



BRILL

Classifying “Lao” Ethnic Languages Spoken in Central Thailand Using Tonal Criteria: A Case Study of “Chachoengsao Lao”

Warunsiri Pornpottanamas

Ph.D. Candidate, Department of Linguistics, Faculty of Arts, Chulalongkorn University, Bangkok, Thailand

warunsiri89@gmail.com

Received 10 March 2020 | Revised 16 May 2020 | Accepted 16 December 2020

Abstract

In the linguistic literature on the languages of ethnic Lao in Thailand, labels such as “Lao” or “Lao Wiang” are often used to identify local dialects as Lao varieties. This study examines patterns of tonal splits and mergers in the linguistic varieties spoken by the so-called “Lao” ethnic groups in Chachoengsao Province, Thailand, to re-identify and reclassify the so called “Lao” languages collected from 124 participants at 50 locations. This study used the tone box concept (Gedney 1972) as a basic tool to analyse tonal patterns. The results indicate that the “Lao” ethnic languages of Chachoengsao can be classified into three main groups, namely Lao, Phuan and Hua Phan Tai Nuea. While the Lao varieties show typical tonal patterns of Lao dialects ($B \neq DL$, $C1=DL_{123}$ and/or $C2_{34}=DL_4$), the other two groups show none of the patterns. The findings show that the patterns of tonal development labels are better criteria than ethnic labels in the identification of Lao groups.

Keywords

Lao language – ethnic group – linguistic classification – tonal criteria

1 Introduction

There have been several studies on “Lao” ethnic languages¹ spoken by the so-called “Lao” ethnic groups living in Central Thailand, e.g., Khanittanan (1973), Panka (1980), Chanthanakhom and Ratanapraserart (1983), Wattanaprasert and Liamprawat (1985), Daecha (1987), and Akharawatthanakun (2003; 2004). The ancestors of the speakers of these languages migrated from the Lan Chang Kingdom to Siam as a result of wars during the Thonburi and early Rattanakosin periods (Vallibhotama 1980; Piyabhan 1998). However, these previous studies have classified the “Lao” ethnic languages based primarily on their ethnonyms,² i.e., “Luang Prabang Lao”, “Lao Wiang/Central Lao”, “Lao Tai/Southern Lao”, “Lao Phuan”, “Lao Khrang”, “Lao Ngaew”, etc. In some cases, this may be problematic as the ethnonyms may not be in accordance with the languages they speak. Kullavanijaya and L-Thongkum (1998) have found that Tai-speaking groups living apart and having the same ethnonyms may speak different languages. Their research indicates that the “Tai Dam” ethnic groups living in the Counties of Yuanjiang and Maguan, Yunnan province, do not actually speak the same language as the Tai Dam varieties reported in the linguistic literature.

Regarding “Lao” ethnic groups, L-Thongkum (2016) examined the dialects spoken by the “Lao Khrang” and “Lao Wiang” groups living in Ban Rai District, Uthai Thani Province, and found that among the nine Tai-Lao varieties, only four could be classified as Lao. Therefore, the ethnonyms “Lao Khrang” and “Lao Wiang” imply both Lao and non-Lao Tai peoples migrated from Mueang Khrang (Khrang District) and from Khwaeng Wiang Chan (Vientiane Province) or Mueang Wiang Chan (Vientiane District) in Lan Chang (Lao PDR). Significantly, this reveals that the “Lao” ethnic languages spoken in Central Thailand need to be reconsidered using more robust linguistic criteria.

The literature review focuses on the history of “Lao” ethnic people’s migration and the languages of “Lao” ethnic groups in Chachoengsao Province (Duke and Sarikaphut 1986; Vallibhotama 1980; Piyabhan 1998; Premsrirat et al. 2004). Chachoengsao Province, in the central part of Thailand, was chosen as

1 In this paper, “Lao” ethnic languages are the so called “Lao” languages, which can be Lao dialects or non-Lao Tai dialects, spoken by Laotians whose ancestors migrated from Lan Chang (Lao PDR) and settled in Chachoengsao Province, Central Thailand during the Thonburi and early Rattanakosin periods, rather than the Lao ethnic groups who have recently migrated from Lao PDR and Northeast Thailand.

2 An ethnonym is the name applied to a given ethnic group of people, for example, “Lao Wiang”, “Lao Phuan”, “Lao Ngaew”, “Lao Khrang”, etc.

the experimental site. Based on historical records and their interviews with Chachoengsao inhabitants, Duke and Sarikaphut (1986) mentioned four “Lao” ethnic groups which had migrated or been sent by royal command to Chachoengsao as a result of wars during the Thonburi and early Rattanakosin periods, namely, the Lao Phuan, Lao Wiang, Lao Mueang Phlan and Lao Nuea or Tai Et. Despite evidence given by historical records, it is unclear from where the “Lao” ethnic groups migrated from and what language they actually spoke. According to Duke and Sarikaphut (1986), even though historical records can help trace the homelands of the “Lao Phuan” and the “Lao Mueang Phlan” to Mueang Phuan, Xiang Khouang Province, and Mueang Phlan, Savannakhet Province, respectively, the original homelands of the “Lao Wiang” and the “Lao Nuea” or “Tai Et” cannot be traced and remain unclear.

The diversity as reported in the historical studies seems at odds with Premsrirat et al. (2004) as ethnolinguistic maps of Thailand in which only two languages namely Phuan and Lao Wiang, spoken by the four “Lao” ethnic groups, were recognised and plotted on the map of Chachoengsao Province. As this discrepancy might be a result of a mismatch between the ethnic labels and the languages, the main aim of this paper is to investigate the “Lao” ethnic languages spoken in fifty research locations in thirty-one villages in Chachoengsao Province through the use of tonal criteria and to re-identify and reclassify the “Lao” ethnic languages from their tonal patterns of splits and mergers. The research findings shed some light on the puzzling migration history of the “Lao” ethnic groups in Chachoengsao Province and the languages they speak.

2 Literature Review

In order to distinguish the Lao language from non-Lao Tai languages such as Thai, Phuan, Tai Nuea, Phu Tai, etc., through tonal criteria, there are two major areas that require elucidation. These areas are tone box concept and the typical patterns of tonal development in Lao language.

2.1 *Tone Box*

Gedney's tone box is a common tool used to discover the patterns of tonal developments in modern Tai languages. It represents the historical interaction between the Proto-Tai tones and factors that may cause tonal splits. Li (1977) and Pittayaporn (2009) reconstructed three contrastive Proto-Tai tones, labelled *A, *B and *C, in smooth syllables and tone *D in checked syllables. The tonal systems of modern Tai varieties differ from that of Proto-Tai as a result of tonal splits and mergers conditioned by four categories of the

Proto-Tai initial consonants. In checked syllables ending with final stops /-p, -t, -k, -ʔ/, tonal splits and mergers are additionally conditioned by vowel length. To illustrate how Gedney’s tone box is used in discovering tonal developments in Tai varieties, as well as the pattern of tonal splits and mergers, the tone system and the tonal characteristics of each tone in present-day Vientiane Lao spoken in Vientiane Prefecture, as based on Osatananda (2016), is presented in the tone box below.

