j	k	g	ŋ	h	
33	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
11	+	+	+		+		+			+	+	+	+	+	+	+	+	+				+
53	+	+	+	+	+		+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
31	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+			+
21	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+		+	+	+		
35	+	+	+	+	+		+		+	+	+	+	+	+	+	+	+	+	+			+
13	+	+		+	+	+	+		+	+	+	+	+	+	+		+		+			
341	+	+	+	+			+		+	+	+	+		+	+	+	+	+	+	+		

5.2.6 Vowel – Tone Patterns

There are no clear restrictions between vowels and tones in Lao Kim Mun.

Table 25 illustrates the nucleus tone patterns accounted for in Lao Kim Mun.

Table 15. Nucleus – Tone Patterns in Lao Kim Mun

V T	i	e	ɛ	ə	a	u	o	ɔ
33	+	+	+		+	+	+	+
11	+	+		+	+	+	+	+
53	+	+	+	+	+	+	+	+
31	+	+	+	+	+	+	+	+
21	+	+	+	+	+	+	+	+
35	+	+	+	+	+	+	+	+
13	+	+	+	+	+	+	+	+
341	+		+	+	+	+	+	+

5.2.7 Coda – Tone Patterns

There are no clear restrictions between the coda and tones in Lao Kim Mun.

It can be observed that final plosives only occur with contour tones. The

final velar plosive only occurs on the low falling and mid rising tones and rarely occurs in the data compared to the pre-palatal plosives /p, t/.

Furthermore, each of the eight tones in Lao Kim Mun can occur on open syllables. Table 26 illustrates the coda tone patterns accounted for in Lao Kim Mun.

Table 16. Coda – Tone Patterns in Lao Kim Mun

C_3 T	p	t	k	m	n	ŋ	j	w
33				+	+	+	+	+
11				+	+	+	+	+
53	+	+		+	+	+	+	+
31	+	+		+	+	+	+	+
21	+	+	+	+	+	+	+	+
35	+	+	+	+	+	+	+	+
13				+	+	+	+	+
341				+	+	+	+	+

5.3 Summary

To summarize the results of the phonological analysis for the Kim Mun variety in Laos, there are 21 distinctive consonants, nine vowels, and eight tones.

There is a higher functional load on oral and nasal stops than on fricatives or approximants. Of the nine vowels, only the open central vowel /a/ has length distinction, however, with very few examples of contrast. There is

environmentally conditioned length for the other vowels, implying that the Lao variety may be losing the length distinction.

The tonal system is rich, with two level, three falling, two rising, and one rising-falling tone. Tonal alteration does occur in Lao Kim Mun and final plosives only occur with contour tones.

The shortest possible syllable is made up by a preglottalized vowel. The maximal syllable is made up by a consonant cluster preceding a vowel with a voiceless plosive, a nasal, or a central approximant following the vowel.

Consonant clusters are restricted to bilabial and velar plosives followed by approximants. Monosyllabic words with single initials in closed syllables are most frequent. There are a small number of minor syllables with oral and nasal stops.

CHAPTER 6

PHONOLOGICAL DESCRIPTION OF KIM MUN, VIETNAM VARIETY

6.1 Inventory of Phonemes

This section will provide an analysis and description of the phonemes in the Vietnam variety of Kim Mun, organized by consonants, vowels, and tones.

A distribution of phonemes will follow.

6.1.1 Consonants

The Vietnam variety of Kim Mun has twenty-one distinctive consonants with four major places of articulation which can be slightly modified according to specific places of articulation, i.e. labial includes bilabial and labiodental segments, pre-palatal includes dental and alveolar segments, palatal includes alveolo-palatal and palatal segments as well as the alveolar sibilant²⁰, and post-palatal includes velar and glottal segments. Each place of articulation is also modified according to the manner of articulation. The consonant

²⁰ The alveolar sibilant sounds like the English /s/ which is produced through an alveolar constriction and groove in the alveolo-palatal area with an alveolar release (cf. Ladefoged/Maddieson 1996: 146f)

inventory is shown in Table 17 and will be exemplified in the following sections.²¹

Table 17. Inventory of Consonantal Phonemes in Vietnam Kim Mun

Place Manner	Labial	Pre- Palatal	Palatal	Post- Palatal
Plosives	p b	t d	t̚ d̚	k g
Fricatives	f v	θ	s	h
Nasals	m	n	ɲ	ŋ
Lateral Approximants		l	ɭ	
Central Approximants			j	w

Evidence of contrast is provided in Appendix E. As already mentioned in Section 4.3.2.2, the Chinese symbols are used following Mao (2004) for alveolo-palatal stops in both the Lao and the Vietnam data.

6.1.1.1 Plosives

There are sets of voiced and voiceless plosives in all four possible places of articulation for a total of eight plosives. Bilabial and alveolar stops are produced with stiff voice. Only voiceless plosives occur syllable-final and are unreleased in this position, see Figure 5. There is no alveolo-palatal or velar unreleased final stop.

²¹ The major places of articulation labeled pre-palatal and post-palatal are phonological categories not phonetic categories.

$$\left\{ \begin{array}{c} p \\ t \\ t̥ \\ k \end{array} \right\} \rightarrow \left\{ \begin{array}{c} p̚ \\ t̚ \\ \emptyset \\ \emptyset \end{array} \right\}$$

Figure 5. Final Plosives in Vietnam Kim Mun

Next to the alveolo-palatal plosive (See initial discussion in Section 5.1.1.1), the velar plosive deviates from this pattern. A possible solution could be that the final velar plosive has become a final glottal stop in Vietnam Kim Mun. Furthermore, only voiceless and voiced initial bilabial and alveolar plosives have stiff voice, the alveolo-palatal and velar variants have modal voice.

The syllable-final glottal stop is a phonetic feature of individual tones (cf. Section 6.1.3) and has no phonemic status as a consonant. The glottal stop also occurs word-initial as a predictable vowel onset, as in #022 ‘duck’ [ʔa:p¹¹].

The contrastive plosives with examples and their exact phonetic description are listed below.

/p/ stiff voiceless bilabial plosive [p* ~ pʻ]

Examples:

/pja:⁴⁴/ ‘fire tongs’

/pew⁴⁴/ ‘hammer’

/tɔp³³/ ‘bean’

The stiff voiceless bilabial stop is not released if in syllable-final position.

/b/ stiff voiced bilabial plosive [b]

Examples:

/blew¹¹/ ‘rice’

/be³⁵/ ‘dream’

/biŋ²¹⁴/ ‘monkey’

/t/ stiff voiceless alveolar plosive [t* ~ tʻ]

Examples:

/ti³³/ ‘bag’

/tew³¹/ ‘fire’

/pit³¹/ ‘turtle’

The stiff voiceless alveolar stop is not released if in syllable-final position.

/d/ stiff voiced alveolar plosive [d]

Examples:

/di⁴⁴/ ‘mother’s mother’

/dej⁴⁴/ ‘excrement’

/daŋ³³/ ‘boat’

/t̚/ voiceless alveolo-palatal plosive [t̚]

Examples:

/t̚ɛŋ⁴⁴/ ‘frog’

/t̚o¹¹/ ‘bridge’

/t̚ɛ⁵²/ ‘guest’

/d̚/ voiced alveolo-palatal plosive [d̚]

Examples:

/d̚im⁴⁴/ ‘thorn’

/d̚i³⁴¹/ ‘mother’

/d̚ɛt³³/ ‘mouth’

/k/ voiceless velar plosive:

Examples:

/klum⁵²/ ‘lungs’

/kɛŋ²¹⁴/ ‘insect’

/kɔj³³/ ‘river’

The voiceless post-palatal unreleased plosive [k̚] was not found in the data, however, due to symmetry it is possible that it does exist or it has become a final glottal stop.

/g/ voiced velar plosive [g]

Examples:

/guŋ¹¹/ ‘sky’

/gɛn³⁴¹/ ‘village’

/gja:⁵²/ ‘iron’

As a summary, only bilabial and alveolar plosives in Vietnam Kim Mun are pronounced with an audible stiff voice. This is not surprising as the

limitation to these two most front occlusives has been observed in Thai, where stiff voice occurs only on bilabial and alveolar voiced plosives (Ladefoged/Maddieson 1996). It is also only the bilabial and alveolar voiceless stops that occur unreleased in syllable-final position. The alveolo-palatal plosives identified in the Vietnam data have as little friction on release as in the Lao data and as such are analyzed as plosives.

6.1.1.2 Fricatives

There are five syllable-initial fricatives in the Vietnam variety of Kim Mun, i.e. a voiced and a voiceless labiodental fricative as well as voiceless dental, alveolar and glottal fricatives. The contrastive fricatives with examples and their exact phonetic description are listed below.

/f/ voiceless labiodental fricative [f]

Examples:

/faŋ¹¹/ ‘flower’

/fa⁴⁴/ ‘husband’

/fej³⁵/ ‘to sleep’

The voiceless labiodental fricative occurs only seven times and is restricted to preceding the central vowels /a/ and /e/. Three of those occurrences are found in compound words with the root ‘man’.

/v/ voiced labiodental fricative [v]

Examples:

/vən³⁵/ ‘cloud’

/laŋ³⁵**vin**⁵²/ ‘rope’

/gɔŋ³³**ve**³⁴¹/ ‘good’

The voiced labiodental fricative only occurs three times in the data but with different vowels.

/θ/ voiceless dental fricative [θ]

Examples:

/θɛw³³/ ‘ant’

/θim⁵²/ ‘needle’

/θap⁵²/ ‘centipede’

/s/ voiceless alveolar fricative [s]

Examples:

/si³³/ ‘mat’

/so²¹⁴/ ‘mushroom’

/saŋ⁵²/ ‘basket’

/h/ voiceless glottal fricative [h]

Examples:

/**ho**³³bu³³/ ‘taro’

/ham⁵²/ ‘short’

/hɔp⁵²/ ‘to drink’

The glottal fricative is rare, it only occurs eight times in the data.

In summary, only two of the five fricatives occur frequently, i.e. the voiceless dental fricative and the voiceless alveolar sibilant.

6.1.1.3 Nasals

The Vietnam Kim Mun variety shows four nasals, one for each major place of articulation. Except from the alveolo-palatal nasal, which is found only as a syllable onset, all nasals occur in syllable-initial and syllable-final position. A description of all four nasals with examples is listed below.

/m/ bilabial nasal [m]

Examples:

/min⁵²/ ‘face’

/mɛj³⁴¹/ ‘wasp’

/ma:³³/ ‘medicine’

/n/ alveolar nasal [n]

Examples:

/ni⁵²/ ‘earth’

/nuŋ³³/ ‘pus’

/naw³⁴¹/ ‘mother’s brother’

/ɲ/ alveolo-palatal nasal [ɲ^j]

Examples:

/ɲew²¹⁴/ ‘hoe’

/ɲaŋ⁵²/ ‘year’

/ɲa:¹¹/ ‘tusk’

/ŋ/ velar nasal [ŋ]

Examples:

/ŋɔŋ¹¹/ ‘buffalo’

/ŋa:m¹¹/ ‘cave’

/biŋ²¹⁴/ ‘monkey’

Syllable-initial, the velar nasal is rare in the Vietnam data; the phoneme only occurs syllable-initial six times out of the one hundred and seventeen times it occurs in the data.

In summary, except the alveolo-palatal nasal, Vietnam Kim Mun nasals are found both syllable-initial and syllable-final. Syllable-initial, the velar nasal is rare.

6.1.1.4 Approximants

Vietnam Kim Mun has four approximants, i.e. a labiovelar and palatal central approximant and an alveolar and alveolo-palatal lateral approximant. These approximants with examples are listed below.

/w/ voiced labial approximant [w]

Examples:

/wem²¹⁴/ ‘water’

/kwa⁵²/ ‘trousers’

/new²¹⁴/ ‘hoe’

The labiovelar approximant occurs syllable-initial, medial, and final.

/l/ voiced alveolar lateral approximant [l]

Examples:

/le³³/ ‘fishnet’

/klu⁴⁴/ ‘dog’

/la:ŋ¹¹/ ‘groom’

The alveolar lateral approximant occurs syllable-initial and as the medial consonant in clusters, but not syllable-final.

/ɭ/ voiced alveolo-palatal lateral approximant [ɭ]

Examples:

/ɭu³¹to²¹⁴/ ‘sickle’

The alveolo-palatal lateral approximant only occurs once in the data.

/j/ voiced palatal approximant [j]

Examples:

/juŋ¹¹/ ‘goat’

/mɛj³³/ ‘eye’

/pje⁴⁴/ ‘head’

The palatal approximant occurs in all three possible consonant positions, i.e. syllable-initial, medial, and final.

To summarize the section on approximants, they all occur syllable-initial and with the exception of the alveolo-palatal lateral, they all occur as the medial consonant in clusters. The central approximants also occur syllable-final, whereas the lateral approximants do not appear syllable-final.

6.1.2 Vowels

The Vietnam variety of Kim Mun has eight distinctive vowel qualities with three front vowels, two mid vowels, and three back vowels. For one vowel, the open central vowel /a/, length is distinctive, adding up to a total of nine vowel phonemes as demonstrated in Figure 6. Each of these vowels show environmentally conditioned variation in length, dependant on the word structure discussed in Section 6.2.

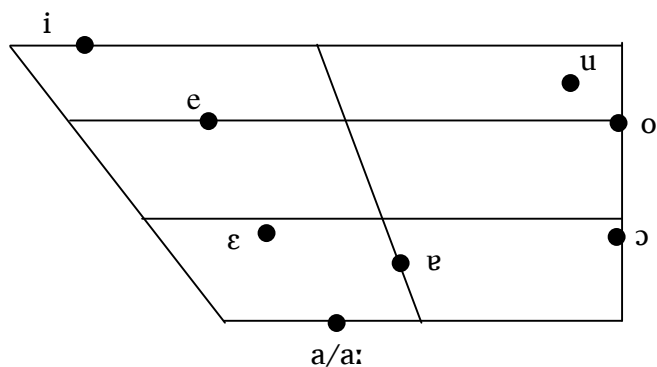


Figure 6. Distribution of Vowels in Vietnam Kim Mun

The environmental conditions for long and short vowels are discussed in Section 6.1.2.4. Evidence of contrast is provided in Appendix F.

The Vietnam variety of Kim Mun has no contrastive diphthongs. Vowels can only be followed by the ambiguous closed front and back vowels [i] and [u], which are analyzed as approximants rather than vowels. They are interpreted as labiovelar and palatal approximants /j/ and /w/ since there are other syllables ending with unambiguous voiceless plosives and nasals.

There is one allophonic diphthong with a predictable environment, which will be discussed below.

The following sections provide examples and a description for each vowel.

6.1.2.1 Front Vowels

/i/ close front unrounded vowel [i ~ ɪ]

Examples:

/pɪ⁴⁴le⁴⁴/ ‘brain’

/biŋ²¹⁴/ ‘monkey’

/ɬi³⁴¹/ ‘mother’

The close front unrounded vowel is slightly retracted. In closed syllables ending on labial, dental, or alveolar consonants, this vowel is realized as a near-close near-front unrounded [ɪ]. Examples for the occurrence of this allophone are #050 ‘turtle’ [p^{*}it⁷⁴¹] and #231 ‘needle’ [θim⁴³].

$$i \rightarrow [ɪ] / _C \left(\begin{array}{l} + \text{labial} \\ + \text{dental} \\ + \text{alveolar} \end{array} \right)$$

[i] elsewhere

/e/ close-mid front unrounded vowel [ɛ ~ ɛʲ]

Examples:

/se⁵²θun²¹⁴/ ‘descendant’

/ne³¹gjaɟ³⁵/ ‘cabbage’

/te²¹⁴kow⁵²/ ‘coop’

The close-mid front unrounded vowel is strongly retracted. It occurs mostly in open syllables. In open word-final syllables, or in open monosyllabic words, it is realized with a palatal off-glide [ɤ^j], as in [p*ⁱ³³lɤ^{j43}] ‘brain’.

/e/ → [ɤ^j] / __#
 [ɤ] elsewhere

/ɛ/ open-mid front unrounded vowel [ɛ^ɾ]

Examples:

/lɛ³³/ ‘fishnet’

/tɛŋ⁴⁴/ ‘frog’

/gjet³³/ ‘to sit’

The open-mid front unrounded vowel is slightly retracted and lowered. It tends to occur in closed syllables, which leads to the conclusion that Vietnam Kim Mun might be undergoing a vowel merge. In a few instances there is still a clear contrast with the close-mid front vowel /e/, as in /pe²¹⁴/ ‘father’s older brother’ vs. /pe²¹⁴/ ‘to know’.

6.1.2.2 Central Vowels

/e/ near-open central unrounded vowel [ɐ]

Examples:

/pɐw⁴⁴/ ‘hammer’

/mɛj³⁴¹/ ‘wasp’

/vɛn³⁵/ ‘cloud’

The near-open central unrounded vowel appears in any possible environment, including minor syllables (cf. Section 6.2.2) where it is extra short and not distinctive.

/a/ open central unrounded vowel [a]

Examples:

/θat³³/ ‘near’

/ma³⁴¹/ ‘horse’

/tew³¹**tan**⁵²/ ‘charcoal’

/a:/ long open central vowel [a:]

In the Vietnam data there is one instance of contrast between long and short open central vowels that cannot be explained by the vowel-length conditioning word structure. This is /gjaŋ³⁵/ ‘plot, dry’ vs. /gja:ŋ³⁵/ ‘tree’.

6.1.2.3 Back Vowels

/u/ close back rounded [u]

Examples:

/mɛj³³**bu**³³/ ‘blind’

/mɛj³⁴¹**muŋ**³³/ ‘bee’

/blut³³/ ‘mucus’

/o/ close-mid back rounded vowel [o ~ o^w]

Examples:

/gɔj⁵²wɛm²¹⁴/ ‘lizard’

/tɔŋ¹¹ɗam³⁵/ ‘pillow’

/θo⁴⁴/ ‘grave’

The close-mid back rounded vowel usually occurs in open syllables. Just like the close-mid front counterpart, it is realized with an off-glide, in this case the labiovelar off-glide [o^w] in word-final open syllables or in open monosyllabic words, e.g. [so^{w214}] ‘mushroom’.

/o/ → [o^w]/ _#

[o] elsewhere

/ɔ/ open-mid back rounded vowel [ɔ^r ~ aʊ]

Examples:

/tɔŋ²¹⁴/ ‘mountain’

/nɔ¹¹kej¹¹/ ‘sparrow’

/tɔp¹¹/ ‘bean’

The close-mid back rounded vowel is slightly lowered. The combination with preceding non-back consonants and a following velar nasal is realized as the diphthong starting with a central vowel and moving into a rounded back vowel [aʊ], as in [ɸaʊŋ⁵²] ‘full’ and [saʊŋ⁴⁴] ‘cold’. However, if the preceding consonant is alveolo-palatal or velar the vowel remains unaffected, as in [tʰɔ^rŋ²¹⁴] ‘mountain’ or [gɔ^rŋ²¹⁴vɤjʔ³⁴¹] ‘good’.

/ɔ̄/ → [aʊ] / C [-alveolo-palatal] [-velar] _C [+velar] [+nasal]
 [ɔ̄] elsewhere

6.1.2.4 Vowel Length

With the exception of the open central vowel /a/, vowel length is not contrastive in Vietnam Kim Mun and therefore it is not marked in the data. The general word pattern shows initial and medial syllables with short vowels, and a long vowel in the final syllable. If such a word-pattern conditioned syllable-final vowel is combined with other syllables so that it is no longer final, the vowel length undergoes neutralization and changes from long to short.

In minor syllables, the non-contrastive vowel is always short, such as in [p*ě.laj⁵²] ‘price’, [mě.nɔ̄-m²¹] ‘ears’, and [kě.t*aj⁴⁴] ‘eggplant’ (cf. Section 6.2.2).

6.1.3 Tones

Vietnam Kim Mun has eight distinctive tones, i.e. three level tones, three contour tones, and two complex tones, with the latter tonal annotation following Yip (2002). Tonal alternation occurs for the mid rising and the falling-rising tone. Syllable-final glottalization can occur on all tone-bearing units that end with a falling contour, i.e. high falling, mid falling, and rising-falling. For an overview, see Table 18.

Table 18. Vietnam Kim Mun Tone Schema

Tone	Chao Tone Number	Examples
High	/44/	/kjaw ⁴⁴ / ‘road’
Mid	/33/	/da:w ³³ / ‘salt’
Low	/11/	/pe.taw ¹¹ / ‘shoulder’
High Falling	/52/	/taw ⁵² / ‘to come’
Mid Falling	/31/	/θin ²¹⁴ taw ³¹ / ‘heart’
Mid Rising	/35/	/ɗaw ³⁵ / ‘wind’
Mid Rising-Falling	/341/	/gjaw ³⁴¹ / ‘nest’
Low Falling-Rising	/214/	/gjaw ²¹⁴ / ‘stone’

The Vietnam Kim Mun tones and their phonetic features will be presented in the following three sections.

6.1.3.1 Level Tones

The three level tones in Vietnam Kim Mun are high, mid, and low tones.

Only the mid and the low tones can occur on syllables with final plosives.

/44/ high tone [43]

Examples:

/ɗim⁴⁴/ ‘thorn’

/tej⁴⁴/ ‘tail’

/θo⁴⁴/ ‘grave’

The high tone is pronounced with a breathy voice and a high pitch level ending with a slight drop in pitch.

/33/ mid tone [33]

Examples:

/kɛp³³/ 'bear'

/pa:m³³/ 'mud'

/ti³³/ 'bag'

The mid tone is pronounced with creaky voice and often has a moderate final glottal stop. The laryngealization could be an artifact of the syllable-final glottal constriction.

/11/ low tone [21]

Examples:

/a:p¹¹/ 'duck'

/sam¹¹/ 'bracelet'

/tɔ¹¹/ 'bridge'

The low tone is pronounced with modal voice and has a pitch level that begins low and has a slight drop.

6.1.3.2 Contour Tones

There are three contour tones in Vietnam Kim Mun, two falling tones and one rising tone. Each of the contour tones can occur with syllable-final plosives. The mid rising tone undergoes tone alternation.

/52/ high falling tone [52]

Examples:

/θap⁵²/ ‘centipede’

/θɔm⁵²/ ‘beard’

/ni⁵²/ ‘earth’

The high falling tone is pronounced with breathy voice and has the highest starting pitch of all the Vietnam Kim Mun tones. Open syllables and syllables ending with a final sonorant that bear the high falling tone can undergo postglottalization, which results in a shortened syllable.

/31/ mid falling tone [41]

Examples:

/gat³¹/ ‘to cut (with a knife)’

/naŋ³¹su³⁵/ ‘porridge’

/ku.a:³¹/ ‘crow’

The mid falling tone is pronounced with modal voice. It begins slightly higher than the mid tone and exhibits a strong drop in pitch. Like with the high falling tone, final vowels and final consonantal sonorants can occur postglottalized, accompanied with a shortened syllable.

/35/ mid rising tone [35 ~ 33]

Examples:

/twem¹¹kat³⁵/ ‘water well’

/vɛn³⁵/ ‘cloud’

/bu³⁵/ ‘name’

The mid rising tone is pronounced with modal voice. It starts at about mid level pitch and shows a strong rise. In non-word final syllables where the vowel is shortened, only the target pitch level is produced. Examples are [gja:ŋ³⁵] ‘tree’ vs. [gjaŋ³³θm⁵²] ‘tree trunk’, or [θaw³⁵] ‘leg’ vs. [θaw³³p*ən⁴³] ‘foot’.

/35/ → [33]/ __.(C)(C)V(C)#
 [35] elsewhere

6.1.3.3 Complex Tones

There are two complex tones in Vietnam Kim Mun, a concave and a convex tone. The concave tone refers to a low falling-rising tone and the convex tone refers to a mid rising-falling tone (Yip 2002). The low falling-rising tone undergoes tone alternation.

/341/ mid rising-falling tone [341?]

Examples:

/kliŋ³⁴¹/ ‘to fall down’

/law³⁴¹/ ‘to return’

/jo³⁴¹/ ‘father’s younger brother’

The convex tone is pronounced with creaky voice. The convex tone is also a checked tone. This might be a reflex of a possible former checked and unchecked distinction of the mid rising tone. Future Kim Mun tonal comparison with Kim Mun data from other varieties may reveal a correlation

between the Vietnam convex and mid rising tones with the checked and unchecked tones as reported by other researchers (Mao 2004; He 1999).

/214/ low falling-rising tone [214 ~ 33]

Examples:

/guj²¹⁴/ ‘shirt/tunic’

/kla:ŋ²¹⁴/ ‘neck’

/du²¹⁴/ ‘rat’

The concave tone is pronounced with modal voice. The pitch begins slightly lower than the mid tone, then often drops quite low before rising to a pitch similar to the pitch level of the high tone. Like the mid rising tone, the low falling-rising tone also undergoes tone neutralization on shortened non-word final syllables where it is realized with a mid level tone. Evidence of this is found in examples like [kjɛ̃ɾŋ²¹⁴] ‘insect’ vs. [kjɛ̃ɾŋ³³bo^{w41}] ‘grasshopper’, or [kwã²¹⁴] ‘melon’ vs. [kwã³³kjo^{w41}] ‘cucumber’.

/214/ → [33]/ _(C)(C)V(C)#

[214] elsewhere

6.1.3.4 Tone Summary

The tonal behavior for Vietnam Kim Mun can be summarized as follows:

Table 19. Tonal Impact on the Vietnam Kim Mun Syllable

Tone	Impact on Syllable
High /44/	Breathy voice Long and short => No impact on vowel length
Mid /33/	Creaky voice (moderate glottal stop as artifact) Long and short => No impact on vowel length
Low /11/	Modal voice Long and short => No impact on vowel length
High Falling /52/	Breathy voice Postglottalization on open syllables and final sonorants => Shorter rhyme Absence of glottal stop => Longer rhyme Long and short => No impact on vowel length
Mid Falling /31/	Modal voice Postglottalization on open syllables and final sonorants => Shorter rhyme Absence of glottal stop => Longer rhyme Long and short => No impact on vowel length
Mid Rising /35/	Modal voice Long and short vowels => No impact on vowel length
Mid Rising- Falling /341/	Creaky voice Syllable final glottalization in any position within a word Always short vowels => Shortens vowels
Low Falling- Rising /214/	Modal voice Long and short vowels => No impact on vowel length

Tones in Vietnam Kim Mun are accompanied by predictable phonation types.

The mid falling, mid rising, low, and low falling-rising tones show non-distinctive modal voice. The high and high falling tones always exhibit breathy voice. The mid and mid rising-falling tones are pronounced with creaky voice. The creaky voice may be an outcome of a following glottal

stop. Furthermore, only the mid rising-falling tone occurs with only short vowels.

A summary of all the tones and allotones in the Lao variety is provided in Table 20. The abbreviation Ms. stands for monosyllabic and Son. for sonorants. Evidence of tonal contrast is also provided in Appendix G.

Table 20. Vietnam Kim Mun Tonal Summary

Tones/Allotones		Syllable Structures	Syllable Positions	Types of Codas	Examples		
L e v e l	High /44/	V	Ms		#215	older sister	/o ⁴⁴ /
		C ₁ V	Initial		#200	descendant	/se ⁴⁴ θun ²¹⁴ /
			Medial		#218	widow	/gjem ³³ fa ⁴⁴ aw ⁴⁴ /
			Final		#063	brain	/pi ⁴⁴ le ⁴⁴ /
			Ms		#090	milk	/nu ⁴⁴ /
		C ₁ C ₂ V	Ms		#019	dog	/klu ⁴⁴ /
		C ₁ V C ₃	Initial	Son	#168	rice spike	/nin ⁴⁴ bla:w ³¹ /
			Medial	Son	#097	ribs	/nɔ ¹¹ tam ⁴⁴ θuj ⁴⁴ /
			Final	Son	#021	dragon fly	/kjetj ²¹⁴ nunj ⁴⁴ /
			Ms	Son	#062	bone	/θuj ⁴⁴ /
		C ₁ C ₂ V C ₃	Initial	Son	#281	stairs/ladder	/kjaw ⁴⁴ ka ³⁵ /
			Medial	Son	#083	hip	/ke.tlaj ⁴⁴ tuj ⁴⁴ /
			Ms	Son	#024	eagle	/kla:ŋ ⁴⁴ /

Tones/Allotones		Syllable Structures	Syllable Positions	Types of Codas	Examples			
Mid /33/	V	C ₁ V	Initial		#297	ripe	/a ³³ su ³⁵ /	
			Final		#079	hair of head	/pi ³³ dɔŋ ²¹⁴ /	
			Ms		#171	taro	/ho ³³ bu ³³ /	
		C ₁ V C ₃	Initial	p/t/m/ŋ	#128	rain	/buŋ ³³ lu ⁵² /	
			Medial	p/t/m/ŋ	#396	to work	/aj ³³ guŋ ³³ po ⁵³ /	
			Final	p/t/m/ŋ	#253	plane	/tuŋ ¹¹ paw ³³ /	
	C ₁ C ₂ V C ₃	Ms		#126	mud	/pa:m ³³ /		
			Initial	p/t/m/ŋ	#298	right side	/bjaw ³³ pu ³¹ /	
			Final	p, t/m/ŋ	#164	glutinous rice	/me ³³ blet ³³ /	
		Ms		#293	slick	/blaŋ ³³ /		
			Initial		#408	to arise	/θe ¹¹ kwe ³⁴¹ /	
			Final		#249	harrow	/tuŋ ¹¹ pa ¹¹ /	
	Low /11/	C ₁ V	Ms		#196	o. brother	/ta ¹¹ /	
			C ₁ C ₂ V	Ms		#340	to swim	/kjo ¹¹ /
				C ₁ V C ₃	Initial	p/m/n/ŋ	#143	banana leaf
		Medial			p/m/n/ŋ	#035	lizard	/be.koŋ ¹¹ sa: ⁵² /
		Final	p/m/n/ŋ		#099	shoulder	/pe.taw ¹¹ /	
		C ₁ C ₂ V C ₃	Ms		#377	go	/niŋ ¹¹ /	
Initial				n/ŋ	#240	basket	/gjaŋ ¹¹ maw ³¹ /	
Final				n/ŋ	#254	plow	/tuŋ ¹¹ kjaŋ ¹¹ /	
Ms				#086	intestine	/kla:ŋ ¹¹ /		
			Initial		#374	to hone knife	/to ⁵² tu ³³ /	
			Final		#199	daughter	/mun ¹¹ sa ⁵² /	
C o n t o u r		C ₁ V	Ms		#299	red	/θi ⁵² /	
	C ₁ C ₂ V		Final		#228	clothing	/ŋuj ²¹⁴ kwa ⁵² /	
			Ms		#236	trousers	/kwa ⁵² /	
			C ₁ V C ₃	Initial	p/t/Son	#390	to drain	/goj ⁵² wem ²¹⁴ /
	Medial			p/t/Son	#186	day	/me.nj ⁵² ta: ³⁵ /	
	Final			p/t/Son	#026	flea	/kle.muŋ ⁵² /	
	C ₁ C ₂ V C ₃	Ms		#072	face	/min ⁵² /		
			Final	t/m/n/ŋ	#232	ring	/pu.dɔ ¹¹ kwin ⁵² /	
			Ms	t/m/n/ŋ	#089	lungs	/klum ⁵² /	

Tones/Allotones		Syllable Structures	Syllable Positions	Types of Codas	Examples			
	Mid Falling /31/	C ₁ V	Initial		#056	arm	/tə ³¹ kəŋ ²¹⁴ /	
			Medial		#084	hoof	/θaw ³⁵ ɔ̃ ³¹ waj ³⁵ /	
			Final		#030	grasshopper	/kjetŋ ²¹⁴ bo ³¹ /	
		C ₁ C ₂ V	Final		#115	cliff	/gjaw ²¹⁴ pje ³¹ /	
			C ₁ VC ₃	Initial	p/t/Son	#173	tobacco	/jin ³¹ taj ³⁴¹ /
				Medial	p/t/Son	#124	lightening	/buŋ ²¹ bit ³¹ to ⁵² /
		Final		p/t/Son	#149	cotton	/buŋ ³³ min ³¹ /	
		C ₁ C ₂ VC ₃	Ms	p/t/Son	#050	turtle	/pit ³¹ /	
			I	w	#207	host/owner	/pjaw ³¹ mun ³¹ /	
			Final	w	#168	rice spike	/nin ⁴⁴ blaw ³¹ /	
	Mid Rising /35/	V	Ms		#420	2	/i ³⁵ /	
			Final		#344	to steal	/aj ³³ θa ³⁵ /	
		C ₁ V	Ms		#182	to dream	/be ³⁵ /	
			Final		#120	fog	/kja: ³⁵ /	
		C ₁ C ₂ V	Ms		#103	thigh	/θaw ³⁵ boŋ ³⁵ /	
			Final	t/Son	#227	cloth	/buŋ ³⁵ /	
		C ₁ VC ₃	Ms	t/Son	#042	pig sow	/tuŋ ³¹ kjan ³⁵ /	
Final	Son		#069	egg	/kjaw ³⁵ /			
	-Allotone [33]	C ₁ V	Initial		#301	old	[lo ³³ n ¹ aŋ ⁴¹]	
			Initial	Son	#076	foot	[θaw ³³ p*ən ⁴³]	
			Initial	m/ŋ	#175	tree trunk	[gjaŋ ³³ θm ⁵²]	
C o m p l e x	Low Falling- Rising /214/	C ₁ V	Final		#257	sickle	/ku ³¹ to ²¹⁴ /	
			Ms		#358	to roast	/si ²¹⁴ /	
		C ₁ C ₂ V	Ms		#288	sticky	/bla ²¹⁴ /	
			Final	Son	#200	descendant	/se ⁴⁴ θun ²¹⁴ /	
		C ₁ VC ₃	Ms	Son	#037	monkey	/biŋ ²¹⁴ /	
			Final	Son	#041	piglet	/tuŋ ³¹ kjen ²¹⁴ /	
		Ms	Son	#093	neck	/klaŋ ²¹⁴ /		

Tones/Allotones	Syllable Structures	Syllable Positions	Types of Codas	Examples		
-Allotone [33]	C ₁ V	Initial		#268	coop	[tɕ ³³ ko ^{w52}]
	C ₁ C ₂ V	Initial		#150	cucumber	[kwa ³³ kjo ^{w31}]
		Medial		#162	pumpkin	[kɕɛːŋ ²¹ kwa ³³ waŋ ⁴¹]
	C ₁ V C ₃	Initial	Son	#082	heart	[θm ³³ t* ^ə w ⁴¹]
		Medial	Son	#190	morning	[ɔ̃ɛ.t* ^ɔ m ³³ gjo ^{w41}]
C ₁ C ₂ V C ₃	Initial	ŋ/w	#048	spider	[kɕɛːŋ ³³ ŋ ^{jə} . ⁴³]	
Mid Rising-Falling /341/	C ₁ V	Final		#307	left	/θaj ³³ bu ³⁴¹ /
		Ms		#213	mother	/ɕi ³⁴¹ /
	C ₁ C ₂ V	Final		#408	to arise	/θe ¹¹ kwe ³⁴¹ /
		C ₁ V C ₃	Initial	m/ŋ/w/j	#004	bee
	Final		m/ŋ/w/j	#300	raw	/a ⁴⁴ ŋim ³⁴¹ /
	C ₁ C ₂ V C ₃	Ms	m/ŋ/w/j	#401	to buy	/maj ³⁴¹ /
		Initial	m/ŋ/w	#127	pond	/bjaw ³⁴¹ klaŋ ¹¹ /
		Final	m/ŋ/w	#008	caterpillar	/buŋ ³³ blew ³⁴¹ /
Ms		m/ŋ/w	#241	basket	/gjem ³⁴¹ /	

The interaction of Vietnam Kim Mun tones and phonotactics will be described under the Vietnam Kim Mun syllable structure in Sections 6.2.5 through 6.2.7.