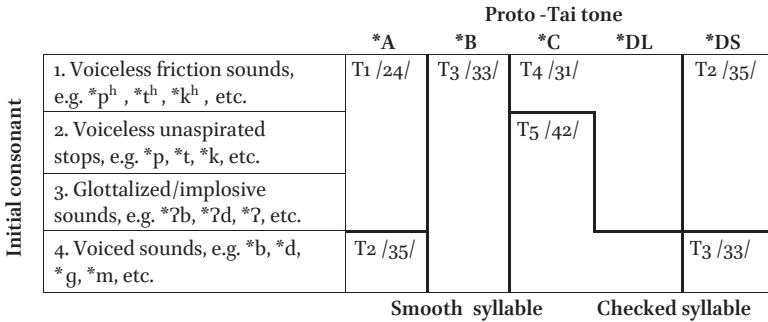


FIGURE 1 The tone box presenting the pattern of tonal splits and mergers of Vientiane Lao together with its tone system and the tonal characteristics

The five-tone system in Present-day Vientiane Lao is the result of tonal changes that converted Vientiane Lao from the original three-tone system to a five-tone system with restricted distribution on checked syllables. Each of the five tones can be referred to by the name of the box that relates to its Proto-Tai initial consonants and tones. According to Osatananda (2016), Tone 1 (T1) in Vientiane Lao, referred to as A123, is Low-Rising /24/. Tone 2 (T2) is referred to as A4 and DS123 or A4=DS123 is Mid-Rising /35/. Tone 3 (T3), referred to as B1234 and DS4 (B1234=DS4), is Mid Level /33/ whereas Tone 4 (T4), referred to as C1 and DL123 (C1=DL123), is Mid-Falling /31/. Tone 5 (T5), described as C234 and DL4 (C234=DL4), is High-Falling /42/.

Vientiane Lao has the following tonal pattern of split and merger, i.e. A123-4, B1234, C1=DL123, C234=DL4, B≠DL, A4=DS123 and B1234=DS4. In other words, the original *A tone in Vientiane Lao split into two different tones, resulting in the A123-4 tonal pattern of split. For example, *ka:^A ‘crow’ and *ga:^A ‘to be stuck’ are now pronounced with different tones, namely, Tone 1 and Tone 2, respectively. Regarding the original *B tone, syllables with all categories of the Proto-Tai initial consonants have the same tone: Tone 3, referred to as B1234. The *C tone split into two different tones, resulting in C1-234. The words *p^ha:^C ‘cloth’ and *pa:^C ‘aunt’ turned out to be pronounced with different tones, Tone 4 and Tone 5, respectively. Moreover, Vientiane Lao went through tonal split

based on vowel length in checked syllables. The split caused *D tone syllables with long vowels (*DL) and short vowels (*DS) to have different tones, i.e., *ka:p^D ‘husk’ and *kap^D ‘things to eat with rice’ are now pronounced with different tones, i.e., Tone 4 and Tone 2, respectively. This split can be referred to as DL≠DS.

2.2 *The Pattens of Tonal Splits and Mergers of the Lao Language*

Lao varieties are spoken in Lao PDR, Northeastern Thailand and some parts of Central Thailand. The well-known distinctive tonal patterns of splits and mergers in the Lao language are B≠DL, C1=DL123 and C234=DL4, as shown in Figure 2 below. According to Akharawatthanakun (2003; 2004), the B1234 pattern was claimed to be one of the distinctive patterns of tonal split and merger in the Lao language group. However, the B123-4 pattern of tonal split was found in several varieties of Lao language spoken in Mueang and Thawat Buri Districts in Roi-et; Wapi Pathum District in Maha Sarakham; Non Phet Subdistrict, Prathai District in Nakhon Ratchasima; and Khon Sawan District in Chaiyaphum (Brown 1965). The tonal pattern of B1234 is not thus included in this study as a distinctive tonal pattern in the Lao language.

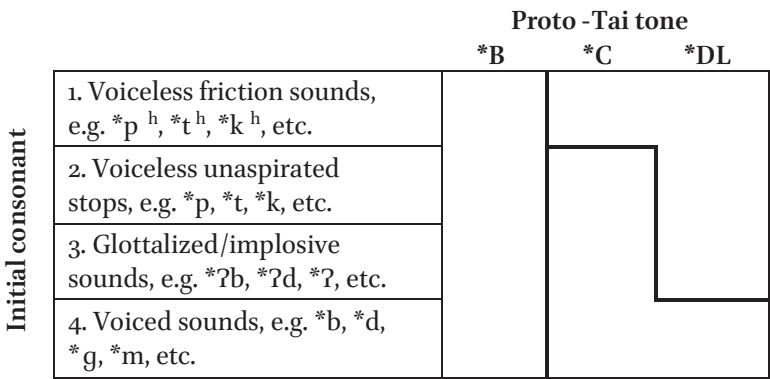


FIGURE 2 The distinctive tonal patterns of splits and mergers in the Lao language

The distinctive patterns resulting from tonal changes in the Lao language distinguish Lao varieties from other non-Lao Tai varieties, i.e., Thai, Phuan, Phu Thai, Red Tai, Lue, etc. As pointed out by Tingsabadh (2001), dialects of each language share a distinctive pattern of tonal splits and mergers whereas their other patterns of splitting and merging diverge at other cells in the tone box. The patterns of tonal splits and mergers presented in Gedney’s (1972) tone box are, therefore, widely used as criteria for identifying and classifying Tai dialects or varieties. However, some Lao varieties found in earlier studies do

not have the well-known patterns of splits and mergers pertaining to the Lao language group, i.e., $B \neq DL$, $C_1 = DL_{123}$ and $C_{234} = DL_4$, as found in Lao Wiang spoken in Nongnae Subdistrict, Phanom Sarakham District, Chachoengsao Province (Chanthanakhom and Ratanaprasedart 1983; Ratanaprasedart 1985; Pornpottanamas 2016), Lao Ngaew as well as Lao-Lao spoken in Lopburi, Saraburi and Singburi Provinces (Khanittanan 1973) and Lao Khrang spoken in Kanchanaburi Province (Akharawatthanakun 2003). These “Lao” dialects reflect none of the typical tonal patterns of splits and mergers in the Lao language.