6.2 Syllable and Word Structure

This section will provide an overview of the syllable structure of the Vietnam variety of Kim Mun and the general rules that apply. Words are made up by one major syllable or a combination of one possible minor and up to three major syllables.²² The most frequent word length is one to two syllables.

²² This analysis is limited to a wordlist with minimal access to native speakers, therefore a more detailed analysis of the syllable and word structure using criteria such as Kroeger (2005) is for future Kim Mun studies.

Syllables can be open and closed. The Vietnam Kim Mun word structure is $(C_1)C_2V(C_3)T$, with the non-distinctive vowel in the possible word-initial minor syllable not being marked.

6.2.1 Major Syllables

There are three open templates and three closed templates allowed in the Vietnam variety of Kim Mun. The most basic syllable is a preglottalized vowel and the most common syllable template is the C_1VC_3T . The maximal syllable template is $(C_1)(C_2)V(C_3)T$.

The Vietnam variety allows a complex onset but not a complex nucleus.

There are no examples of a complex coda and the C_3 is restricted to the final labial and alveolar stops, the final labial, alveolar, and velar nasals, and the final labiovelar and palatal approximants.

Table 21 provides an overview of the Vietnam Kim Mun syllable structure for both open and closed syllables.

Table 21. Vietnam Kim Mun Syllable Template

Syllable Type	Onset	Rhyme		Examples		
		Nucleus	Coda			
Open Syllable		V		#016	crow	/ku.a: ³¹ /
	C_1	V		#063	to know	/pe ²¹⁴ /
	C_1C_2	V		#246	fire tongs	/pja: ⁴⁴ /
Closed Syllable		V	C_3	#022	duck	/a:p ¹¹ /
	C_1	V	C_3	#050	turtle	/pit ³¹ /
	C_1C_2	V	C_3	#089	lungs	/klum ⁵² /

6.2.2 Minor Syllables

Minor syllables in Vietnam Kim Mun are always word-initial. They consist of a restricted set of initial consonants followed by a shortened near-open central /ɛ/ or the close back /u/, and do not carry tone. An exception to these restrictions for minor syllables is the occurrence of a syllable-initial cluster, as in #026 ‘flea’ /kl̥.muŋ⁵²/ and #002 ‘bat’ /kl̥.buj⁵²/. This might be a newer minor syllable that shows the typical shortened vowel but has not undergone any simplification of the onset yet. Two other examples for a possible current semantic reduction of the first syllable in a compound word is the word /p̥.kəŋ²¹⁴/ ‘thunder’ and /k̥.a:³¹/ ‘crow’.

There may be four different semantic domains for Vietnam Kim Mun minor syllables discovered in the data, related to the upper body, the mid to lower body, vegetables, and animals.

p̥- used with upper body parts

/p̥.pen⁴⁴/ ‘hand’

/p̥.θe⁵²/ ‘arm’

/p̥.dɔ³¹/ ‘finger’

/p̥.taw¹¹/ ‘shoulder’

/p̥.dɔ³¹waj³⁵/ ‘fingernail’

/p̥.ʔəŋ²¹⁴/ ‘nose’

kě- used with mid body parts

/kě.tlai⁴⁴ke?⁵²/ ‘butt’

/kě.tlai⁴⁴tui⁴⁴/ ‘hip’

/kě.tan⁴⁴kaŋ²¹⁴/ ‘back’

kě- used with some vegetables

/kě.taŋ⁴⁴/ ‘eggplant’

/kě.ɗu²¹⁴/ ‘banana flower’

klě- used with some animals

/klě.muŋ⁵²/ ‘flea’

/klě.buj⁵²/ ‘bat’

Further examples not grouped into semantic domains include:

/pě.laj⁵²/ ‘price’

/bě.təm²¹⁴gjo³¹/ ‘morning’

/bě.koŋ¹¹sa:⁵²/ ‘lizard’

/mě.nɔ:m¹¹/ ‘ears’

/mě.nɔj⁵²ta:³⁵/ ‘day’

/tě.dup³¹/ ‘skin’

/ně.muŋ⁵²/ ‘carrying pole’

6.2.3 Consonant Clusters

Table 22 illustrates the different consonant clusters that are possible in

Vietnam Kim Mun. There are three possible phonemes for the C₂ position:

/l, w, j/. The C₁ position can have either one of five phonemes: /p, b, t, k,

g/.

Table 22. Initial Consonant – Medial Consonant Sequences in Vietnam Kim Mun

C ₁ \ C ₂	p	b	t	k	g
l		+	+	+	
w			+	+	+
j	+	+	+	+	+

Consonant clusters starting with the alveolar stop are rare. /tl/ only occurs in one morpheme which occurs twice in the wordlist in /kɛ.tlaj³³kɛ⁵²/ ‘butt’ and /kɛ.tlaj³³tui⁴⁴/ ‘hip’. The /tj/ and /tw/ also only occur once in the wordlist in /tju⁵²/ ‘to run’ and /twɛm¹¹kɔt³⁵/ ‘water well’ respectively. As can be observed from Table 22 above, the consonant clusters /pl, pw, bw, gl/ do not occur in the data, however, due to symmetry, it can be predicted that there may be /pl, pw, bw, gl/ clusters in a bigger data corpus. It is also possible Vietnam Kim Mun is losing consonant clusters. In the recording of the wordlist, the language informant at one point inserted the central vowel /ɛ/ between the consonant cluster /kl/.

6.2.4 Consonant – Vowel Sequences

There are no obvious restrictions on vowels following initial consonants and medial consonants. The strongest limitation is found with the glottal fricative, which is not found with front vowels, and the labiodental fricative, which only occurs after central vowels. It also can be observed that alveolar and velar consonants do not occur with front vowels other than the close /i/.

The more open front vowels /e, ε/ are quite restricted in their environment compared to the rest of the Vietnam Kim Mun vowel spectrum. This may reflect the possibility that the close-mid and open-mid front vowels /e/ and /ε/ are merging (cf. Section 6.1.2). The alveolo-palatal lateral only occurs once in the data preceding the back vowel /u/. Table 23 illustrates the consonant-vowel-sequences accounted for in Vietnam Kim Mun.

Table 23. Consonant – Vowel Sequences in Vietnam Kim Mun

$C_{1/2} \backslash V$	p	b	m	w	f	v	t	d	n	l	s	ʃ	ɕ	ɲ	ʎ	j	k	g	ŋ	θ	h
i	+	+	+	+		+	+	+	+	+	+		+	+		+	+	+	+	+	
e	+	+	+			+				+	+	+		+		+					+
ε	+	+	+	+						+		+		+		+					
ɛ	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+			+
a	+		+	+	+		+	+	+	+	+	+	+	+		+	+	+	+	+	+
u	+	+	+				+	+	+	+	+	+	+		+	+	+	+	+	+	
o	+	+					+			+	+	+		+		+	+	+	+	+	+
ɔ		+		+			+	+	+	+	+	+		+		+	+	+	+	+	+

The back vowel /o/ also has a slightly restricted environment, but there does not seem to be any correlation with the other back vowels that would explain the restriction. The two central vowels /ɛ/ and /a/ and the front vowel /i/ have the least restricted environments among Vietnam Kim Mun vowels, followed by the back vowels /u/ and /ɔ/.

6.2.5 Syllable Onset – Tone Patterns

There are no clear restrictions between syllable onsets and tones in Vietnam Kim Mun. The strongest limitation is with the velar nasal /ŋ/ on only low tones, which reflects the fact that it rarely occurs syllable-initial. The labiodental and glottal fricatives /f, v, h/ also have a restricted environment, which is also due to their rare occurrence in the data. All that can be noted is that the voiced labial fricative /v/ never occurs with level tones whereas the glottal fricative /h/ only occurs with level tones. Generally, fricatives, except the alveolar sibilant, along with the labiovelar approximant and the alveolar stops occur with fewer tones than the other consonants. The alveolo-palatal lateral only occurs once in the data on a mid falling tone.

Table 24 illustrates the syllable onset tone patterns accounted for in Vietnam Kim Mun.

Table 24. Syllable Onset – Tone Patterns in Vietnam Kim Mun

$C_{1/2}$ V	p	b	m	w	f	v	t	d	n	l	s	ʃ	ʈ	ɳ	ɭ	j	k	g	ŋ	θ	h
44	+		+	+	+		+	+	+	+	+	+	+	+		+	+	+		+	
33	+	+	+				+	+	+		+	+	+	+		+	+	+		+	+
11	+	+	+	+	+		+	+	+	+	+	+	+	+		+	+	+	+	+	+
52		+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+		+	+
31	+	+	+				+	+	+	+	+	+		+	+	+	+	+			
35		+	+		+	+		+	+	+	+	+	+			+	+	+		+	
214	+	+	+	+	+		+	+	+	+	+	+	+	+		+	+	+	+	+	
341		+	+	+		+			+	+		+	+	+		+	+	+			

The labiovelar approximant does not occur with mid tones at all, whether level or contour tones. The reason probably is that the mid falling tone and the mid rising-falling tone are the most restricted among Vietnam Kim Mun tones, due to the fact that these two tones are used the least among all the tones. The high falling, high, low falling-rising, and low tones are the least restricted tones in Vietnam Kim Mun and occur more frequently than other tones.

6.2.6 Vowel – Tone Patterns

There are no clear restrictions between vowels and tones in Vietnam Kim Mun. It can be observed that the front vowel / ϵ / cannot occur with the mid falling, the mid rising, and the mid rising-falling tones. The rounded back vowels show a gap for only one of the mid tones. All the other Vietnam Kim Mun vowels can occur with any tone. Table 25 illustrates the nucleus tone patterns accounted for in Vietnam Kim Mun.

Table 25. Nucleus – Tone Patterns in Vietnam Kim Mun

V T	i	e	ɛ	ɐ	a	u	o	ɔ
44	+	+	+	+	+	+	+	+
33	+	+	+	+	+	+	+	+
11	+	+	+	+	+	+	+	+
52	+	+	+	+	+	+	+	+
31	+	+		+	+	+		+
35	+	+		+	+	+	+	+
214	+	+	+	+	+	+	+	+
341	+	+		+	+	+	+	

6.2.7 Coda – Tone Patterns

Each tone in Vietnam Kim Mun can occur on open syllables, and there are no clear restrictions between the coda and tones in Vietnam Kim Mun. Table 26 does reflect that the final velar plosive is not found in syllable-final position. It also can be observed that syllables ending with stops do not occur with the high level and the two complex tones.

Table 26. Coda – Tone Patterns in Vietnam Kim Mun

C ₃ T	p	t	k	m	n	ŋ	j	w
44				+	+	+	+	+
33	+	+		+	+	+	+	+
11	+	+		+	+	+	+	+
52	+	+		+	+	+	+	+
31	+	+		+	+	+	+	+
35		+		+	+	+	+	+
214				+	+	+	+	+
341				+		+	+	+

6.3 Summary

As shown in this chapter, the phoneme inventory of Kim Mun in Vietnam includes twenty-one consonants, nine vowels, and eight tones.

Vietnam Kim Mun has both voiced and voiceless stops with stiff voice as a non-contrastive feature.

There is a higher functional load on plosives and nasals than on fricatives or approximants. All eight vowels phonetically show environmentally conditioned vowel length, whereas merely the open central vowel /a/ has one example of contrast for length distinction. This is implying that Vietnam Kim Mun has almost entirely lost a possible older long and short vowel distinction. However, Vietnam Kim Mun has a large informational load on tones with a total of three level tones, two contour tones, and two complex tones. The shortest possible syllable is made up by a preglottalized vowel, and the maximal syllable is made up by a consonant cluster and a plosive or central approximant following the vowel. Consonant clusters are restricted to plosives followed by approximants. Closed syllables with initial onsets are most frequent. There are a small number of minor syllables with a restricted set of oral and nasal stops followed by a non-distinctive vowel. The maximal word length is one minor syllable followed by up to three major syllables. The typical word has one or two syllables.

CHAPTER 7

PHONOLOGICAL COMPARISON OF KIM MUN IN LAOS AND VIETNAM

7.1 Phonological Comparison

This section will provide a contrastive analysis of the phonemes in the Lao and Vietnam varieties of Kim Mun. Also included in this section are comparisons with Kim Mun varieties in China derived from previous research.

7.1.1 Consonantal Comparison

Between Lao and Vietnam Kim Mun, the Lao variety with twenty-one distinctive consonants does not differ much from the Vietnam variety, which also has twenty-one distinctive consonants. The four major places of articulation in Lao and Vietnam Kim Mun concurs with the research of Mao (2004) and Liu, et. al. (1998) who documented labial, alveolar, alveolo-palatal, and velar places of articulation in Chinese Kim Mun.

Table 27. Comparison of Inventory of Phonetic Consonants (Laos and Vietnam)

Place Manner	Labial	Pre- Palatal	Palatal	Post- Palatal
Oral Stops	p	t	t̚	k
	b	d	d̚	g
Fricatives	f	θ	s	h
	v	ð		
Nasal Stops	m	n	ɲ	ŋ
Lateral Approximants		l	ɭ	
Central Approximants			j	w

Table 27 documents all the consonants discovered between the two varieties, which will be discussed below.²³ The shaded sections mark the two distinctions between the two varieties. The differences being the voiced counterpart of the Lao dental fricative that Vietnam Kim Mun is lacking and the Vietnam voiced alveolo-palatal lateral that Lao Kim Mun is lacking. Furthermore, both varieties of Kim Mun contain phonemes that rarely occur, i.e. the voiced fricatives /v, ð/, the voiceless fricatives /f, h/, and the alveolo-palatal lateral approximant /ɭ/. A larger corpus from both varieties could clarify the status and distribution of such phonemes. Also, in order to decide if the sounds are an outcome of borrowing from neighboring languages a phonological and lexical comparison with these languages is

²³ The major places of articulation labeled pre-palatal and post-palatal are phonological categories not phonetic categories.

necessary. This would exceed the limited framework of this study and is for future studies.

7.1.1.1 Plosives

Both varieties have a set of voiced and voiceless plosives in four major places of articulation, i.e. labial, alveolar, alveolo-palatal, and velar. The plosives occur syllable-final in both varieties, with the exception of the alveolo-palatal plosive for both varieties and without a velar final stop for Vietnam Kim Mun. Lao Kim Mun has a final velar plosive, but it is rare. It is possible that Kim Mun is in the process of losing the final velar plosive.

The voiced and voiceless labial and alveolar plosives are realized with stiff voice in both Lao and Vietnam Kim Mun. This is in line with the conditions documented in Edmondson's (2004) study of Sui and in that found in Thai where bilabial and alveolar stops have stiff voice (Ladefoged and Maddieson 1996). For Lao Kim Mun, this laryngeal setting is also observed with alveolo-palatal voiced and voiceless plosives.

7.1.1.2 Fricatives

The labiodental fricatives /f, v/ appear in both Lao and Vietnam Kim Mun and while they rarely occur in either variety, they were also documented in Hainan, Yunnan, and Guangxi Kim Mun. The voiced dental fricative /ð/

only occurs in Lao Kim Mun, and only four times at that. There are no cognates in the data to compare between the Lao and Vietnam varieties, but since the voiceless dental fricative /θ/ is quite frequent it can be postulated that Vietnam Kim Mun does have the voiced equivalent. It is possible it is just as rare as it is in Lao Kim Mun and did not surface in the data.

A closer look at other Kim Mun varieties found in China suggests another possible explanation. It may be postulated that the voiced dental fricative is missing in Vietnam Kim Mun because it has merged with the voiced alveolar stop /d/, analogous to data from China. In cognates from Yunnan Kim Mun the fricatives /θ, ð/ are realized as the affricates /tθ, dð/ (Mao 2004), and in cognates from Hainan Kim Mun the fricatives /θ, ð/ are realized as the plosives /t, d/ (Shintani 1990). This demonstrates that in some varieties of Kim Mun the fricatives /θ, ð/ are changing to affricates or stops. For Vietnam Kim Mun, it is especially the voiced dental fricative that would undergo this sound change since voiceless fricatives are preferred in both Lao and Vietnam Kim Mun.

7.1.1.3 Nasals

Both varieties share the same set of nasals, including the rare occurrence of the velar nasal /ŋ/ as a syllable onset. Along with plosives and

approximants, nasals can fill the coda position of a syllable in both varieties, which is consistent with the Hainan, Yunnan, and Guangxi Kim Mun finals.