Moreover, additional patterns of splits and mergers may be used to classify varieties of the same language into (sub)dialects. Among Lao dialects spoken in Lao PDR and Thailand, the splitting pattern of the Proto-Tai *A tone seems to vary. The patterns of A_{1-234} , A_{123-4} or A_{1-23-4} are found throughout Lao dialects. However, it seems possible to divide them into groups based on the different tonal changes in the Proto-Tai *A tone. Based on Brown’s (1965) classification of the Lao dialects, the Luang Prabang Lao group (Northern Lao) exhibits two-way splitting of the Proto-Tai *A tone: A_{1-234} . The Northern Lao varieties are spoken in Luang Prabang and Kaen Thao, Lao PDR, as well as some areas in Northeastern Thailand, e.g., the districts of Dan Sai and Mueang in Loei Province. The A_{1-234} pattern of Northern Lao varieties distinguishes the Luang Prabang Lao group from the group of Vientiane Lao (Central/Southern Lao) spoken throughout most areas of Northeastern Thailand as well as in Central and Southern Laos. The patterns of A_{1-23-4} and A_{123-4} are found in the Vientiane Lao group. Therefore, it can be concluded that the Northern Lao varieties share the distinctive pattern of the tonal splitting, A_{1-234} , while the Central/Southern Lao varieties share the distinctive tonal patterns of split and merger, A_{1-23-4} or A_{123-4} .

3 Methodology

Duke and Sarikaphut (1986) provided a list of locations of “Lao” speakers in Chachoengsao Province based on historical records and their field research. Following the list of village names reported in 1986, the author first contacted local authorities in Chachoengsao not only to recheck the information but also to obtain other preliminary information about “Lao” ethnic groups, language situations and other locations of “Lao” speakers in Chachoengsao which were not reported in the historical research. After finding the locations of speakers from “Lao” ethnic groups who presently speak their “Lao” languages in daily life, three out of the eleven districts of Chachoengsao were chosen as research sites. The three districts were Phanom Sarakham, Sanam Chai Khet and Tha

Takiap. Fifty research locations located in thirty-one villages were selected. Research sites (locations and village names) and the number of participants interviewed can be found in Appendix 1. The research locations were based on the number of “Lao” ethnic languages informed by the “Lao” ethnic speakers living in each village; for example, in Pa Rai Village, Nong Nae Subdistrict, Phanom Sarakham District, there were three locations since three “Lao” ethnic languages were found in this village. Unfortunately, an exact number for the “Lao” ethnic population in the three selected districts is not available.

At each location, three female participants, aged 50-88 years old, who were descendants of “Lao” ethnic groups of peoples who migrated from Lan Chang and settled in Chachoengsao Province during the Thonburi and early Rattanakosin periods, were invited to participate in this research project. The women were selected as it was more convenient to recruit older female speakers since they tend to remain in their villages and spoke their mother tongue fluently. They were also helpful and cooperative. However, in some cases, only one or two speakers were available when field work was conducted. Additionally, for acoustical analyses, it is more convenient to measure and compare the pitch height, pitch contour and pitch range of speakers of the same sex than different sexes, due to the different sizes of their vocal tracts and organs of speech which can affect the acoustic value of tones.³

For the analysis of the patterns of tonal splits and mergers, the tone systems, and tonal characteristics, 102 monosyllabic words adapted from Gedney’s tone box were used (see Appendix 2). Prompted by pictures presented in a PowerPoint slideshow, participants were asked to produce target words, e.g., /k^ha:A¹/ ‘leg’, /pa:A²/ ‘fish’, /k^haw^{C1}/ ‘rice’, etc., using visual stimuli displayed as pictures. In order to confirm the results, 22 words were selected for an acoustic analysis of the tonal characteristics using Praat. The 5-scale graphs presenting the phonetic characteristics of each tone based on average semitone values in normalised time were miniaturised and presented in the cells of the tone box. Following the notation for tone-marking in Chao (1930), each level in the graphs represented pitch levels in the pronunciation of a tone, 1 representing the lowest level and 5 representing the highest level in a speaker’s pitch range. For example, T₁ /24/ is a rising tone, starting low and then moving up considerably. A name and tone number were also given in the tone box; for example, T₁ /24/ means Tone 1 is Low-Rising /24/, T₂ /331/ means Tone 2 is Mid Level-Falling /331/, etc.

3 The acoustic value or the fundamental frequency (F₀) of tones can differ in each speaker. An average adult male speaker’s frequency range, typically, is lower than an average adult female’s frequency range (Laver 1994).

To re-identify and re-classify the “Lao” ethnic languages of Chachoengsao, their tonal patterns of splits and mergers and tonal characteristics of tones were considered. The languages were categorised as typical Lao varieties when they show the typical tonal patterns pertaining to the Lao language group, i.e., $B \neq DL$, $C_1 = DL_{123}$ and $C_{234} = DL_4$. In cases in which only the $B \neq DL$ and $C_1 = DL_{123}$, $C_1 = DL_{123}$ and $C_{234} = DL_4$ patterns are presented, or the other way round ($B \neq DL$ and $C_{234} = DL_4$), the typical tonal characteristics of the Lao tones, e.g., the tone in C_{234} was Falling, the tone in B_{1234} was Level, etc., were used as a secondary criterion to help identify deviant Lao varieties. For subgrouping Lao varieties, the development of the Proto-Tai *A tone was used as a criterion. A Northern Lao subgroup has the A_{1-234} pattern of tonal split whereas a Central/Southern Lao subgroup has the A_{123-4} or A_{1-23-4} pattern of tonal split. If the “Lao” ethnic languages neither showed one of the typical tonal patterns in the Lao language group nor the typical tonal characteristics of the Lao tones, they may be considered as non-Lao Tai languages. Other linguistic features were additionally considered to help confirm the tonal criteria.

4 Results

After carefully analysing the tone data collected from the 50 locations, 16 patterns of tonal split and merger were found. These 16 patterns could be divided into three major groups: Lao (G_1), Phuan (G_2) and Hua Phan Tai Nuea (G_3). Each group consisted of two main subgroups: typical Lao ($G_{1/1}$) and deviant Lao ($G_{1/2}$); typical Phuan ($G_{2/1}$) and deviant Phuan ($G_{2/2}$); and typical Tai Nuea ($G_{3/1}$) and deviant Tai Nuea ($G_{3/2}$).