7.1.1.4 Approximants

In each variety the approximants can occur as initial or medial consonants of a syllable onset, which is consistent with data from Yunnan Kim Mun (Mao 2004) but in contrast to Hainan Kim Mun (Shintani 1990) where the central approximants /w/ or /j/ are not found syllable-initial. It is also partially in contrast with the Guangxi variety (Mao 2004) where only the palatal approximant /j/ can occur syllable-initial. In both Lao and Vietnam Kim Mun syllable-final approximants occur as codas. The alveolo-palatal lateral only occurs once in Vietnam Kim Mun and there are no cognates to compare between the two varieties.

7.1.1.5 Summary of Lao and Vietnam Kim Mun Consonants

The consonants in the Lao and Vietnam varieties of Kim Mun have a direct one to one correspondence, as illustrated in Table 28.

Table 28. Summary of Lao and Vietnam Kim Mun Consonants

Segment	Lao Kim Mun	Vietnam Kim Mun	Gloss
/p/	/kja ^{p21} /	/kje ^{p33} /	bear
/b/	/bwe ¹³ /	/be ³⁵ /	dream
/t/	/ta ^{p31} /	/ta ^{p33} /	to bite
/d/	/da:ja ³⁵ /	/deja ⁵² /	to fly
/t̥/	/ta:w ¹¹ /	/ta:w ³³ /	to fry
/ɬ/	/ɬa:w ¹³ /	/ɬa:w ³⁵ /	wind
/k/	/kjo ³¹ wɔm ⁵³ /	/kjo ¹¹ /	to swim
/g/	/guj ⁵³ /	/guj ²¹⁴ /	clothing/shirt
/f/	/gjaŋ ³³ fa:ŋ ³¹ /	/faŋ ¹¹ /	flower
/v/	/van ¹³ /	/ven ³⁵ /	cloud
/θ/	/θɔŋ ³⁵ /	/θɔŋ ⁵² /	blanket
/ð/	/tə.ðaj ³³ /	N/A	tools
/s/	/səm ⁵³ /	/sem ²¹⁴ /	gold
/h/	/hɔp ³⁵ jin ³⁵ bja:t ³¹ /	/hɔp ⁵² jin ²¹⁴ /	to smoke
/m/	/maj ³⁴¹ /	/maj ³⁴¹ /	to buy
/n/	/nu ³³ /	/nu ⁴⁴ /	milk
/n̥/	/n̥in ³³ /	/n̥in ³³ /	to eat
/ŋ/	/tuŋ ³⁴¹ /	/tuŋ ³¹ /	pig
/l/	/la: ³⁵ /	/la: ⁴⁴ /	moon
/l̥/	N/A	/lu ³¹ to ²¹⁴ /	sickle
/j/	/ja ⁵³ /	/ja ²¹⁴ /	I
/w/	/daw ³³ /	/da:w ³³ /	salt

The only two consonants that do not appear in cognates between the two varieties are the voiced alveolo-palatal lateral approximant /l̥/, which only occurs in the Vietnam variety in one instance, and the voiced dental fricative /ð/, which only occurs in the Lao variety in four instances.

7.1.2 Vowel Comparison

Vietnam and Lao Kim Mun both have nine vowels. The Vietnam variety has three front vowels /i, e, ε/ two central vowels /ɐ, a/, and the three back vowels /u, o, ɔ/. The Lao variety only differs in the opening degree of the non-open central vowel; where the Vietnam variety has a near-open central vowel, the Lao variety has a mid central vowel /ə/.

The distinctive vowels found between the two varieties are represented in Figure 7. Lao Kim Mun, marked with squares, has front vowels close to cardinal quality and slightly lowered back vowels while Vietnam Kim Mun, marked with circles, has retracted front vowels and back vowels close to cardinal quality.²⁴ Other than these differences in pronunciation, the vowel systems of the Lao and the Vietnam varieties of Kim Mun are identical.

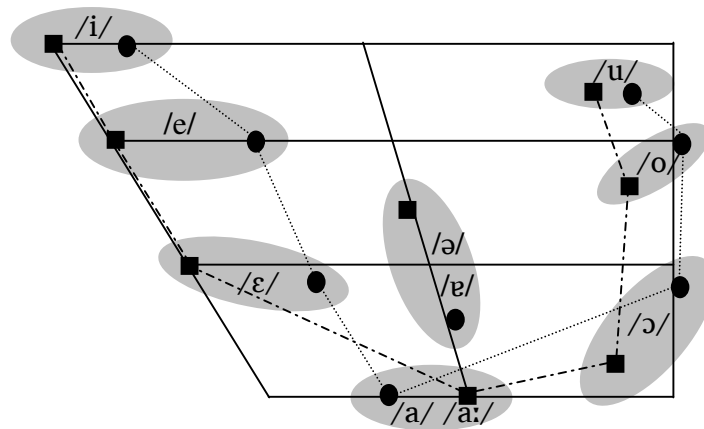


Figure 7. Distributional Comparison of Lao and Vietnam Kim Mun Vowels

²⁴ Based on auditory impression.

It appears that Lao and Vietnam Kim Mun have a slightly more complicated vowel system than the Hainan, Yunnan, and Guangxi varieties with a symmetrical three front vowel – three back vowel system. The varieties in Laos and Vietnam have two additional central vowels.

Both Lao and Vietnam Kim Mun demonstrated a restricted environment on the close-mid and open-mid front vowels /e/ and /ɛ/. Especially Lao Kim Mun seems to demonstrate a vowel merger taking place. This also seems to have taken place in other Kim Mun varieties, such as in Guangxi, China (Mao 2004), Hainan, China (Shintani 1990), and Yunnan, China (He 1999 and Liu, et. al. 1998).

7.1.2.1 Vowel Length

Despite a vast number of syllables in both varieties containing vowel length, neither variety could provide an ample supply of examples of contrast, which is consistent with Mao and Chou's (1972) findings. Both varieties have environmentally conditioned long and short vowels, namely vowel length neutralization, with only the word final syllable demonstrating vowel length. The open central vowel /a/ was found to not be affected by this neutralization. Lao Kim Mun contained three examples of contrast for the open central vowel while Vietnam Kim Mun only contained one example of

contrast. A former vowel length distinction might have been reduced to the open central vowel, with even this contrast possibly disappearing.

7.1.2.2 Summary of Lao and Vietnam Kim Mun Vowels

The vowels in the Lao and Vietnam varieties of Kim Mun usually have a direct one to one correspondence with the exception of the open central unrounded vowel /a/, as illustrated in Table 29.

Table 29. Summary of Lao and Vietnam Kim Mun Vowels

Vowel Correspondence	Lao Kim Mun	Vietnam Kim Mun	Gloss
/i/ – /i/	/θi ³⁵ /	/θi ⁵² /	red
/e/ – /e/	/bwe ¹³ /	/be ³⁵ /	dream
/ɛ/ – /ɛ/	/tɛŋ ³³ /	/tɛŋ ⁴⁴ /	frog
/ə/ – /ɐ/	/səm ⁵³ /	/səm ²¹⁴ /	gold
/a/ – /a/	/tap ³¹ /	/tap ³³ /	to bite
/a/ – /ɐ/	/kjap ²¹ /	/kjɛp ³³ /	bear
/u/ – /u/	/nu ³³ /	/nu ⁴⁴ /	milk
/o/ – /o/	/no ³¹ /	/no ¹¹ /	you (pl)
/ɔ/ – /ɔ/	/θɔŋ ³⁵ /	/θɔŋ ⁵² /	blanket

Among cognates, the open central unrounded vowel /a/ in the Lao variety can occur as either the open central unrounded vowel /a/ or the near-open central unrounded vowel /ɐ/ in the Vietnam variety. It is uncertain as whether this is semantically, morphologically, or phonologically motivated. A larger corpus is needed to analyze the reason behind this sound alteration.

7.1.3 Tonal Comparison

Both Lao and Vietnam Kim Mun have eight tones as demonstrated in Table 30, which is close with the number of tones listed in the Hainan variety, but less consistent with the large amount of tones listed in the various Yunnan varieties and the Guangxi variety.

Table 30. Tone Contour Comparison between Lao and Vietnam Kim Mun

Variety	Level			Contour					Complex	
	High	Mid	Low	High Falling	Mid Falling	Low Falling	Mid Rising	Low Rising	Rising Falling	Falling Rising
Laos		/33/	/11/	/53/	/31/	/21/	/35/	/13/	/341/	
Vietnam	/44/	/33/	/11/	/52/	/31/		/35/		/341/	/214/

While Vietnam Kim Mun has three level tones, Lao Kim Mun only has two level tones. However Lao Kim Mun has three falling tones while Vietnam Kim Mun has only two falling tones. Both varieties have a mid rising tone, but where Lao Kim Mun has a low rising tone, Vietnam Kim Mun has a falling rising tone. With initial voiced plosives, the Lao Kim Mun low rising tone can resemble the Vietnam Kim Mun falling-rising tone, but other than this, one is a clear low rising tone and the other is a clear falling-rising tone. Among cognates, the mid and low tones in Lao Kim Mun often occur as the high and mid tones in Vietnam Kim Mun, respectively. The high falling tone in Lao Kim Mun often occurs as the falling rising tone in Vietnam Kim Mun. The mid falling tone in Lao Kim Mun often occurs as either the low or

the mid falling tone in Vietnam Kim Mun. The two rising tones in Lao Kim Mun, mid rising and low rising, often occur as high falling and mid rising in Vietnam Kim Mun, respectively. The one tone that usually occurs on the same cognates in both varieties is the mid rising-falling tone. To summarize this, see Table 31.

Table 31. Summary of Lao and Vietnam Kim Mun Tones

Tone Correspondence	Lao Kim Mun	Vietnam Kim Mun	Gloss
/33/ – /44/	/ɬim ³³ /	/ɬim ⁴⁴ /	thorn
/11/ – /33/	/ma: ¹¹ /	/ma: ³³ /	grass
/53/ – /214/	/səm ⁵³ /	/səm ²¹⁴ /	gold
/31/ – /11/	/guŋ ³¹ /	/guŋ ¹¹ /	sky
/31/ – /31/	/nɔm ³¹ /	/nɔm ³¹ /	leaf
/21/ – /33/	/bə.ɬam ²¹ /	/ɬa:m ³³ /	night
/35/ – /52/	/mə.nɔj ³⁵ /	/mɛ.nɔj ⁵² /	sun
/13/ – /35/	/van ¹³ /	/vɛn ³⁵ /	cloud
/341/ – /341/	/maj ³⁴¹ /	/maj ³⁴¹ /	to buy

Other than a shift from mid or low tones in Lao Kim Mun to high or mid tones in Vietnam Kim Mun, there is no obvious systematic relationship connecting pitch height or contour between the two varieties.

7.2 Syllable Structure Comparison

The syllable templates of both varieties are very similar. Lao and Vietnam Kim Mun words are made up by one major syllable or a combination of one possible minor syllable and up to three or four major syllables. The most frequent word length is one to two syllables in both varieties with a word

structure of (C.)C₁(C₂)V(C₃)T, with the non-distinctive vowel in the possible word-initial minor syllable not being marked.

7.2.1 Major Syllable

Both varieties demonstrate three open templates and three closed templates. The most common syllable template in both varieties is the C₁VC₃T. The most basic template in both varieties is a preglottalized vowel. There are no examples in the data of a complex coda, however both varieties demonstrate a complex onset. The coda in both varieties can be filled with either a voiceless plosive (labial or alveolar), nasal (labial, alveolar, or velar), or central approximant (labial or palatal). Lao Kim Mun can also have a final voiceless velar plosive.

7.2.2 Minor Syllable

Both varieties were found to have minor or pre-syllables. While Downer (1961) mentions that pre-syllables are a feature of Yao languages, this feature was not expected in that it was not documented for any of the Chinese varieties.

7.2.3 Consonant Clusters

Both varieties have consonant clusters, with almost the same limited number of initial and medial consonants. This is consistent with the Chinese

varieties, though the C_1 position in Lao Kim Mun is more restricted than the Chinese varieties. Lao Kim Mun recorded only labial and velar plosives in the C_1 position, whereas Vietnam Kim Mun contained one occurrence of the alveolar plosive filling the initial position of a consonant cluster. The Chinese varieties also documented a few non-plosive segments filling the C_1 position in a consonant cluster (Mao 2004). Vietnam Kim Mun also had examples of cluster-initial alveolar plosives, while Lao Kim Mun had no such examples. Between the Lao and Vietnam varieties the medial consonant in clusters can only be an approximant /w, l, j/, which is consistent with the previous studies on Chinese Kim Mun.

7.2.4 Consonant – Vowel Sequences

Each of the two front vowels /e, ε/ in both Lao and Vietnam Kim Mun has a more restricted environment than other vowels. Besides this there are no other clear limitations between the two varieties.

7.2.5 Syllable Onset – Tone Patterns

There are no clear limitations between syllable onsets and tones in either variety, though both varieties showed more restriction among tones occurring on non-plosive syllable onsets, which reflects the fact that both

varieties have a higher functional load on plosives than on non-plosive segments.

7.2.6 Vowel – Tone Patterns

There are no clear limitations between vowels and tones in either variety.

7.2.7 Coda – Tone Patterns

There are no clear limitations between the coda and tones in the two varieties, though both varieties usually have a tendency for final plosives to occur with contour tones. In the case of the Lao variety, final plosives only occur with contour tones.

7.3 Summary

Since there were no significant differences between Vietnam and Hainan Island varieties of Kim Mun (Shintani 1990), it was assumed there should be no significant differences between Laos and Vietnam either, especially considering that Laos and Vietnam have had more language exposure to each other as bordering neighbors than Vietnam and Hainan Island. Lao and Vietnam Kim Mun are indeed quite similar on a segmental, suprasegmental and phonotactic level. There are clear segmental correspondences between the cognates of the two varieties. On the lexical level the two varieties do

have some differences. A lexical comparison is needed for future Kim Mun studies.

As expected, both Lao and Vietnam Kim Mun have similar consonantal systems with similar consonant clusters and a high functional load on tones. What deviated from the previous research on the Chinese varieties are the vowels of the two varieties under study. The vowel systems of both varieties contain more vowel phonemes than was documented in Hainan, Yunnan, or Guangxi. Regarding vowel length and number of tones, there was no clear forecast possible. Both of these issues were addressed in this research and both the Lao and Vietnam varieties were consistently the same. Vietnam and Lao Kim Mun exhibited vowel length with only few examples of contrast, and both had only eight tones in comparison to the plethora of tones documented by previous researchers in Yunnan and Guangxi Kim Mun. Two phenomena that were not foreseen also appeared in the analysis of both varieties, namely vowel length neutralization and minor syllables.

Finally, both varieties exhibited stiff plosives as expected. Unlike the segments discovered on Hainan Island (Shintani 1990) and Guangxi (Mao 2004), the stiff segments in Lao and Vietnam Kim Mun are clearly voiced and voiceless. Furthermore, this study documents in the Lao and Vietnam

varieties that the voiced and voiceless stiff plosives extend further than the labial and alveolar stops documented by Shintani (1990) and Mao (2004) to alveolo-palatal stops in Lao Kim Mun. And as was expected, the stiff voice segments do not contrast with other phonation types in the data, but are rather an areal feature documented for neighboring languages such as Thai.

CHAPTER 8

SUMMARY, CONCLUSION, AND OUTLOOK

8.1 Summary

The goal of this study was to analyze the phonology of two Kim Mun varieties, one in Laos and one in Vietnam, in order to find out whether future language development work such as orthography development, literacy work, and translation could encompass Kim Mun speakers in both Vietnam and Laos, or if it would have to be divided among several different pockets of Kim Mun speakers. It was also hoped that this study would yield insight on a possible extension of language development work to the other Kim Mun varieties found throughout China.

After giving an overview on previous research done in Kim Mun varieties in China and Vietnam, the study investigated the four main applications of the frequently used but not clearly defined term preglottalization and applied the result to Lao and Vietnam Kim Mun. For both varieties, what has been reported as preglottalization by some researchers seems to be the laryngeal setting of stiff voice for voiced and voiceless plosives, with the features [+constricted][+stiff][-spread][+/-voice]. The voiced stiff plosives [b̥, d̥,

[ɕ] may contain a moderate glottal stop prior to voice onset as documented in Edmondson's instrumental analysis (2004). This is not audible in the data available for this study and might be a physiological artifact of the stiff laryngeal setting. The voiceless stiff plosives [p*, t*, ʈ*] do not contain a pre-glottal stop. Stiff voice is not distinctive for the Kim Mun varieties under study and seems to be an areal feature as it is found in neighboring Tai-Kadai languages (cf. Section 4.5).

Two more areal features noted in this study are alveolo-palatal segments (cf. Section 4.3.2.2), and the open central unrounded vowel /a/ [a] (cf. Section 5.1.2.2). The alveolo-palatal place of articulation is common in South Asia but not fully represented in the phonetic alphabet of the International Phonetic Association where only affricates for this place of articulation are symbolized. Both Kim Mun varieties under study document the voiced and voiceless alveolo-palatal plosives /tʃ/ [tʃ] and /ɕ/ [ɕ] as well as the alveolo-palatal nasal /ɲ/ [ɲ]. Vietnam Kim Mun also documents the alveolo-palatal lateral /ɭ/ [ɭ]. For the Vietnam variety, the alveolo-palatal stop has the same phonological environment as the velar stop in that it does not occur syllable-final whereas bilabial and alveolar stops do. In addition, alveolo-palatal and velar consonants in Vietnam Kim Mun both affect the allophonic rule that causes /ɔ/ to become [aʊ] whereas alveolar consonants leave the

vowel unaffected. This provides some evidence that alveolo-palatal consonants cannot be considered a palatalized version of alveolar consonants but that they are closely linked with back-articulated velar consonants. Both varieties also documented the central unrounded vowel /a/, another common areal feature of South Asia and not represented in IPA.