4.1 *Group 1: Lao*

Lao was spoken in eight locations. The typical pattern of tonal split and merger in Lao as pointed out by Brown (1965), Strecker (1979), Hartmann (1980, 2002), Osatananda (1997), Tingsabadh (2001), Akharawatthanakun (1998; 2002; 2003; 2004), Kamalanavin (2013) and L-Thongkum (2016) is $B \neq DL$, $C_1 = DL_{123}$ and $C_{234} = DL_4$. On this basis, two types of typical Lao could be found at the research sites, i.e., Northern Lao and Central/Southern Lao. Northern Lao was spoken in location 33 and Central/Southern Lao was spoken in five locations: 24, 29, 32, 39 and 41.⁴ The two patterns of tonal split and merger ($G_{1/1.1}$ or Northern Lao and $G_{1/1.2}$ or Central/Southern Lao) can be seen in Figure 3. For

4 See details on research sites and locations in Table 1 in Appendix 1.

more information on Luang Prabang Lao, see Roffe and Roffe 1956; Brown 1965; Chamberlain 1975; Hasonnary 2000; and Kamalanavin 2013.

The deviant Lao spoken in locations 31 and 36, as shown in

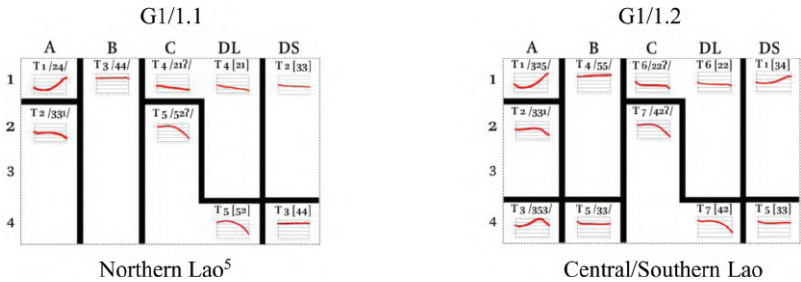


FIGURE 3 Two types of typical Lao

Figure 4, consists of two varieties, namely, G1/2.1 and G1/2.2. Although the former does not provide all of the typical tonal patterns in the Lao language group, it has maintained one, B≠DL, as well as the typical tonal characteristics of the Lao tones in which C234 is Falling and the tone in B1234 is Level. However, the latter has no longer preserved the typical patterns of tonal split and merger in the Lao language, resulting atypical tonal patterns.

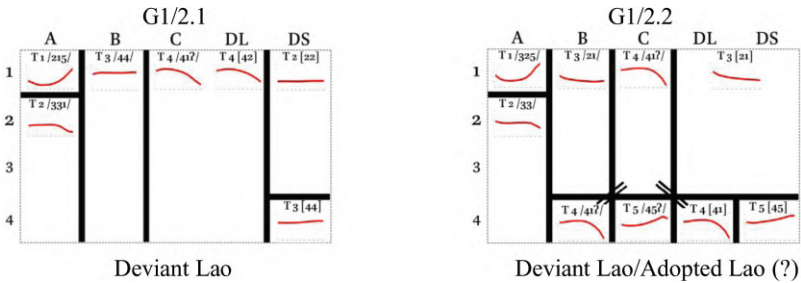


FIGURE 4 Two types of deviant Lao

5 Although Northern Lao (G1/1.1) has the tonal pattern of splits and mergers which is identical to Luang Prabang Lao, the tonal characteristics of each tone differ from that of Luang Prabang Lao in Roffe and Roffe (1956), Brown (1965), and Kamalanavin (2013), especially the characteristics of tones in A1 and C1. The distinctive tonal characteristics of the A1 and C1 tones in Luang Prabang Lao found in the earlier works seem to be Mid-Falling-Rising and High-Falling glottalized, respectively. Perhaps, G1/1.1 should be classified as a kind of deviant Northern Lao instead of typical Northern Lao.

4.2 Group 2: Phuan⁶ (non-Lao Tai)

Phuan speakers have been known as Phuan, Tai Phuan, Thai Phuan and Lao Phuan. Even though Mueang Phuan, from which they migrated, is in the northern part of Lan Chang, they do not speak a linguistically defined Lao variety.

Phuan was spoken in eighteen locations. Based on previous research findings, typical Phuan can be said to have the following pattern of tonal split and merger, i.e., A1-234, B123-4, C1-234, DL123-4, DS123-4, B123=DL123, B4=DL4 and C1≠DL123 (Tanprasert 2003; Hartmann 2004; Akharawatthanakun 2003; 2004; 2010). Typical Phuan (G2/1) was spoken in fifteen locations (1, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 40). In the other three locations (6 and 17: Deviant Phuan 1 (G2/2.1) and 2: Deviant Phuan 2 (G2/2.2)) deviant Phuan was used, as shown in Figure 5. Deviant Phuan has two patterns which are identical to typical Phuan except that the tone in DS123 has merged with the tone in B123 and DL123 (B123=DL123=DS123) in the G2/2.1 and no tonal split occurs in the C column (C1234) in G2/2.2.

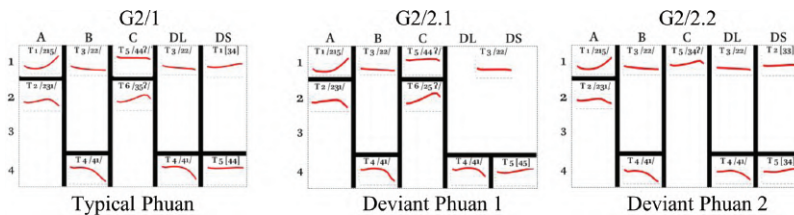


FIGURE 5 One type of typical Phuan and two types of deviant Phuan

4.3 Group 3: Hua Phan Tai Nuea⁷ (non-Lao Tai)

Based on Chamberlain (1984) and Dejongsa et al.'s (1972) research findings, Tai Nuea has the following pattern of tonal splits and mergers: A1-234,

6 Phuan, a Southwestern Tai language (SWT) (Li 1960; Brown 1965; Chamberlain 1975; Hartmann 2004; Pittayaporn 2009), is spoken in Lao PDR, Thailand and Cambodia. Based on Chamberlain's (1975) classification using phonological criteria, SWT varieties were divided into two main groups: P group (the Proto-Tai *voiced stops became unaspirated voiceless stops or *b > p) and PH group (the Proto-Tai *voiced stops became aspirated voiceless stops or *b > p^h). Phuan like Thai, Tai Nuea, etc., belongs to the PH group of the SWT branch.

7 Based on Chamberlain's (1975) classification, Tai Nuea is one of the Nuea-Phuan sub-branches of the PH group of Southwestern Tai (SWT). The term Nuea was used to refer to the Tai languages of Hua Phan Province. Tai Nuea is phonologically and lexically closest to Phuan, hence the term Nuea-Phuan. In Hua Phan nowadays, they are usually called /tai^{A4} p^hut^{DS4}/ meaning 'Tai Buddhists', to separate them from the Tai Daeng and other Tais who often live side-by-side (Chamberlain, email to author, October 17, 2019). He used the spelling Tai Neua or Neua in order to differentiate them from the Tai Nüa of Yunnan. However, throughout this paper the author will use Tai Nuea /tai^{A4} nuə^{A1}/ according to the transliteration from Thai to English based on the system implemented by the Royal Institute of Thailand (1999).