This study documents a high phonological similarity between the Kim Mun varieties in Laos and Vietnam. Both varieties have an almost identical consonantal system, with only an additional voiced counterpart for the dental fricative in Lao Kim Mun and an additional alveolo-palatal lateral in Vietnam Kim Mun. The places of articulation are found to be the same for both varieties. Apart from a slight deviation in pronunciation, the vowel system is identical. Both varieties have the same amount of tones and identical word and syllable structures.

Both Vietnam and Lao Kim Mun seem to be undergoing sound change. They are losing long and short vowel distinction, and the open-mid front unrounded /ɛ/ and the close-mid front unrounded /e/ seem to be merging. Even though the open-mid front vowel shows more restrictions, it is yet uncertain which of the two vowels will emerge dominant. However, regardless of which vowel emerges dominant, it is expected this will lead to further change in the vowel system of Kim Mun. It is likely that one of the

mid vowels will begin to migrate towards a front vowel to maintain vowel symmetry. Similarly, the open-mid and close mid back vowels which already show a slightly restricted environment for the open-mid rounded /o/, might undergo merging and show the same amount and opening degree as their front counterparts.

8.2 Conclusion and Outlook

Overall the Lao and Vietnam varieties are phonologically quite similar, and from a cursory look, there seem to be many similarities and patterns among the other varieties of Kim Mun (Mao 2004; He 1999; Liu, et. al. 1998; and Shintani 1990). Further phonological comparison is needed between the other varieties of Kim Mun. One of the largest inconsistencies between the varieties of Kim Mun in this study and other varieties of Kim Mun are the amount of tones reported in varieties of Kim Mun in Yunnan and Guangxi provinces of China. The tone systems of the Lao, Vietnam, and Hainan Island varieties of Kim Mun seem very similar. However the tone systems documented by Mao (2004), He (1999), and Liu, et. al. (1998) are quite different, in particular all three record three or more tones than documented in the Lao, Vietnam, and Hainan Island varieties of Kim Mun. Further analysis is needed on Kim Mun tones from Yunnan and Guangxi provinces and subsequent tonal comparison between the Lao, Vietnam, and China

varieties of Kim Mun, including the Kim Kun on Hainan Island. Further tonal analysis on the eight-tone system and its application to Kim Mun may also produce valuable results, in particular the possible relationship between Kim Mun voicing quality and Kim Mun tones.

Further study is also needed on Kim Mun vowel systems. The Lao and Vietnam varieties seem to have slightly more complicated vowel systems than reported in the Chinese varieties. It was also noted that the Lao and Vietnam varieties are losing long and short vowel distinction and have two front vowels that seem to be in the process of merging. Both of these phonological changes have some documentation in the Chinese varieties. Mao and Chou (1972) report the disappearance of vowel length distinction, however He (1999) reports that a variety of Kim Mun under study in Yunnan has abundant examples of vowel length distinction. Furthermore, Mao (2004) documents the close-mid and open-mid front vowels /e, ε/ in a Yunnan variety while Liu, et. al. (1998) only documents the open-mid /ε/ and He (1999) only documents the close-mid /e/ in other areas in Yunnan. In the Guangxi variety Mao (2004) only documents the /ε/. This seems to confirm the merging of the vowels /e, ε/ in the Lao and Vietnam varieties. However, further study is needed to analyze the consistencies and differences of changes in the vowel systems of each variety of Kim Mun.

The corpuses used in this analysis were adequate for this study, but a larger corpus from both Vietnam and Lao Kim Mun will also be useful for future Kim Mun studies. A larger corpus will be useful in analyzing rarely occurring phonemes, i.e. the voiced and voiceless bilabial fricatives /f, v/, the voiced dental fricative /ð/, and the voiced alveolo-palatal lateral approximant /l/. A larger corpus will also be useful for analyzing motivation behind sound changes between the two varieties, i.e. the open central /a/ in the Lao variety occurs as either the open central /a/ or the near-open central /e/ in the Vietnam variety.

Kim Mun and Yao languages in general may be characterized with palatalized and labialized segments (Downer 1961). Further study could reveal a possible correlation between the alveolo-palatal segments in Kim Mun and the feature of palatalization.

One of the aims in this thesis was to address the issue of preglottalization, as it was termed by previous researchers. In addressing this phenomenon questions arise for future studies. Shintani (1991) analyzed the preglottalized segments as voiced implosives that originated from voiceless segments. Further study could determine whether Hainan Kim Mun has voiced implosives in place of voiceless plosives or a laryngeal setting similar to that of the stiff voice in Lao and Vietnam Kim Mun.

One other area for future Kim studies is that of the syllable. This study only presented a very brief phonological analysis of Kim Mun syllables. Further study could more accurately determine word breaks from syllable breaks and further describe in more detail the possible syllable types in Kim Mun, i.e. various types of major and minor syllables as documented in Mien (Purnell 1965). None of the researchers of the Chinese varieties describe the syllable structure of Kim Mun in China.

Regarding the *phoneme inventory*, the Lao and the Vietnam Kim Mun varieties are similar enough for a literacy project to include both of them.²⁵ More comparative studies, such as lexical comparison, need to be done in order to decide whether cognates are close enough to create one common dictionary. A tentative comparison with data from China shows both similarities and differences in the phonological systems. Therefore, in order for future language development work to include Kim Mun outside of just Laos and Vietnam, further Kim Mun studies are needed.

²⁵ This statement is based solely from a phonological perspective and is not meant to circumvent further linguistic research necessary for the development of a common literacy program, such as Social Linguistic research. Such further research is outside of the scope of this thesis and is for future Kim Mun studies.

APPENDIX A

WORDLISTS OF LAO AND VIETNAM KIM MUN

Ref. #	English	Luang Nam Tha, Laos
Nature		
001.	sky	gɯŋ ³¹
002.	sun	mə.nɔj ³⁵
003a.	the sun rises	mə.nɔj ³⁵ saw ¹³
003b.	the sun rises	mə.nɔj ³⁵ set ³¹
004a.	the sun sets	mə.nɔj ³⁵ mot ²¹ təj ²¹
004b.	the sun sets	mə.nɔj ³⁵ tɯj ³¹
005.	moon	la: ³⁵
006.	star	θin ⁵³ taw ¹³
007.	light	gwan ⁵³
008.	shadow	bə.gloj ⁵³
009.	to twinkle	-----
010.	bright	gwan ⁵³ daŋ ³⁵
011.	dark	dam ²¹
012.	cloud	van ¹³
013.	rain	buŋ ²¹
014.	rainbow	gɯŋ ³¹ gaŋ ¹³
015.	lightning	buŋ ²¹ bit ³¹ to ³⁴¹
016.	thunder	bu.gɔŋ ⁵³ ha:w ³¹
017.	wind	da:w ¹³
018.	storm	da:w ¹³ kja ⁵³
019.	snow	-----
020.	to melt	ju: ¹¹

Ref. #	English	Lao Cai, Vietnam
Animals		
001.	ant	θew ³³
002.	bat	kle.buj ⁵²
003.	bear	kjɛp ³³
004.	bee	mɛj ³⁴¹ muŋ ⁴⁴
005.	bird	nɔ ³³
006.	buffalo	ŋɔŋ ¹¹
007.	cat	ma:w ¹¹
008.	caterpillar	buŋ ³³ blew ³⁴¹
009.	centipede	θap ⁵²
010.	chicken cock	tɛj ²¹⁴¹ koŋ ³¹
011.	chicken hen	tɛj ²¹⁴ nɛj ³⁴¹
012.	chicken	tɛj ²¹⁴
013.	cow/ox	ŋɔ ¹¹ waŋ ¹¹
014.	crab	kjɛm ³⁵ naj ²¹⁴
015.	cricket	kjɛŋ ²¹⁴ kjo ³¹
016.	crow	ku.a: ³¹
017.	barking deer	tɯŋ ²¹⁴
018.	sambar deer	ki ¹¹ juŋ ¹¹
019.	dog	klɯ ⁴⁴
020.	dragon	kuŋ ²¹⁴
021.	dragon fly	kjɛŋ ²¹⁴ nuŋ ⁴⁴
022.	duck1	a:p ¹¹

Ref. #	English	Luang Nam Tha, Laos
021.	hail	pjɔ ²¹
022.	weather	si ³⁵
023.	nice day, fine day	si ³⁵ gɔŋ ¹³
024.	cloudy day	ɔŋ ³¹ naj ³¹ van ¹³
025.	drought	ɔŋ ⁵³ hain ³⁵
026.	night	bə.dam ²¹
027.	day	mə.nɔj ³⁵ fa. ¹³
028.	morning	bu.dom ⁵³ tɔn ¹³
029.	noon	dum ³¹ nɔj ³⁵
030.	yesterday	kum ³¹ nɔj ³⁵
031.	tomorrow	saj ³¹ dom ⁵³
032.	year	nəŋ ³⁵
033a.	east	tɔŋ ⁵³ fan ¹³
033b.	east	mə.nɔj ³⁵ set ³¹ fan ¹³
034a.	west	fe ⁵³ fan ¹³
034b.	west	mə.nɔj ³⁴¹ mot ²¹ təj ³¹ fan ¹³
035a.	north	pu ³³ fan ¹³
035b.	north	tə ³¹ le ³⁵ fan ¹³
036a.	south	nam ³¹ fan ¹³
036b.	south	ku ³³ le ³⁵ fan ¹³
037.	horizon	ɔŋ ³¹ sin ³¹
038.	water	wɔm ⁵³
039.	river	wɔm ⁵³ lu ³⁵

Ref. #	English	Lao Cai, Vietnam
023.	duck2	-----
024.	eagle	kla:ŋ ⁴⁴
025.	fish	bjaw ³⁴¹
026.	flea	kle.muŋ ⁵²
027.	fly	kjeŋ ²¹⁴ gjem ⁵²
028.	frog	təŋ ⁴⁴
029.	goat	juŋ ¹¹
030.	grasshopper	kjeŋ ²¹⁴ bo ³¹
031.	horse	ma ³⁴¹
032.	insect	kjeŋ ²¹⁴
033.	leech, dry	kjem ²¹⁴
034.	leech, wet	ma ¹¹ waŋ ¹¹
035.	lizard	bə.koŋ ¹¹ sa. ⁵²
036.	louse, head	θej ³³
037.	monkey	bij ²¹⁴
038.	mosquito	kjeŋ ²¹⁴
039.	pig	tuj ³¹
040.	bore	tuj ³¹ kew ⁴⁴
041.	piglet	tuj ³¹ kjen ²¹⁴
042.	pig sow	tuj ³¹ kjan ³⁵
043.	rat	du ²¹⁴
044.	shrimp	tə ³¹ koŋ ²¹⁴
045.	snail	kwej ²¹⁴

Ref. #	English	Luang Nam Tha, Laos
040.	stream	wɔm ⁵³ nɔ ³⁴¹
041.	sea	koj ¹¹ lu ³⁵
042.	earth, soil	ni ³⁵
043.	mud	ni ³⁵ pam ²¹
044.	dust	ni ³⁵ buɲ ³⁵
045.	stone	gja:w ⁵³
046.	pebble	gjaw ⁵³ θaj ⁵³ ɲɔt ³⁵
047.	sand	gjaw ⁵³ θaj ⁵³ min ³¹
048.	gold	səm ⁵³
049a.	silver	ɲan ³¹ pɛ ²¹
049b.	silver	-----
050.	iron	gja: ³⁵
051.	steel	θe ⁵³ kuɲ ³⁴¹
052.	mountain	ɬɔŋ ⁵³
053.	cave	ɬə.bɛŋ ³¹ kɔt ³⁵
054.	earthquake	guɲ ³¹ ni ³⁵ ɬɔŋ ³⁴¹
055.	swamp	gla:ŋ ³¹
056.	cliff	gjaw ⁵³ bɛŋ ¹³
057.	valley	sun ³⁵ ka:w ⁵³
058.	hole	kɔt ³⁵
059.	ice	wɔm ⁵³ kat ³¹
060.	to flow	tuj ³⁵
061.	flood	wɔm ⁵³ ja:m ¹³

Ref. #	English	Lao Cai, Vietnam
046.	snake	na:ŋ ²¹⁴
047.	sparrow	nɔ ³³ kej ³³
048.	spider	kjeŋ ²¹⁴ ɲa: ⁴⁴
049.	tiger	gja:n ¹¹
050.	turtle	pit ³¹
051.	wasp	mɛj ³⁴¹
052.	weasel	kin ¹¹ ma:w ¹¹
053.	earthworm	nuɲ ¹¹ naɲ ²¹⁴
054.	goose	-----
055.	pangolin	-----
Body		
056.	arm	pu.θe ⁵²
057.	back	ke.tan ⁴⁴ kaŋ ²¹⁴
058.	beard	θɔm ⁵²
059.	belly	ɲo ³³
060.	blood	θa:m ³³
061.	body	θin ⁵²
062.	bone	θuɲ ⁴⁴
063.	brain	pi ⁴⁴ le ⁴⁴
064.	butt	ke.tlaɲ ⁴⁴ ke ⁵²
065.	chest	ke.lap ³¹
066.	cockcubi	gen ²¹⁴
067.	corpse	mun ¹¹ tej ³³

Ref. #	English	Luang Nam Tha, Laos
062.	to float	bjɔ ³¹
063.	to sink	sim ⁵³
064.	waterfall	wɔm ⁵³ tuj ³¹ ka:m ³¹
065.	island	wɔm ⁵³ gjeŋ ⁵³
066.	lake	wɔm ⁵³ gap ²¹
Plants, Food		
067.	forest	kim ³¹
068.	tree	gjaŋ ¹³
069.	branch	gjaŋ ³³ gwa: ³¹
070.	tree bark	gjaŋ ¹³ dup ²¹
071.	thorn	dim ³³
072.	root	gjaŋ ³³ duj ³¹
073.	leaf	nɔm ³¹
074.	flower	gjaŋ ³³ faŋ ³¹
075.	fruit	gjaŋ ³³ pjo ³³
076a.	seed	-----
076b.	seed	nɔm ⁵³
077.	grass	ma: ¹¹
078.	bamboo	la:w ¹¹
079.	bamboo shoot	law ¹¹ bjaŋ ²¹
080.	bamboo pole	law ¹¹ ke ⁵³
081.	coconut tree	mak ²¹ paw ³¹ gjaŋ ¹³
082.	mushroom	so ⁵³

Ref. #	English	Lao Cai, Vietnam
068.	ears	me.nɔm ¹¹
069.	egg	kjaw ³⁵
070.	eye	mej ³³
071.	eyebrows	mej ³³ ma:j ³¹
072.	face	min ⁵²
073.	excrement	dej ⁴⁴
074.	finger	pu.dɔ ³¹
075.	thumbnail	pu.dɔ ³¹ waj ³⁵
076.	foot (surface)	θaw ³⁵ pen ⁴⁴
077.	hair of body	pje ²¹⁴
078.	hair of body2	-----
079.	hair of head	pi ³³ dɔŋ ²¹⁴
080.	hand	pu.pen ⁴⁴
081.	head	pje ⁴⁴
082.	heart	θin ²¹⁴ taw ³¹
083.	hip	ke.tjaŋ ⁴⁴ tuj ⁴⁴
084.	hoof	θaw ³⁵ dɔ ³¹ waj ³⁵
085.	horn	kjaŋ ²¹⁴
086.	intestine	klaŋ ¹¹
087.	leg	θaw ³⁵
088.	liver	gjen ⁵²
089.	lungs	klum ⁵²
090.	milk	nu ⁴⁴

Ref. #	English	Luang Nam Tha, Laos
083.	sugarcane	kum ³¹ ˈsa:13
084.	betelnut	θɛn ⁵³
085.	banana	kum ³¹ ˈkaw ³⁴¹
086.	papaya	-----
087.	mango	θin ³¹ dɔ ³⁴¹ pjo ³³
088.	coconut	mak ²¹ paw ³³ pjo ³³
089.	pineapple	dum ³¹ daw ³⁴¹ pjo ³³
090.	watermelon	kwa ⁵³ θaj ⁵³
091.	apple	mak ²¹ ˈpom ³¹ pjo ³³
092.	eggplant	kə.daj ³³
093.	peanut	tə.bwe ³³ ni ³⁵
094.	ginger	θuj ³⁵
095.	garlic	tun ³⁵ pje ³³
096.	rice husk	buj ³⁵
097.	sweet potato	dɔj ³¹ dun ⁵³
098.	potato	fə.laj ⁵³ ˈdɔj ³¹
099.	taro	hoʔ ¹¹
100.	pumpkin	gjaŋ ³³ kwa:ː ³³
101.	cucumber	kwa ⁵³
102.	carrot	tə.bak ²¹ pjo ³³
103.	tomato	pjaw ³³ pjo ³³
104.	green bean	tə.bwe ³³ miŋ ⁵³
105a.	sesame	θa ³⁵ pɛ ²¹ (white)

Ref. #	English	Lao Cai, Vietnam
091.	mouth	dɛt ³³
092.	mucus	blut ³³
093.	neck	klaj ²¹⁴
094.	nest	gjaw ³⁴¹
095.	nose	pu.tɔŋ ²¹⁴
096.	pus	nuŋ ³³
097.	ribs	nɔ ¹¹ tam ⁴⁴ θuj ⁴⁴
098.	saliva	dɑ:n ¹¹
099.	shoulder	pe.taw ¹¹
100.	skin	tə.dup ³¹
101.	tail	tɛj ⁴⁴
102.	tears	mɛj ³³ wɛm ²¹⁴
103.	thigh	θaw ³⁵ bɔŋ ³⁵
104.	toe	θaw ³⁵ dɔ ³¹
105.	tongue	bjet ³³
106.	tusk	na:11
107.	boil/ulcer	bew ³⁴¹
108.	urine	wa ³⁴¹
109.	waist	klaj ⁴⁴
110.	chin	-----
111.	heel	-----
112.	navel	-----
Nature		

Ref. #	English	Luang Nam Tha, Laos
105b.	sesame	θa ³⁵ kja ⁵³ (black)
106.	onion	tɔŋ ³³ pɔŋ ³³
107.	soybean sprout	tə.bwe ³³ na: ³¹
108.	ingredients	aŋ ³³ jin ³⁵ θə.daj ³³
109.	salt	daw ³³
110.	oil	maj ³⁵
111.	soy sauce	θə.koŋ ⁵³ kja:ŋ ⁵³
112.	sugar	toŋ ³¹ van ¹³
113.	white sugar	toŋ ³¹ van ³³ pe ²¹
114.	spices	-----
115.	black pepper	haw ³¹ θiw ⁵³ pjo ³³
116.	boiling water	wɔm ⁵³ vej ¹³
117.	tea	θa: ³¹
118.	wine	blaw ³¹ θe ⁵³ tiw ³³
119.	cigarette	jin ³⁵ bja:t ³¹
120.	to smoke	hɔp ³⁵ jin ³⁵ bja:t ³¹
121.	to cook (rice)	θo ³³ naŋ ³⁵
122.	to wash rice	daw ³³ naŋ ³⁵
123.	to cut into pieces	θap ³¹
124.	to cut into slices	pi ¹¹
125.	to chop/mince	dəj ³⁵
126.	cutting board	θum ³¹ dεŋ ³¹
127.	wood	θaŋ ³¹

Ref. #	English	Lao Cai, Vietnam
113.	bank river	wem ²¹⁴ sin ³¹
114.	cave	ŋja:m ¹¹
115.	cliff	gjaw ²¹⁴ pje ³¹
116.	cloud	ven ³⁵
117.	copper	tɔŋ ¹¹
118.	ditch	θin ³⁵ wem ²¹⁴
119.	earth	ni ⁵²
120.	fog	kja: ³⁵
121.	forest	kim ¹¹
122.	gold	sem ²¹⁴
123.	iron	gja: ⁵²
124.	lightening	bun ³³ bit ³¹ to ⁵²
125.	mountain	θɔŋ ²¹⁴
126.	mud	pa:m ³³
127.	pond	bjaw ³⁴¹ kla:ŋ ¹¹
128.	rain	bun ³³ tu ⁵²
129.	river	kɔj ³³
130.	salt	da:w ³³
131.	sand	gjaw ²¹⁴ θa:t ²¹⁴
132.	silver	na:n ¹¹
133.	sky	guŋ ¹¹
134.	stone	gjaw ²¹⁴
135.	sun	me.nɔj ⁵²

Ref. #	English	Luang Nam Tha, Laos
128.	frying pan	ʔɛŋ ³⁵
129.	to stir	mun ³¹
130.	to knead (a dough)	nɯj ³¹
131.	to pound (garlic)	ʔup ³⁵
132.	to put in (ingredients)	ʔuŋ ³³ liw ²¹
133.	to pour over	kuŋ ³³ naŋ ³³
134.	to squeeze	nɛŋ ³³
135.	to crack an egg	bɔ ⁵³ kjaw ¹³
136.	to boil	ʔo ³³
137.	to stir fry, to fry	ʔa:w ¹¹
138.	to fry in fat/oil	ʔin ¹³
139.	to steam	saŋ ⁵³
140.	to roast	si ⁵³
141.	to bake	up ³¹
142.	to taste	dɔp ²¹
143.	to set the table	bin ³³ ʔoŋ ³⁴¹
144.	cover	gaj ¹³
145.	to dip	nam ³⁴¹
146.	bowl	wan ³³
147.	dish	ban ³¹
148.	chopsticks	ʔo ²¹
149.	spoon	ʔə.kun ⁵³
150.	bottle	nɛw ²¹

Ref. #	English	Lao Cai, Vietnam
136.	sunshine	guŋ ¹¹ kjɔm ²¹⁴
137.	thunder	bu.koŋ ²¹⁴
138.	water	wɛm ²¹⁴
139.	wind	ɗa:w ³⁵
140.	(corrupt file)	-----
Vegetable/Food		
141.	banana	kum ¹¹ ʔaw ³⁴¹
142.	banana flower	ke.ɗu ²¹⁴
143.	banana leaf	ʔiw ¹¹ nɔm ³¹
144.	bean	tɔp ³³
145.	cabbage	nɛ ¹¹ gjaŋ ³⁵
146.	chili pepper	ɗuŋ ³³ maɪ ³³
147.	cogongrass	gaŋ ²¹⁴
148.	corn	buŋ ³³ mɛj ³⁴¹
149.	cotton	buŋ ³³ min ³¹
150.	cucumber	kwa ²¹⁴ kjo ³¹
151.	eggplant	ke.taŋ ⁴⁴
152.	fat	mɛj ⁵²
153.	flower	faŋ ¹¹
154.	fruit	pjo ⁴⁴
155.	garlic	tun ⁵²
156.	grass	ma: ³³
157.	indigo	gam ¹¹

Ref. #	English	Luang Nam Tha, Laos
151.	cup	ʔɔk ²¹
152.	to grow	sɔŋ ¹³
153.	sprout	blaw ³¹ ja:ŋ ⁵³
154.	to sprout	pju ³³ na: ³¹
155.	tree shade	gjaŋ ¹³ glom ¹³
156.	petals of a flower	nɛp ⁵³
157.	to ripen	su ¹¹
158.	peel	lut ³⁵
159.	bean	tɔp ³¹
160.	to wither	gju ³¹
161.	to decay	ɔt ⁵³
Animals		
162.	animal	θuŋ ³⁵ haw ³³
163.	tiger	gja:n ³¹
164.	bear	kjap ²¹
165.	deer	kim ³³ ɔaj ³¹
166.	monkey	du ⁵³ kuk ³⁵
167.	rabbit	tu ³⁵
168.	porcupine	daj ²¹
169.	dog	klu ³³
170.	to bark	kuŋ ¹³
171.	to bite	tap ³¹
172a.	cat	ma:w ³¹

Ref. #	English	Lao Cai, Vietnam
158.	leaf	nɔm ¹¹
159.	medicine	ma: ³³
160.	melon	kwa ²¹⁴
161.	mushroom	so ²¹⁴
162.	pumpkin	kjeŋ ¹¹ kwa ²¹⁴ waj ³¹
163.	rice	blaw ¹¹
164.	rice glutinous	me ³³ blet ³³
165.	rice grilled	me ³³ kaw ³³
166.	porridge	naŋ ³¹ su ³⁵
167.	ricedgi.wav	sɔŋ ³⁵
168.	rice spike	nin ⁴⁴ bla:w ³¹
169.	soup	je ³³ wem ²¹⁴
170.	sugarcane	ku ¹¹ sa: ³⁵
171.	taro	ho ³³ bu ³³
172.	thorn	ɗim ⁴⁴
173.	tobacco	jin ³¹ ʔaj ³⁴¹
174.	tree	gja:ŋ ³⁵
175.	tree trunk	gjaŋ ³⁵ θin ⁵²
176.	vegetable	gjej ²¹⁴
177.	wine/alcohol	tiw ⁴⁴
178.	moss	-----
179.	mustards	-----
180.	onion	-----

Ref. #	English	Luang Nam Tha, Laos
172b.	cat	-----
173.	pig	tuj ³⁴¹
174.	cow	ɲɔŋ ³³ wa:ŋ ³¹
175.	milk	nu ³³
176.	buffalo	ɲɔŋ ³³ bu ¹¹
177.	horn	kjoŋ ⁵³
178.	tail	təj ³³
179.	elephant	kjaŋ ³⁴¹
180.	bird	no ²¹
181.	bird's nest	no ²¹ gjaw ³⁴¹
182.	wing	dat ⁵³
183.	feather	no ²¹ pje ⁵³
184a.	to fly	daj ³⁵
184b.	to fly	-----
185.	egg	kjaw ¹³
186.	chicken	tə ⁵³
187.	duck	aɲ ⁵³
188.	fish	bjaw ³⁴¹
189.	snake	naŋ ⁵³
190.	house lizard	kə.dun ³¹
191.	turtle	tu ²¹
192.	crocodile	tu ³³ pe ³⁴¹ tu ³³ da:n ³¹
193.	frog	təŋ ³³

Ref. #	English	Lao Cai, Vietnam
181.	pomelo	-----
Concepts		
182.	dream	be ³⁵
183.	name	bu ³⁵
184.	price	pe.laj ⁵²
Time		
185.	afternoon	kaj ³³ dam ³⁵
186.	day	me.nɔj ⁵² .ka: ³⁵
187.	evening	da:m ³³
188.	midday	me.nɔj ⁵² .ka: ³⁵
189.	moon	la: ⁴⁴
190.	morning	be.tɔm ²¹⁴ gjo ³¹
191.	night	da:m ³³
192.	year	n.aŋ ⁵²
193.	new year	-----
People		
194.	ancestor	θəm ¹¹ sew ⁴⁴
195.	bride	n.ɔm ²¹⁴
196.	o. brother	tə ¹¹
197.	y. brother	jo ³⁴¹
198.	child	mun ¹¹ sej ⁴⁴
199.	daughter	mun ¹¹ sa ⁵²
200.	descendant	se ⁴⁴ θun ²¹⁴

Ref. #	English	Luang Nam Tha, Laos
194.	tadpole	ʔɛŋ ³³ plɔŋ ¹³
195.	spider	kjiŋ ⁵³ na: ³³
196.	spider web	kjiŋ ⁵³ na ³³ θa:ŋ ⁵³
197a.	louse (head)	-----
197b.	louse (head)	θe ¹¹
198.	termite	sə.blaw ³¹
199.	cockroach	bjan ³⁴¹
200.	snail	kwe ⁵³
201.	mosquito	kim ⁵³ ʔaj ⁵³
202.	bee	məj ³⁴¹
203.	fly	kjiŋ ⁵³ gjam ³⁵
204.	butterfly	pluŋ ³¹ blo ³⁴¹
205.	scorpion	θap ³¹ kɔŋ ⁵³
206.	earthworm	duŋ ³¹ na:ŋ ⁵³
Body		
207.	head	pje ³³
208.	face	min ³⁵
209.	brain	pje ³³ le ²¹
210.	hair	pje ³³ doŋ ⁵³
211.	forehead	min ³⁵ dup ²¹
212.	eyebrow	məj ²¹ jap ³⁵ pje ⁵³
213.	eye	məj ²¹
214.	eyelid	məj ²¹ dup ²¹

Ref. #	English	Lao Cai, Vietnam
201.	father's older brother	pɛ ²¹⁴
202.	father's younger brother	jo ³⁴¹
203.	grandfather	klaw ³⁴¹
204.	grandmother	bo ³⁴¹
205.	groom	laŋ ¹¹
206.	guest	ʔɛ ⁵²
207.	host, owner	pjaw ³¹ mun ³¹
208.	husband	fa ⁴⁴
209.	lover	mun ¹¹ -j ³⁵
210.	man	mun ¹¹ fa ⁴⁴
211.	mother's brother	naŋ ³⁴¹
212.	mother's mother	di ⁴⁴
213.	mother	di ³⁴¹
214.	mother's sister	ʔu ¹¹
215.	o. sister	o ³⁴¹
216.	y. sister	mu ³³
217.	son	mun ¹¹ ʔɔn ²¹⁴
218.	widow	gjem ³³ fa ⁴⁴ aw ⁴⁴
219.	wife	aw ⁴⁴
220.	woman	mun ¹¹ di ³⁴¹
221.	artisan	-----
222.	daughter-in-law	-----
223.	nung	-----

Ref. #	English	Luang Nam Tha, Laos
215.	nose	bu.tɔŋ ⁵³
216.	cheek	min ³⁵ .uj ⁵³
217.	ear	mə.nɔm ³¹
218.	mouth	dɛt ²¹
219.	tongue	bjet ³¹
220a.	saliva	dən ³¹ .wɔm ⁵³
220b.	saliva	-----
221.	tooth	n.a: ³¹
222.	gums	n.a: ³¹ .lɔŋ ³⁵
223.	chin	kləŋ ⁵³ .ŋam ³⁴¹
224.	beard	dɛt ²¹ θəm ³⁵
225.	back	tan ³³ .kam ⁵³
226.	navel	n.o ¹¹ .dɔt ⁵³ .kla:ŋ ⁵³
227.	heart	θim ⁵³ .ta:w ³¹
228.	lungs	klum ³⁵
229.	liver	gjan ³⁵
230.	intestines	kla:ŋ ³¹
231.	hand	pu ³⁴¹
232.	elbow	θe ³¹ .dɔŋ ⁵³
233.	armpit	kə.dap ³¹ .dij ³³
234.	palm	pu ³⁴¹ .pin ³³
235.	finger	pu ³⁴¹ .dɔ ⁵³
236.	finger nail	pu ³⁴¹ .dɔ ⁵³ .waj ¹³

Ref. #	English	Lao Cai, Vietnam
224.	widower	-----
Apparel		
225.	blouse	gjem ⁴⁴
226.	bracelet	sam ¹¹
227.	cloth	buj ³⁵
228.	clothing	ŋuj ²¹ .kwa ⁵²
229.	comb	ka ²¹⁴
230.	earring	bin ⁵²
231.	needle	θim ⁵²
232.	ring	pu.dɔ ¹¹ .kwin ⁵²
233.	shirt/tunic	guj ²¹⁴
234.	skirt	ʃun ¹¹
235.	thread	θuj ⁵²
236.	trousers	kwa ⁵²
Tools		
237.	awl	θun ²¹⁴
238.	axe	pəw ⁴⁴
239.	bag	ti ³³
240.	basket i	gjan ¹¹ .maw ³¹
241.	basket ri	gjem ³⁴¹
242.	basket wi	saŋ ⁵²
243.	bowl	wən ⁴⁴
244.	chopsticks	ʃəw ³³

Ref. #	English	Luang Nam Tha, Laos
237.	buttocks	kə.daj ³³
238.	leg	θaw ³³ klɑ:ŋ ⁵³
239.	thigh	θaw ³³ bɔŋ ³³
240.	knee	ni ³⁵ toŋ ⁵³
241.	calf	θaw ³³ ɕiŋ ³³
242.	shin	θaw ³³ min ³⁵
243.	foot	θaw ¹³
244.	heel	θaw ³³ ɕeŋ ⁵³
245.	bone	θuŋ ³³
246.	rib	la ³¹ taŋ ³³ θuŋ ³³
247.	flesh	a ³³ ɕaj ⁵³
248.	fat	məj ³⁵ pi ³¹
249.	skin	dup ²¹
250.	blood	sam ¹¹
251.	sweat	ha:n ¹¹
252.	pus	saj ³¹ nuŋ ²¹
253.	excrement	daj ³³
254.	urine	wa ³⁴¹
People		
255.	I (1s)	ja ⁵³
256.	thou (2s)	məj ³¹
257a.	he/she/it	θi ⁵³
257b.	he/she/it	mun ³¹

Ref. #	English	Lao Cai, Vietnam
245.	fire	tew ³¹
246.	fire tongs	pja ⁴⁴
247.	fishnet	le ³³
248.	hammer	pəw ⁴⁴
249.	harrow	tuj ¹¹ pa ¹¹
250.	hoe	nɛw ²¹⁴
251.	knife	ɕu ³³
252.	masher	kum ³³ so ⁵²
253.	plane	tuj ¹¹ paw ³³
254.	plow	tuj ¹¹ kjaj ¹¹
255.	carrying pole	ne.muj ⁵²
256.	rope	laŋ ³⁵ vin ⁵²
257.	sickle	ku ³¹ to ²¹⁴
258.	anvil	-----
259.	chisel	-----
260.	peg	-----
261.	pot	-----
Town		
262.	ashes	saj ³³
263.	bed	ʰo ⁵²
264.	blanket	θɔŋ ⁵²
265.	boat	ɕaj ³³
266.	bridge	ʰo ¹¹

Ref. #	English	Luang Nam Tha, Laos
258.	we (1p)	pan ³¹ ti ³¹ doj ³¹
259.	you (2p)	nɔ ³¹
260a.	they	θi ³¹ tin ³¹ doj ³¹
260b.	they	-----
261.	man	mun ³¹ ton ⁵³
262.	woman	mun ³¹ di ³⁴¹
263.	father	fa: ³³
264.	mother	di: ³⁴¹
265.	child	sej ³³
266.	husband	la:ŋ ³¹
267.	wife	aw ³³
268.	widow	mun ³¹ di ³⁴¹ kwa. ³³
269.	brother (elder of f)	pɛ: ⁵³
270.	brother (elder of m)	puj ³³
271.	sister (elder of f)	n:a:m ⁵³
272.	sister (elder of m)	hej ³¹
273.	brother(younger of f)	jo ³⁴¹
274.	brother(younger of m)	naw ³⁴¹
275.	sister (younger of f)	mu ²¹
276.	sister (younger of m)	θaj ¹³
277a.	friend	pɛw ³⁵
277b.	friend	lo ³³ toj ²¹
278.	name	bu ¹³