BCDL123-4 and B=DL. However, in some Tai Nuea varieties, the tone in C123 has merged with the tone in B4 and DL4 (C123=B4=DL4). These two different types of tonal pattern have made them have different tonal systems, i.e., six-tone and five-tone systems, respectively. In the present study, Tai Nuea was spoken in twenty-four locations: Tai Nuea people living in twelve locations, i.e., 19, 21, 23, 25, 34, 35, 37, 42, 44, 45, 46 and 47, speak two varieties of typical Tai Nuea (G3/1.1 and G3/1.2) as shown in Figure 6. Typical Tai Nuea 1 (G3/1.1) and 2 (G3/1.2) could be found in nine locations (23, 25, 34, 37, 42, 44, 45, 46, 47) and three locations (19, 21, 35), respectively. The two patterns of tonal split and merger in typical Tai Nuea can be seen in Figure 6. More information on the tone split and merger patterns of Tai Nuea spoken in Hua Phan Province, Lao PDR, can be found in Chamberlain (1984) and Dejvongsa et al. (1972).

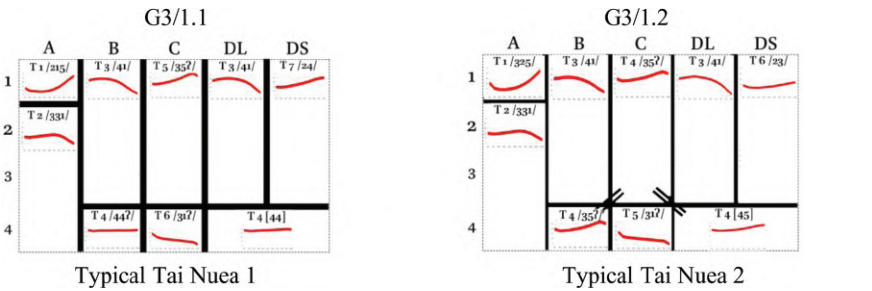


FIGURE 6 Two types of typical Tai Nuea

In the other twelve locations: 18, 20, 22, 26, 27, 28, 30, 38, 43, 48, 49, 50, seven types of the Tai Nuea tone split and merger patterns were found, i.e., G3/2.1, G3/2.2, G3/2.3, G3/2.4, G3/2.5, G3/2.6 and G3/2.7 as shown in Figure 7 below. It is not certain whether these seven sub-varieties of Tai Nuea classified by their

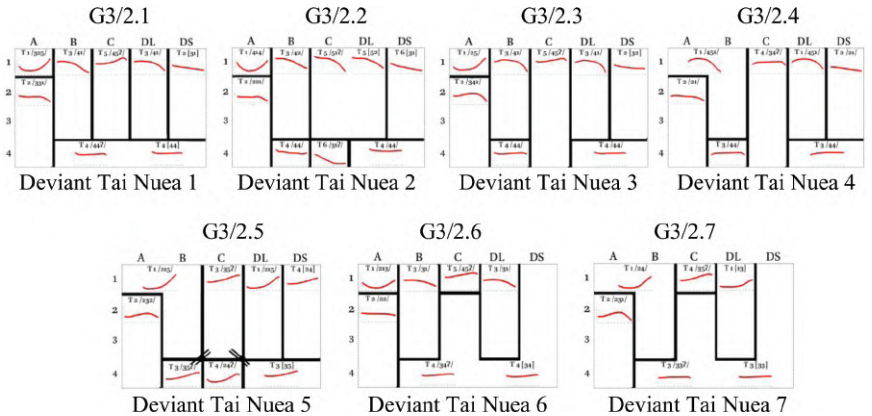


FIGURE 7 Seven types of Deviant Tai Nuea

tonal patterns should be called “deviant Tai Nuea” because their tonal patterns of spilt and merger show some degree of diversity compared with the tonal patterns of Tai Nuea found in earlier works (Chamberlain 1984; Dejongsa et al. 1972). For example, an atypical tonal merging between the tone in A₁ and B₁₂₃ (A₁=B₁₂₃) is found in this study (G₃/2.4, G₃/2.5 and G₃/2.7) and the C₂₃₄=B₄=DL₄ pattern of tonal merger is also found in G₃/2.6 and G₃/2.7. It is possible that some of these varieties should be regarded as different Tai languages. Before coming to any definite conclusion, a thorough survey of the Tai languages and dialects or varieties spoken in the Hua Phan Province of Lao PDR is needed.

Tentatively, seven deviant Tai Nuea can be categorised into two groups based on which variety they could deviate from. G₃/2.1 (locations 20, 22, 26, 43), G₃/2.2 (location 38), G₃/2.3 (locations 27, 49) and G₃/2.4 (location 28) seem to deviate from typical Tai Nuea 1, or G₃/1.1, whereas G₃/2.5 (location 30), G₃/2.6 (location 18) and G₃/2.7 (locations 48, 50) possibly deviate from typical Tai Nuea 2, or G₃/1.2.

In summary, the tonal research revealed that the languages spoken by the “Lao” ethnic groups living in Chachoengsao were three major Tai languages, i.e., Lao, Phuan and Hua Phan Tai Nuea, as plotted on a map of the “Lao” ethnic languages spoken in Chachoengsao Province in Figure 8. As seen on the map,