Ref. #	English	Lao Cai, Vietnam
267.	charcoal	tew ³¹ tan ⁵²
268.	coop	ɬe ²¹⁴ ko ⁵²
269.	dock, boat	bɛj ¹¹
270.	door	kjeŋ ¹¹
271.	firewood	θaŋ ¹¹
272.	garden	ɬin ⁵²
273.	grave	θo ⁴⁴
274.	house	pjaw ⁴⁴
275.	mat	si ³³
276.	paddy	giŋ ³³¹ ɔ ⁵²
277.	pillow	toŋ ¹¹ ɬam ³⁵
278.	plot dry	gjaŋ ³⁵
279.	wet field	giŋ ¹¹
280.	road	kjaw ⁴⁴
281.	stairs/ladder	kjaw ⁴⁴ ka ³⁵
282.	village	gjeŋ ³⁴¹
283.	well (water)	twem ¹¹ ko ³⁵
Description		
284.	wide	kwaŋ ⁴⁴
285.	white	pɛ: ³³
286.	wet	ɬon ²¹⁴
287.	sweet	gam ²¹⁴
288.	sticky	bla ²¹⁴

Ref. #	English	Luang Nam Tha, Laos
Home		
279.	village	gjaŋ ³⁴¹
280.	road, path	kjaw ³³
281.	boat	daŋ ¹¹
282.	house	pjaw ³³
283.	door	kjeŋ ³¹
284.	window	kjeŋ ³¹ kjaŋ ⁵³
285.	roof	pjaw ³³ tuj ¹³
286.	wall of house	pjaw ³³ gɔŋ ³⁴¹
287.	pillow	tuj ³¹ ɔm ¹³
288.	blanket	θɔŋ ³⁵
289.	mat	tuj ³¹ tim ²¹
290.	clothing	guj ⁵³
291.	to weave (cloth)	puj ³³ kan ³⁵
292.	to dye (cloth)	naum ³³ puj ¹³
293.	trousers	kwa: ³⁵
294.	to sew	gɔŋ ³¹
295.	needle	θim ³⁵
296.	comb	ʔa ⁵³
297.	ring (finger)	mun ³³ se ³³ geŋ ¹³
298.	paper, cord	ʔe ³³
299.	pot (cooking-)	mɔ ³³
300.	spoon	ʔə ³¹ kun ⁵³

Ref. #	English	Lao Cai, Vietnam
289.	spicy	bjat ³³
290.	sour	θuj ⁵²
291.	soft	sɔt ³³
292.	smelly	θeɰ ³⁵
293.	slick	blaŋ ³³
294.	short	ham ⁵²
295.	salty	daj ¹¹
296.	rotten	ɟɔt ¹¹
297.	ripe	a ³³ su ³⁵
298.	right side	bjaw ³³ pu ³¹
299.	red	θi ⁵²
300.	raw	a ⁴⁴ ŋjim ³⁴¹
301.	old	lo ³⁵ naŋ ³¹
302.	new	saŋ ³³ naŋ ³¹
303.	near	θat ³³
304.	narrow	it ³³
305.	low	ha ⁵²
306.	light weight	so ⁵²
307.	left	θaj ³³ bu ³⁴¹
308.	late	an ³⁵
309.	inside	gja ³⁴¹
310.	hot	kjɔm ²¹⁴
311.	high	gjaŋ ⁵²

Ref. #	English	Luang Nam Tha, Laos
301.	fire	to ³⁴¹
302.	ashes	to ³⁴¹ sa:j ¹¹
303.	smoke	to ³⁴¹ so ³⁵
304.	candle	ʈo ⁵³
305.	to move	θuj ¹¹
306.	coffin	bin ³³
307.	tools	ʌ.ðaj ³³
308.	scissors	ɗu ²¹
309.	knife	ɗu ²¹ ðem ³¹
310.	to sharpen a knife	ɗo ³⁵ ɗu ²¹
311.	to pierce	lɔm ³⁵
312.	hammer	ban ³³ ɗe ⁵³
313.	to hammer	kəj ³⁵
314.	axe	po ³³
315.	to roll	pluj ⁵³
316.	ropes	la:ŋ ³⁵
317.	basket	dan ⁵³
318.	whistle	no ³³ ɗɔŋ ³¹
319.	matches	jaŋ ⁵³ ho ³³
Verbs		
320.	to hear	tu ⁵³ nuŋ ³⁵
321.	smell	si ³³ da:ŋ ⁵³
322.	to see	fat ²¹

Ref. #	English	Lao Cai, Vietnam
312.	heavy	ni ³³
313.	hard	ŋeŋ ³³
314.	green	məŋ ²¹⁴
315.	good	gɔŋ ³³ ve ³⁴¹
316.	full	bɔŋ ⁵²
317.	fragrant	ɗaŋ ²¹⁴
318.	fishy	θe ³³ diŋ ⁵²
319.	far	gɔ ²¹⁴
320.	early	gjo ⁴⁴
321.	dry	gaj ⁵²
322.	dead	ɗaj ³³
323.	cool	θiŋ ³⁵
324.	cold	sɔŋ ⁴⁴
325.	blind	məj ³³ bu ³³
326.	black	gja: ²¹⁴
327.	bitter	im ²¹⁴
328.	below	di ⁴⁴
329.	bad	ho ³³
330.	alive	saŋ ³¹
331.	above	ʈəj ³³
332.	yellow	waŋ ¹¹
Verbs		
333.	to wash	daw ³⁵

Ref. #	English	Luang Nam Tha, Laos
323.	to wink	dip ²¹ məj ²¹
324.	to weep	ha:w ³¹
325.	to eat	nin ³³
326.	to swallow	na ⁵³
327.	to be hungry	nə ³¹ sa ¹³
328.	to be full	piw ³³
329.	to be thirsty	nə ³¹ ga:t ³¹
330.	to drink	həp ³⁵ wəm ⁵³
331.	to be drunk	bin ⁵³
332.	to vomit	u ³³
333.	to spit	də ³⁴¹ də:n ⁵³
334.	to cough	saɲ ³¹ ha ³⁵
335.	to sneeze	saɲ ³¹ ha ³⁵ kjan ⁵³
336.	to yawn	kaw ³¹ ŋəp ⁵³
337.	to breathe	təŋ ³³ si ³⁵
338.	to blow	pjəm ³³
339a.	to suck	dut ⁵³
339b.	to suck	həp ³⁵
340.	to lick	klim ³⁴¹
341.	to smile	kjət ²¹
342.	to laugh	kjət ²¹
343.	to speak	kəŋ ³³
344.	to tell	bu ¹³

Ref. #	English	Lao Cai, Vietnam
334.	to write	kja ⁴⁴
335.	to walk	jaŋ ³³ θaw ³⁵
336.	to wait	tɯ ⁴⁴
337.	to tell	-----
338.	to tear	tɕ ⁵²
339.	to talk	kə ⁵² wa ³⁵
340.	to swim	kjo ¹¹
341.	to stoke	su ¹¹
342.	to stir	law ⁴⁴
343.	to steam	naŋ ³⁵ saɲ ²¹⁴
344.	to steal	aɲ ³³ θa ³⁵
345.	to stand	θə ⁴⁴
346.	to soak	θə ³³ wəm ²¹⁴
347.	to smoke	həp ⁵² jin ²¹⁴
348.	to smell	həm ⁵²
349.	to sleep	fəj ³⁵
350.	to slash	daw ⁴⁴
351.	to sit	gjet ³³
352.	to set trap	niŋ ¹¹ θi ⁵²
353.	to sell	maɲ ³³
354.	to see	məŋ ³³
355.	to scrape	gwit ⁵²
356.	to scold	ma ³³

Ref. #	English	Luang Nam Tha, Laos
345.	to shout	ha:m ³⁵
346.	to answer	ta:w ⁵³
347.	to lie, fib	puŋ ³³ ma:w ³¹
348a.	to sing	aŋ ¹¹ ɬuŋ ⁵³
348b.	to sing	-----
349.	to think	ne ³¹
350.	to know	pəj ⁵³
351.	to forget	no ¹¹ kɔ ³³
352.	to love	oŋ ¹³
353.	to hate	han ¹¹
354.	to wait	tu ³³
355.	to count	θa:w ¹¹
356.	to be afraid	kum ³¹ ɬa: ³³
357.	to be angry	si ²¹
358.	to sleep	fəj ¹³
359.	to snore	da:n ³¹
360.	to dream	bwe ¹³
361.	medicine	ma: ¹¹
362.	to itch	seɪ ³⁵
363.	to scratch	na:ŋ ³³
364.	to shiver	sin ¹³
365.	to die	taj ²¹
366.	ghost	ma:n ¹¹

Ref. #	English	Lao Cai, Vietnam
357.	to run	tju ⁵²
358.	to roast	si ²¹⁴
359.	to roar	haw ¹¹
360.	to ride horse	ɬe ¹¹ ma ³⁴¹
361.	to return	law ³⁴¹
362.	to rest	ni ³¹ gan ⁵²
363.	to remember	saj ³⁵
364.	to pull gr	bɛŋ ¹¹ ma ³⁵
365.	to pull	da:n ³⁵
366.	to pat	bɛ ⁵²
367.	to open mr	gɔj ⁵²
368.	to mow	gwan ⁵²
369.	to marry w	ɬo ¹¹ aw ⁴⁴
370.	to marry d	naj ³⁵ la:ŋ ¹¹
371.	to like	oŋ ³⁵
372.	to know	pe ²¹⁴
373.	to kill	dɛj ³⁵
374.	to hone kn	ɬo ⁵² tu ³³
375.	to hide	mɛm ⁴⁴
376.	to hear	muŋ ⁵²
377.	to go	niŋ ¹¹
378.	to give	fɛn ²¹⁴
379.	to give birth	juŋ ³⁴¹

Ref. #	English	Luang Nam Tha, Laos
367.	to sit	θəj ³⁴¹
368.	to stand	θow ²¹
369.	to kneel	kwe ²¹
370.	to walk	ja:ŋ ³¹
371.	to crawl	nəŋ ⁵³
372.	to come	ta:j ⁵³
373.	to enter	ɬa ²¹
374.	to return	fun ³³ da:ŋ ⁵³
375.	to push	nəŋ ¹¹
376.	to pull	dan ¹³
377.	to kick	tɪ ³³
378a.	to throw	biw ³⁵
378b.	to throw	gweŋ ²¹
379.	to fall	tuj ⁵³
380.	to swim	kjo ³¹ wəŋ ⁵³
381.	to give	fun ⁵³
382.	to tie	θaj ³⁵
383.	to wipe	θət ³⁵
384.	to hit	paŋ ¹³
385.	to split	paj ³⁵
386.	to cut (hair)	te ³⁵ pje ³³
387.	to stab	lɔm ³⁵
388.	to grind	ma: ³¹

Ref. #	English	Lao Cai, Vietnam
380.	to fry	ka:w ³³
381.	to forget	nə ³³ gɔ ⁵²
382.	to fly	dɛj ⁵²
383.	to fear	kun ¹¹ ja ⁵²
384.	to fall down	klɪŋ ³⁴¹
385.	to explode	tɔ ³³
386.	to eat	nain ³³
387.	to sun dry	faj ⁵²
388.	to drink	hɔp ⁵²
389.	to draw water	dan ³⁵
390.	to drain	goj ⁵² wem ²¹⁴
391.	to dip	gwa ⁵²
392.	to die	daj ³³
393.	to cut w/ scissors	gɟap ³³
394.	to cut w/ knife	gat ³¹
395.	to crow	aj ³³ gaj ³⁵
396.	to cook	ʔə ⁴⁴
397.	to come	taw ⁵²
398.	to chew	nəaj ⁵²
399.	to chase	luj ³³
400.	to carry	dam ²¹⁴
401.	to buy	maj ³⁴¹
402.	to blow	pjɔm ⁴⁴

Ref. #	English	Luang Nam Tha, Laos
389.	to plant	-----
390.	to dig	wiʰ ⁵³
391.	to bury (a corpse)	θo ³³
392.	to dry (sth.)	fa:j ³⁵
393.	to pound (rice)	ʰup ³⁵ mej ¹¹
394.	to boil (sth.)	-----
395a.	to burn	pu ³³
395b.	to burn	-----
396.	to work	aj ³³ guj ³³ po ⁵³
397.	to play	blan ³³
398.	to dance	tiw ³¹ pa:ʰ ¹¹
399.	to shoot	fan ³³
400.	to hunt	niŋ ³³ kim ³¹
401.	to fight	ʰeŋ ⁵³
402.	to buy	maj ³⁴¹
403.	to sell	maj ²¹
404.	to exchange	tiŋ ³¹ wan ²¹
405.	to steal	aj ³³ θa ²¹
406.	to disappear	ma ³³ ʂeʰ ³¹ fa:n ¹³
Numbers		
407.	1 (person)	a ³³ lan ³¹
408.	2 (persons)	i ³³ la:n ³¹
409.	3 (persons)	pu ⁵³ la:n ³¹

Ref. #	English	Lao Cai, Vietnam
403.	to bite	tap ³³
404.	to be able	du ²¹⁴
405.	to bathe	dam ³¹ wem ²¹⁴
406.	to dark	ʰuŋ ³⁵
407.	to arrive	daj ¹¹
408.	to arise	θe ¹¹ kwɛ ³⁴¹
409.	to answer	kɔŋ ⁴⁴
Pronouns		
410.	to accept	nɔŋ ³³
411.	you (sg)	mej ¹¹
412.	we	pan ¹¹
413.	they	si ²¹⁴
414.	many	duŋ ³⁵
415.	I	ja ²¹⁴
416.	he	nen ¹¹
418.	you (pl)	no ¹¹
Numbers		
419.	1	ɔ ¹¹
420.	2	i ³⁵
421.	3	po ²¹⁴
422.	4	pje ²¹⁴
423.	5	pja ²¹⁴
424.	6	kjɔ ²¹⁴

Ref. #	English	Luang Nam Tha, Laos
410.	4 (persons)	pi ⁵³ lan ³¹
411.	5 (persons)	pja ⁵³ lan ³¹
412.	6 (persons)	kjo ⁵³ lan ³¹
413.	7 (persons)	ni ³¹ lan ³¹
414.	8 (persons)	jet ³¹ lan ³¹
415.	9 (persons)	du ³³ lan ³¹
416.	10 (persons)	sap ³¹ lan ³¹
417.	20 (persons)	ni ³¹ sap ³¹ lan ³¹
418.	30 (persons)	θam ³³ sap ³¹ lan ³¹
419.	40 (persons)	θe ³³ sap ³¹ lan ³¹
420.	50 (persons)	ŋo ³⁴¹ sap ³¹ lan ³¹
421.	60 (persons)	gu ³¹ sap ³¹ lan ³¹
422.	70 (persons)	ʔet ³⁵ sap ³¹ lan ³¹
423.	80 (persons)	pit ⁵³ sap ³¹ lan ³¹
424.	90 (persons)	ku ³³ sap ³¹ lan ³¹
425.	100 (persons)	a ³³ pe ⁵³ lan ³¹
426.	1,000 (persons)	a ³³ tin ³⁵¹ lan ³¹
427.	10,000 (persons)	sap ³¹ tin ³⁵¹ lan ³¹
428.	100,000 (persons)	a ³³ θe ³³ lan ³¹
429.	1,000,000 (persons)	a ³³ lan ³¹ lan ³¹
430.	to be many	du ³³ lan ³¹
431.	all	θoŋ ³³ du ³⁴¹
432.	some	ki ⁵³ klan ³¹

Ref. #	English	Lao Cai, Vietnam
425.	7	ni ³³
426.	8	jet ³³
427.	9	du ¹¹
428.	10	sap ¹¹
429.	11	sap ¹¹ bjet ³³
430.	12	sap ¹¹ ne ¹¹
431.	13	sap ¹¹ sam ²¹⁴
432.	14	sap ¹¹ θe ³⁵
433.	15	sap ¹¹ ŋo ³⁴¹
434.	16	sap ¹¹ gu ³³
435.	17	sap ¹¹ kjet ⁵²
436.	18	sap ¹¹ pit ³¹
437.	19	sap ¹¹ ku ⁴⁴
438.	20	ni ³³ sap ¹¹
439.	21	ni ³³ sap ¹¹ ne ¹¹
440.	100	ap ¹¹ pe ²¹⁴
441.	1000	a ¹¹ tin ⁵²

Ref. #	English	Luang Nam Tha, Laos	Ref. #	English	Lao Cai, Vietnam
433.	to be few	θɔ ²¹			
434.	half a unit	a ³³ fa:n ¹³			
Dimensions					
435.	to be big	lu ³⁵			
436.	to be small	kja:m ⁵³			
437.	to be long	da:w ³³			
438.	to be short (length)	niŋ ³³			
439.	to be tall	gjaŋ ³⁵			
440.	to be short (height)	ha: ³⁵			
441.	to be thick	hu ³⁵			
442.	to be thin	fa ²¹			
443.	to be fat	kun ²¹			
444.	to be wide, broad	gwaŋ ³³			
445.	to be narrow	dɛp ³¹			
446.	to be deep	du ⁵³			
447.	to be shallow	gjaŋ ³³			
448.	to be round	klun ³¹			
449.	to be full	pɔŋ ³³			
450.	right side	bja:w ³¹ fa:n ¹³			
451.	left side	θa: ³³ fa:n ¹³			
452a.	to be straight	dɛŋ ³¹			
452b.	to be straight	saŋ ¹³			
453.	to be far	ku ⁵³			