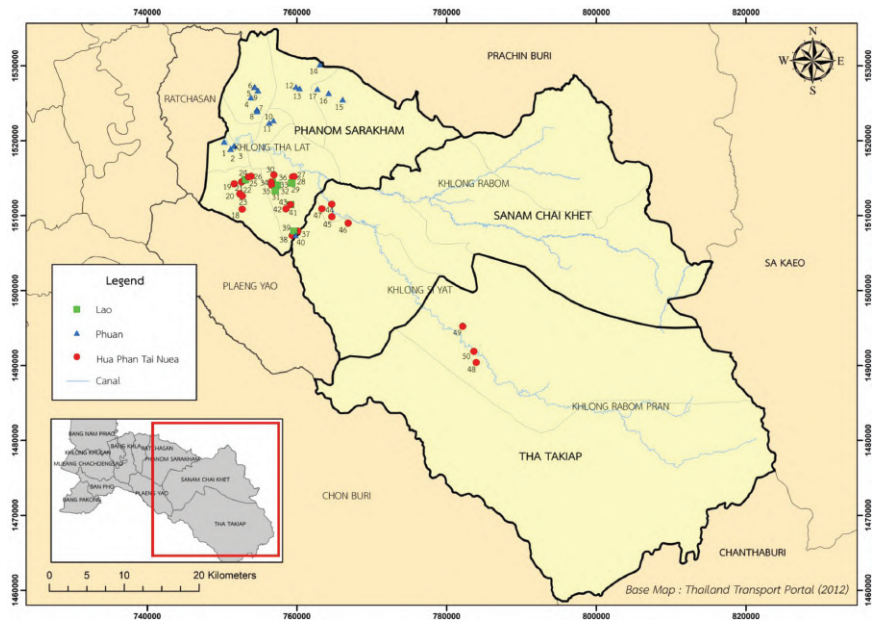


FIGURE 8 Map of the “Lao” languages spoken in Chachoengsao Province

“Lao” ethnic people speaking the Lao language were found only in five research locations, whereas the rest of the “Lao” ethnic people scattered throughout forty-five research locations in the three districts of Chachoengsao turned out to speak non-Lao Tai languages (Phuan and Hua Phan Tai Nuea). The research findings demonstrate that the tonal development could help reveal what language the “Lao” ethnic groups actually spoke while ethnic labels such as “Lao Wiang” could not.

5 Discussion

The findings in the current study based on tonal criteria were in accordance with those on other linguistic features, i.e., lexical items and other phonological changes. The classifications of the native “Lao” speakers of Chachoengsao Province are discussed below.

Lao people who speak typical Lao varieties (G_{1/1.1} and G_{1/1.2}) have locally been known as “Lao /ʔi:³³ ɲaŋ²⁴/”, which implies “the people who use the word /ʔi:³³ ɲaŋ²⁴/ to mean ‘what’”. It is also noticeable that they use the word /het⁴⁵/ meaning ‘to do, to make’ and that the Proto-Tai *au has become /ai/ (*au > ai). That is, all lexical items spelled with *mai muan* (ໄມ່ມູນ) in Thai orthography are pronounced [ai], e.g., ‘heart’ /cai^{A2}/, ‘new’ /mai^{B1}/, etc.

Regarding the deviant Lao varieties, G_{1/2.1} and G_{1/2.2}, it looks as if both have deviated from Northern Lao. It is also possible that the cause of tonal deviation, especially in G_{1/2.2}, is language contact with Thai or, the other way round, Thai speakers have adopted the tonal features of Thai, consciously or unconsciously, which means that perhaps the speakers of the G_{1/2.2} do not speak a Lao variety as their ethnonym “Lao” suggests. Lao people who speak deviant Lao G_{1/2.1} have been known as “Lao /nɔ:²⁴ prui:³³/”, which means ‘the Lao living in /nɔ:²⁴ prui:³³/’, which is a village name. Like most typical Lao varieties, deviant Lao G_{1/2.1} keeps the high-falling characteristics of tone C₂₃₄ and the high-level characteristics of tone B₁₂₃₄. Moreover, speakers use the words /ʔi:³³ ɲaŋ²⁴/ and /het⁴⁵/ meaning ‘what’ and ‘to do, to make’, respectively, and the Proto-Tai *au > ai as is typical Lao varieties. Words spelled with *mai muan* in Thai will be pronounced [ai], for example /cai^{A2}/ ‘heart’, /mai^{B1}/ ‘new’, etc.

In the Nong Prue village in Ko Khanun Subdistrict, Phanom Sarakham District, the villagers speak two varieties of typical Lao, namely, G_{1/1.1}, G_{1/1.2} and two varieties of deviant Lao, namely, G_{1/2.1} and G_{1/2.2}. The ones who speak G_{1/2.2} have been called “Lao or Thai /nɔ:²⁴ na:m⁴⁵ dam³³/” and they live in a small section of Nong Prue Village. The other groups of Nong Prue inhabitants think that the language spoken by Lao Nong Nam Dam is “a strange mixture of

Thai and Khmer". Besides having a Thai tonal pattern to their speech, they have /ɲ/ and /h/ (*r > h)⁸ as in Lao. They use both Thai and Lao words; for example, they say /het⁴⁵ ʔa²¹ lai³³ kan³³/ (lit. "Do what together?") instead of /het⁴⁵ ʔi³³ ɲa²⁴/ (lit. "Do what?"). An atypical final particle /p^hə:⁴²/ is used, e.g., /hɔ:n⁴⁵ caŋ³³ p^hə:⁴²/ 'It is very hot', etc. The irregular linguistic features mentioned above means the deviant Lao of Nong Nam Dam might be classified as one of the deviant Tai Nuea varieties in Group 3 because the tonal patterns look similar to that of Tai Nuea and Thai languages.

It is interesting to point out that the word /ʔet⁴⁵/ meaning 'to do, to make' and the final particle /p^hi³³ lə:³⁵/ meaning 'what' are used by the Phuan living in Chachoengsao Province. As for the cognate words spelled with *mai muan*, /ma:i⁴⁵ muan⁴⁵/, in Thai orthography, speakers usually pronounce /ə:/ (Proto-Tai *au > ə:),⁹ e.g., /cə:^{A3}/ 'heart', /hə:^{C1}/ 'to give', etc. Moreover, Proto-Tai *-v:k has become /-v:ʔ/ in Phuan,¹⁰ such as /pi:ʔ^{DL2}/ 'wing', /lu:ʔ^{DL4}/ 'child (offspring)', etc. These typical features in Phuan help to prove that the Phuan do not speak a variety of Lao, although they are called "Lao Phuan". These research findings support in previous research studies, e.g., Brown (1965), Chamberlain (1975), Wattanaprasert and Liamprawat (1985), Daecha (1987), etc.

Generally, the Tai people in Chachoengsao Province who speak Tai Nuea varieties are known as "Lao /ʔan³³ də:³³/" because they use the final particle /ʔan³³ də:³³/, which means 'what', whereas the Lao group uses /ʔi³³ ɲa²⁴/ and the Phuan group uses /p^hi³³ lə:³⁵/. They also identify themselves as "Lao" or "Lao Wiang". The word /ʔet⁴⁵/ 'to do, to make' and the Proto-Tai diphthong *au, which has become /ə:/, are used as in Phuan, for example /mə:^{B1}/ 'new', /bə:^{A3}/ 'leave', /sə:^{B1}/ 'to wear', and so on. This may be the reason why some Phuan-speaking people call them "Phuan Nuea", which means "northern Phuan". Interestingly, the Abbot of Nong Suea Temple, located in Ko Khanun Subdistrict, Phanom Sarakham District, calls them "Tai Et /ʔɛ:t²¹/".¹¹

8 Li (1977) and Pittayaporn (2009) reconstructed the Proto-Tai consonants. The Proto-Tai *ɲ has been preserved as /ɲ/ in Lao but has become /j/ in Thai. The Proto-Tai *r has become /h/ in Lao, but it has been preserved in Thai.