Ref. #	English	Luang Nam Tha, Laos	Ref. #	English	Lao Cai, Vietnam
454.	to be near	θat ²¹			
455.	this	ne ³³			
456.	that	wa. ³³			
Appearance					
457.	black	kja ⁵³			
458.	white	pɛ ²¹			
459.	red	θi ³⁵			
460.	green	mɛŋ ⁵³			
461.	yellow	wa:ŋ ³¹			
462.	to be dirty	klu ³¹			
463.	to be new	saj ³⁵			
464.	to be old	lu ³³ naŋ ⁵³			
465.	to be dark	dam ²¹			
466.	to be bright	gwaŋ ⁵³ daŋ ³⁵			
Taste/Feel					
467.	to be sweet	ka:m ⁵³			
468.	to be sour	θuj ³⁵			
469.	to be bitter	im ⁵³			
470.	to be spicy, hot	bja:t ³¹			
471.	to be rotten	-----			
472.	to be ripe	-----			
473.	to be dry	ga:j ³⁵			
474.	to be wet	don ⁵³			

Ref. #	English	Luang Nam Tha, Laos	Ref. #	English	Lao Cai, Vietnam
475.	to be hot	kjom ⁵³			
476.	to be cold	nam ¹³			
477.	to be sharp	gjaɰ ²¹			
478.	to be blunt	plun ¹³			
479.	to be heavy	ni ¹¹			
480.	to be hard	nɛŋ ³¹			
481.	to be smooth	ðɛŋ ³³ ðo ²¹			
Other Qualities					
482.	to be fast	kan ³³			
483.	to be slow	man ¹¹			
484b.	to be strong	nɛŋ ³³ gaŋ ³¹			
484a.	to be strong	kjoŋ ³³ paŋ ³⁵			
485.	to be weak	də.maj ³³ nup ³⁵			
486.	to be blind	məɰ ²¹ bu ¹¹			
487.	to be deaf	mə.nɔm ³¹ duŋ ⁵³			
488.	bald	pje ³³ ɬa:n ³³			
489.	naked	ɬe ³³ blan ⁵³			
490.	to be good	ɡɔŋ ¹³			
491.	to be bad	ma ³¹ ɡɔŋ ¹³			
492.	to be correct	hɔ ³³ ɬo ²¹			
493.	to be wrong	pɛw ³³			
494.	warm	kjom ⁵³ bɔŋ ³¹			
495.	cool	θiŋ ¹³			

Ref. #	English	Luang Nam Tha, Laos
496.	difficult	ʰo ²¹
497.	easy	həj ¹¹
498.	loose	lom ¹¹
Question Words		
499.	when	toj ³¹ nɔj ³⁵
500.	where	jam ⁵³ ti ¹³
501.	who	man ³⁵
502.	what	nin ³⁴¹ to ³⁵
503.	how many	bu ³¹ la:j ³⁵

Ref. #	English	Lao Cai, Vietnam
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APPENDIX B

EVIDENCE OF CONSONANTAL CONTRAST IN LAO

KIM MUN

Phonemes	Type of Contrast	Number	Gloss	Minimal Pairs/ Analogous Pairs
/p/ : /b/	CIE	#270	brother (elder of mother)	/puj ³⁵ /
		#096	rice husk	/bu ³⁵ /
	CNE	#395	to burn	/pu ³³ /
		#278	name	/bu ¹³ /
/t/ : /d/	CNE	#261	man	/mun ³¹ tɔn ⁵³ /
		#474	to be wet	/dɔn ⁵³ /
	CNE	#346	to answer	/ta:w ⁵³ /
		#437	to be long	/da:w ³³ /
/k/ : /g/	CIE	#230	intestines	/kla:ŋ ³¹ /
		#055	swamp	/gla:ŋ ³¹ /
	CNE	#343	to speak	/kɔŋ ³³ /
		#490	to be good	/gɔŋ ¹³ /
/θ/ : /s/	CIE	#459	red	/θi ³⁵ /
		#022	weather	/si ³⁵ /
	CNE	#127	firewood	/θa:ŋ ³¹ /
		#463	to be new	/saŋ ³⁵ /
/θ/ : /f/	CIE	#382	to tie	/θa:j ³⁵ /
		#392	to dry sth.	/fa:j ³⁵ /
	CIE	#454	to be near	/θat ²¹ /
		#322	to see	/fat ²¹ /
/f/ : /v/	CNE	#399	to shoot	/fan ³³ /
		#012	cloud	/van ¹³ /
/f/ : /ð/	CNE	#392	to dry sth.	/fa:j ³⁵ /
		#307	tools	/tə.ðaj ³³ /
/s/ : /h/	CNE	#250	blood	/sa:m ¹¹ /
		#251	sweat	/ha:n ¹¹ /
	CNE	#157	to ripen	/su: ¹¹ /
		#441	to be thick	/hu: ³⁵ /

Phonemes	Type of Contrast	Number	Gloss	Minimal Pairs/ Analogous Pairs
/θ/ : /ð/	CNE	#368	to stand	/θo ²¹ /
		#481	to be smooth	/ðeŋ ³³ ðo ²¹ /
	CNE	#451	left side	/θaj ³³ fa:n ¹³ /
		#307	tools	/tə.ðaj ³³ /
/θ/ : /t/	CNE	#094	ginger	/θuŋ ³⁵ /
		#173	pig	/tuŋ ³⁴¹ /
	CIE	#468	to be sour	/θuŋ ³⁵ /
		#060	to flow	/tuŋ ³⁵ /
/ð/ : /d/	CNE	#481	to be smooth	/ðeŋ ³³ ðo ²¹ /
		#452a	to be straight	/deŋ ³¹ /
	CNE	#307	tools	/tə.ðaj ³³ /
		#253	excrement	/da:j ³³ /
/t/ : /d/	CNE	#136	to boil	/to ³³ /
		#333	to spit	/do ³⁴¹ da:n ⁵³ /
	CNE	#137	to stir fry, to fry	/tə:w ¹¹ /
		#017	wind	/da:w ¹³ /
/t/ : /t/	CNE	#170	to bark	/təŋ ¹³ /
		#173	pig	/tuŋ ³⁴¹ /
	CNE	#354	to wait	/tu ³³ /
		#167	rabbit	/tu ³⁵ /
/d/ : /d/	CNE	#017	wind	/da:w ¹³ /
		#437	to be long	/da:w ³³ /
	CNE	#126	cutting board	/təm ³¹ dəŋ ³¹ /
		#452a	to be straight	/deŋ ³¹ /
/m/ : /n/	CNE	#299	pot (cooking)	/mɔ ³³ /
		#180	bird	/nɔ ²¹ /
	CNE	#460	green	/meŋ ⁵³ /
		#134	to squeeze	/neŋ ³³ /
/n/ : /n/	CNE	#134	to squeeze	/neŋ ³³ /
		#480	to be hard	/nəŋ ³¹ /
	CNE	#455	this	/ne ³³ /
		#349	to think	/nə ³¹ /

Phonemes	Type of Contrast	Number	Gloss	Minimal Pairs/ Analogous Pairs
/n̥/ : /ŋ/	CNE	#375	to push	/n̥ɔŋ ¹¹ /
		#176	buffalo	/ŋɔŋ ³³ bu ¹¹ /
/w/ : /j/	CNE	#254	urine	/wa ³⁴¹ /
		#255	I	/ja ⁵³ /
	CIE	#461	yellow	/waŋ ³¹ /
		#370	to walk	/jaŋ ³¹ /
/w/ : /v/	CNE	#146	bowl	/wan ³³ /
		#112	sugar	/toŋ ³¹ van ¹³ /

APPENDIX C

EVIDENCE OF VOWEL CONTRAST IN LAO KIM MUN

Phonemes	Type of Contrast	Number	Gloss	Minimal Pairs/ Analogous Pairs
/i/ : /e/	CNE	#410	4 (persons)	/pi ⁵³ la:n ³¹ /
		#425	100 (persons)	/a ³³ pe ⁵³ la:n ³¹ /
	CNE	#260	they	/θi ³¹ tin ³¹ doj ³¹ /
		#051	steel	/θe ⁵³ tuj ³⁴¹ /
/e/ : /ɛ/	CNE	#209	brain	/pje ³³ le ²¹ /
		#458	white	/pe ²¹ /
/ɛ/ : /a/	CNE	#134	to squeeze	/neŋ ³³ /
		#133	to pour over	/kuŋ ³³ naŋ ³³ /
/a/ : /ɔ/	CIE	#171	to bite	/tap ³¹ /
		#159	bean	/tɔp ³¹ /
	CIE	#452b	to be straight	/saŋ ¹³ /
		#152	to grow	/sɔŋ ¹³ /
/ɔ/ : /o/	CNE	#318	whistle	/nɔ ³³ doŋ ³¹ /
		#210	hair	/pje ³³ doŋ ⁵³ /
	CNE	#375	to push	/nɔŋ ¹¹ /
		#371	to crawl	/nɔŋ ⁵³ /
/o/ : /u/	CNE	#113	sugar	toŋ ³¹ van ¹³ /
		#287	pillow	/tuŋ ³¹ ɬɔm ¹³ /
	CNE	#082	mushroom	/so ⁵³ /
		#157	to ripen	/su ¹¹ /
/ə/ : /a/	CIE	#125	to chop/mince	/dəj ³⁵ /
		#184	to fly	/dəj ³⁵ /
	CNE	#358	to sleep	/fəj ¹³ /
		#392	to dry (sth.)	/faj ³⁵ /
/ə/ : /e/	CNE	#004a	the sun sets	/mə.nɔi ³⁵ mot ²¹ təj ²¹ /
		#298	paper, cord	/tɛ ³³ /

APPENDIX D

**EVIDENCE OF TONAL CONTRAST IN LAO KIM
MUN**

Tones	Type of Contrast	Number	Gloss	Analogous Pairs/Minimal Pairs
/21/ : /341/	CNE	#403	to sell	/ma:j ²¹ /
		#402	to buy	/maj ³⁴¹ /
/21/ : /31/ : /35/ : /341/	CIE	#213	eye	/məj ²¹ /
		#259	thou (2s)	/məj ³¹ /
		#110	oil	/məj ³⁵ /
		#202	bee	/məj ³⁴¹ /
/22/ : /35/	CNE	#366	ghost	/ma:n ¹¹ /
		#501	who	/man ³⁵ /
/31/ : /13/ : /53/	CNE	#359	to snore	/da:n ³¹ /
		#376	to pull	/dan ¹³ /
		#317	basket	/da:n ⁵³ /
/31/ : /35/	CIE	#266	husband	/la:ŋ ³¹ /
		#316	ropes	/la:ŋ ³⁵ /
/13/ : /35/ : /53/	CNE	#452b	to be straight	/saŋ ¹³ /
		#463	to be new	/saŋ ³⁵ /
		#139	to steam	/sa:ŋ ⁵³ /
/33/ : /21/	CIE	#391	to bury a corpse	/θo ³³ /
		#368	to stand	/θo ²¹ /
/33/ : /53/ : /21/	CIE	#136	to boil	/tɔ ³³ /
		#304	candle	/tɔ ⁵³ /
		#148	chopsticks	/tɔ ²¹ /
/33/ : /35/ : /53/	CIE	#193	frog	/tɛŋ ³³ /
		#128	frying pan	/tɛŋ ³⁵ /
		#401	to fight	/tɛŋ ⁵³ /
/33/ : /35/	CIE	#245	bone	/θuŋ ³³ /
		#094	ginger	/θuŋ ³⁵ /

APPENDIX E

**EVIDENCE OF CONSONANTAL CONTRAST IN
VIETNAM KIM MUN**

Phonemes	Type of Contrast	Number	Gloss	Minimal Pairs/ Analogous Pairs
/p/ : /t/	CNE	#249	harrow	/tʊŋ ¹¹ pa: ¹¹ /
		#196	o. brother	/ta ¹¹ /
	CNE	#253	plane	/tʊŋ ¹¹ pa:w ³³ /
		#082	heart	/θin ²¹⁴ taw ³¹ /
/b/ : /d/	CNE	#269	dock, boat	/bej ¹¹ /
		#073	excrement	/dej ⁴⁴ /
	CNE	#183	name	/bu ³⁵ /
		#043	rat	/du ²¹⁴ /
/p/ : /b/	CNE	#274	house	/pjaw ⁴⁴ /
		#025	fish	/bjaw ³⁵¹ /
	CNE	#372	to know	/pe ²¹⁴ /
		#182	dream	/be ³⁵ /
/t/ : /d/	CIE	#101	tail	/tej ⁴⁴ /
		#073	excrement	/dej ⁴⁴ /
	CNE	#239	bag	/ti ³³ /
		#212	mother's mother	/di ⁴⁴ /
/t/ : /d/	CNE	#214	mother's sister	/tu ¹¹ /
		#251	knife	/du ³³ /
/t/ : /t/	CNE	#234	skirt	/tʊn ¹¹ /
		#155	garlic	/tʊn ⁵² /
	CNE	#012	chicken	/tʰej ²¹⁴ /
		#101	tail	/tej ⁴⁴ /
/t/ : /d/	CNE	#012	chicken	/tʰej ²¹⁴ /
		#073	excrement	/dej ⁴⁴ /
	CNE	#214	mother's sister	/tu ¹¹ /
		#314	rat	/du ²¹⁴ /
/d/ : /d/	CNE	#251	knife	/du ³³ /
		#043	rat	/du ²¹⁴ /
	CNE	#139	wind	/da:w ³⁵ /
		#130	salt	/da:w ⁴⁴ /

Phonemes	Type of Contrast	Number	Gloss	Minimal Pairs/ Analogous Pairs
/k/ : /g/	CNE	#033	leech, dry	/kjem ²¹⁴ /
		#225	blouse	/gjem ⁴⁴ /
	CNE	#069	egg	/kjew ³⁵ /
		#134	stone	/gjew ²¹⁴ /
/f/ : /v/	CNE	#134	flower	/faŋ ¹¹ /
		#116	cloud	/ven ³⁵ /
/f/ : /θ/	CNE	#134	flower	/faŋ ¹¹ /
		#271	firewood	/θa:ŋ ¹¹ /
/m/ : /n/	CIE	#231	needle	/θim ⁵² /
		#061	body	/θin ⁵² /
	CNE	#216	y. sister	/mu ³³ /
		#090	milk	/nu ⁴⁴ /
/n/ : /ŋ/	CNE	#166	porridge	/naŋ ³¹ su ³⁵ /
		#192	year	/ŋaŋ ⁵² /
	CNE	#046	snake	/na:ŋ ²¹⁴ /
		#132	silver	/ŋa:n ¹¹ /
/ŋ/ : /ŋj/	CNE	#195	bride	/ŋam ²¹⁴ /
		#114	cave	/ŋa:m ¹¹ /
/w/ : /j/	CNE	#236	trousers	/kwa ⁵² /
		#120	fog	/kja: ³⁵ /
/w/ : /v/	CNE	#243	bowl	/wen ⁴⁴ /
		#116	cloud	/ven ³⁵ /

APPENDIX F

EVIDENCE OF VOWEL CONTRAST IN VIETNAM

KIM MUN

Phonemes	Type of Contrast	Number	Gloss	Minimal Pairs/ Analogous Pairs
/i/ : /e/	CNE	#275	mat	/si ³³ /
		#200	descendant	/se ⁴⁴ θun ²¹⁴ /
/e/ : /ε/	CNE	#268	coop	/tε ²¹⁴ ko ⁵² /
		#206	guest	/tε ⁵² /
	CNE	#078	hair of body	/pje ²¹⁴ /
		#201	father's older brother	/pe ²¹⁴ /
/ε/ : /a:/	CNE	#247	fishnet	/lε ³³ /
		#189	moon	/la: ⁴⁴ /
	CNE	#206	guest	/tε ⁵² /
		#229	comb	/tɑ: ²¹⁴ /
/a:/ : /ɔ/	CNE	#060	blood	/θa:m ³³ /
		#058	beard	/θɔm ⁵² /
/ɔ/ : /o/	CNE	#097	ribs	/nɔ ¹¹ tam ⁴⁴ θuŋ ⁴⁴ /
		#059	belly	/nɔ ³³ /
/o/ : /u/	CNE	#277	pillow	/toŋ ¹¹ dam ³⁵ /
		#254	plow	/tuŋ ¹¹ kjaŋ ¹¹ /
	CNE	#204	grandmother	/bo ³⁴¹ /
		#183	name	/bu ³⁵ /
/a/ : /ε/	CNE	#042	pig sow	/tuŋ ³¹ kjan ³⁵ /
		#041	piglet	/tuŋ ³⁴¹ kjen ²¹⁴ /
	CNE	#087	leg	/θaw ³⁵ /
		#001	ant	/θew ³³ /

APPENDIX G

EVIDENCE OF TONAL CONTRAST IN VIETNAM

KIM MUN

Tones	Type of Contrast	Number	Gloss	Analogous Pairs
/44/ : /11/ : /214/	CIE	#024	eagle	/kla:ŋ ⁴⁴ /
		#086	intestine	/kla:ŋ ¹¹ /
		#093	neck	/kla:ŋ ²¹⁴ /
/44/ : /241/	CIE	#280	road	/kjaŋ ⁴⁴ /
		#094	nest	/kjaŋ ²⁴¹ /
/44/ : /214/	CIE	#081	head	/pje ⁴⁴ /
		#077	hair of body	/pje ²¹⁴ /
/33/ : /241/	CNE	#156	grass	/ma: ³³ /
		#031	horse	/ma ²⁴¹ /
/33/ : /241/ : /52/	CIE	#070	eye	/mej ³³ /
		#051	wasp	/mej ²⁴¹ /
		#152	fat	/mej ⁵² /
/52/ : /214/	CIE	#236	trousers	/kwa ⁵² /
		#160	melon	/kwa ²¹⁴ /
/11/ : 52/	CIE	#266	bridge	/tɔ ¹¹ /
		#263	bed	/tɔ ⁵² /

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