9 Proto-Tai *au has merged with *ai in Thai, Lao, etc. It has become /ə:/ in Phuan and some Northern Tai varieties, such as Saek, etc (Pittayaporn 2009).

10 In Phuan, the final *-k has become /-ʔ/ in etyma that have long vowels in Thai and Lao. Akharawatthanakun (2010) pointed out that the final /-ʔ/ in lexical items that have the long vowel is uniquely found in Phuan.

11 At present, Mueang Et /ʔɛ:t²¹/ is in the Hua Phan Province of Lao PDR, near the Lao-Vietnam border. Known for its beautiful woven textiles, weavers ceased weaving when they came to settle in Central Thailand.

Regarding the Hua Phan Tai Nuea group, the author suspects that some of the deviant Tai Nuea varieties could be unknown Tai languages or dialects spoken in the northern areas of Lan Chang about two-hundred years ago as various “Lao” ethnic peoples from several townships in these northern areas of Lan Chang migrated to Thailand during the reign of King Rama III (Piyabhan 1998). Moreover, there have only been a few linguistic research projects conducted in the northern areas of Lao PDR. Therefore, the northern part of Lao PDR seems to be an area rich with potential for doing research on unknown Tai languages.

To summarise, although the classifications of “Lao” ethnic languages in previous studies based on ethnonyms were, in some cases, not in accordance with the linguistic realities, the research findings through the use of tonal criteria agreed with other linguistic features as well as the classifications by the “Lao” ethnic groups. Despite agreement with the findings of Premsrirat et al., (2004) on the Phuan language, the author’s findings were not in accordance with the findings on the “Lao Wiang” language of Chachoengsao. These revealed through the use of tonal criteria that the “Lao Wiang” varieties of Chachoengsao could be re-identified and reclassified into two Tai language groups, Lao and Hua Phan Tai Nuea, the latter of which is not a deviant Lao variety. This phenomenon indicates why some Lao language groups, e.g., “Lao Wiang”, have deviant tonal patterns of split and merger from typical Lao. In some cases, they cannot be regarded as external and internal changes. The research findings help confirm the phenomenon L-Thongkum (2016) found in Uthai Thani Province.

The current linguistic study sheds some light on the history of “Lao” ethnic people’s migration and the languages of “Lao” ethnic groups in Chachoengsao Province. It has helped reveal that the “Lao Wiang”, who spoke Hua Phan Tai Nuea, migrated from Hua Phan Province near the Lao-Vietnam border during the reign of King Rama III as a result of Siam’s depopulation policy in the northern areas of Lan Chang, far from Bangkok, to lessen Vietnam’s power (Duke and Sarikaphut 1986).

6 Conclusion

Based on a different standpoint and not focusing on ethnonyms, the “Lao” ethnic languages of Chachoengsao can be classified into three main Tai language groups, namely, Lao, Phuan (non-Lao) and Tai Nuea (non-Lao). The tonal research findings indicate that the “Lao speaking groups having the same ethnonym “Lao” may speak different Tai languages as found in the case study of “Chachoengsao Lao”. Arguably, therefore, to identify and classify languages,

the patterns of tonal split and merger can serve as better criteria than ethnic labels. In summary, this study found that the label “Lao” and its derivative “Lao Wiang” and “Lao Phuan” do not reflect linguistic reality but the tonal criteria. In addition, the linguistic research findings based on tonal criteria were able to shed light on the perplexing migration history of the “Lao” ethnic groups, especially the “Lao Wiang” group, in Chachoengsao Province. The linguistic evidence revealed what language the “Lao Wiang” of Chachoengsao spoke as well as their original homelands in the Vientiane and Hua Phan Provinces.

Acknowledgements

The author would like to express her gratitude to the 90th Anniversary of Chulalongkorn University Scholarship for funding the research project on identifying and classifying “Lao” ethnic languages spoken in Chachoengsao Province. The author is deeply grateful to Professor Emeritus Dr. Theraphan Luangthongkum, her Ph.D., dissertation supervisor, for all her valuable support, comments and suggestions throughout the years of conducting the research project as well as for the time she has devoted to the author’s research article. The author would like to express her appreciation to Associate Professor Dr. Pittayawat Pittayaporn for his valuable comments and suggestions. The author would also like to thank Professor Emeritus Dr. Amara Prasithrathsint, the two unknown reviewers, and Daniel Loss for their useful comments. The author’s deep and sincere thanks also go to the local authorities and cooperative research participants. Their hospitality and assistance will stay in the author’s memory forever.

References

- Akharawatthanakun, Phinnarat. 1998. *“A Comparative Study of the Tonal System in the Speech of the “Lao”, the “Nyo” and the “Phutai” in That Phanom District, Nakhon Phanom Province.”* M.A. thesis, Chulalongkorn University. (In Thai)
- Akharawatthanakun, Phinnarat. 2002. “Tonal Variations and Changes in a Language Mixture Area: A Case Study of Northeastern Thailand (ISAN).” *Manusya* 5 (2): 30–51. <https://doi.org/10.1163/26659077-00502004>.
- Akharawatthanakun, Phinnarat. 2003. *“Tone Change: A Case Study of the Lao Language.”* Ph.D. diss., Chulalongkorn University. (In Thai)

- Akharawatthanakun, Phinnarat. 2004. “Tonal Variation and Change in Dialects in Contact: A Case Study of Lao.” *Manusya* 7 (1): 56–95. <https://doi.org/10.1163/26659077-00701003>.
- Akharawatthanakun, Phinnarat. 2010. “Phonological Variation in Phuan.” *Manusya* 13 (2): 50–87.
- Boersma, Paul, and David Weenik. 2012. Praat: Doing Phonetics by Computer [Computer Program]. Version 5.3.17.
- Brown, J. Marvin. 1965. *From Ancient Thai to Modern Dialects*. Bangkok: Social Science Association Press.
- Chamberlain, James R. 1975. “A New Look at the History and Classification of the Tai Languages.” In *Studies in Tai Linguistics in Honor of William J. Gedney*, edited by Jimmy G. Harris and James R. Chamberlain, pp. 49–66. Bangkok: Central Institute of English Language.
- Chamberlain, James R. 1984. *The Thai Dialects of Khammouan Province: Their Diversity and Origins*. Bangkok: Chulalongkorn University Press.
- Chamberlain, James R. 1991. “The Efficacy of the P/PH Distinction for Tai Languages.” In *The Ram Khamhaeng Controversy*, edited by James R. Chamberlain, pp. 453–486. The Siam Society.
- Chanthanakhom, Wanna, and Wanna Ratanapraserart. 1983. “Lao Wiang of Nong Nae Subdistrict.” *Borankhadi Journal* 26, 234–241. (In Thai).
- Chao, Yuen-Ren. 1930. “A System of “Tone-letters””. *Le Maître Phonétique* 30: 24–27.
- Daecha, Wilailuck. 1987. “A Comparative Study of the Phonology of Six Thai Dialects Spoken in Amphoe Tha Tako, Changwat Nakhon Sawan.” M.A. thesis, Chulalongkorn University. (In Thai).
- Dejvongsa, Soulang, Soulisak Prachit, Phonh Koxayo, and James R. Chamberlain. 1972. *Lao Language Research*. Vientiane: Royal Academic Council. (In Lao).
- Duke, Phensi, and Nari Sarikaphut. 1986. *The History of the Lao Wiang and the Lao Phuan in Phanom Sarakham and Sanam Chai Khet Districts, Chachoengsao Province*. Thai Studies Project. Chulalongkorn University. (In Thai).
- Gedney, William J. 1972. “A Checklist for Determining Tones in Tai Dialects.” In *Studies in Linguistics in Honor of George L. Trager*, pp. 423–37. The Hague: Mouton.
- Hartmann, John F. 1980. “A Model for the Alignment of Dialects in Southwestern Tai.” *Journal of the Siam Society Bangkok* 68 (1), 72–86.
- Hartmann, John F. 2002. “*Spoken Lao – A Regional Approach*.” Last modified May 11, 2003. <http://www.seasite.niu.edu/lao/>.
- Hartmann, John F. 2004. “Linguistic and Historical Continuities of the Tai Dam and Lao Phuan: Case Studies in Boundary Crossings.” Paper presented at *SEALS14*, May 19–21, 2004, Thammasat University, Bangkok.

- Hasonnary, Siwaporn. 2000. *"The Lao Luang Prabang Phonology: A Comparative Study with Lao Khrang in Thachin River Basin and Lao Dan Say."* M.A. thesis, Silpakorn University. (In Thai).
- Kamalanavin, Varisa. 2013. "Tones in Louang Phabang Lao." *Journal of Language and Culture* 32 (2): 43–74. (In Thai).
- Khanittanan, Wilaiwan Wichienrot. 1973. *"The Influence of Siamese on Five Lao Dialects."* Ph.D. diss., the University of Michigan.
- Kullavanijaya, Pranee, and Theraphan L-Thongkum. 1998. "Linguistic Criteria for Determining Tai Ethnic Groups: Case Studies on Central and South-Western Tais." Paper presented at the International Conference on Tai Studies, July 29–31, 1998, Institute of Language and Culture for Rural Development, Mahidol University, Bangkok.
- Laver, John. 1994. *Principles of Phonetics*. Cambridge Textbooks in Linguistics. Cambridge: Cambridge University Press.
- Li, Fang Kuei. 1960. "A Tentative Classification of Tai Dialects." In *Culture in History: Essays in Honor of Paul Radin*, pp. 951–959. New York: Columbia University Press.
- Li, Fang Kuei. 1977. *A Handbook of Comparative Tai*. Honolulu: University of Hawai'i Press.
- L-Thongkum, Theraphan. 2016. *From the Hands of ASEAN Women: Tai-Lao and Pwo Karen Textiles of Ban Rai District, Uthai Thani Province*. Bangkok: Chulalongkorn University Printing House. (In Thai).
- Osatananda, Varisa. 1997. *"Tone in Vientiane Lao."* Ph.D. diss., The University of Hawaii.
- Osatananda, Varisa. 2016. *Practicing Vientiane Lao language skills*. Bangkok: Institute of Asian Studies, Chulalongkorn University. (In Thai).
- Panka, Kanchana. 1980. *"The Phonological Characteristics of Lao Dialects in Amphoe Muang, Nakhon Pathom."* M.A. thesis, Chulalongkorn University. (In Thai).
- Pittayaporn, Pittayawat. 2009. *"The Phonology of Proto-Tai."* Ph.D. diss., Cornell University.
- Piyabhan, Bung-on. 1998. *The Lao in Early Bangkok*. Bangkok: Thammasat University Press. (In Thai).
- Pornpottanamas, Warunsiri. 2016. "Which Dialects of Lao are Spoken by the "Lao Wiang" of Tambon Nong Nae, Amphoe Phanom Sarakham, Changwat Chachoengsao." Paper presented at the 5th ICLS, July 8–10, 2016, Thammasat University, Bangkok.
- Premssirrat, Suwilai, Sujaritlak Deepadung, Akapong Suwannaket, Apinya Bausuang, Isara Choosri, Sophana Srichampa, Mayuree Thawornpat, Amon Thavisak, and Prapasri Dumsa-ard. 2004. *Ethnolinguistic Maps of Thailand*. Bangkok: Ministry of Culture and Mahidol University. (In Thai).
- Ratanapraseart, Wanna. 1985. *"Word Classes and Word Types of Lao-Wiang Language in Chachoeng Sao Province."* M.A. thesis, Silpakorn University. (In Thai).

- Roffe, Edward G., and Thelma W. Roffe. 1956. *Spoken Lao, Book 1*. Washington, D.C.: American Council of Learned Societies.
- Strecker, David. 1979. “A Preliminary Typology of Tone Shapes and Tonal Sound Changes in Tai: The Lan Na A-tones.” In *Studies in Tai and Mon-Khmer Phonetics and Phonology in Honour of Eugenie J.A. Henderson*, edited by Theraphan L. Thongkum et al., pp. 171–240. Bangkok: Chulalongkorn University Press.
- Tanprasert, Pornpen. 2003. “*A Language Classification of Phuan in Thailand: A Study of the Tone System*.” Ph.D. diss., Mahidol University.
- Thailand Transport Portal. 2012. *Base Map of Chachoengsao Province*. Bangkok.
- The Royal Institute of Thailand. 1999. “Guidelines for Transliteration from Thai to English.” Implemented January 11, 1999. http://www.royin.go.th/wp-content/uploads/2015/03/416_2157.pdf. (In Thai).
- Tingsabadh, M.R. Kalaya. 2001. “Thai Tone Geography.” In *Essays in Tai Linguistics*, edited by M.R. Kalaya Tingsabadh and Arthur S. Abramson, pp. 205–228. Bangkok: Chulalongkorn University Press.
- Vallibhotama, Srisakara. 1980. “The Lao of Thailand: Laotian Settlements in Thailand.” *Muang Boran Journal* 6 (2), 55–66. (In Thai).
- Wattanaprasert, Kantima, and Suwattana Liamprawat. 1985. *The Phonology of Lao Dialects in Thachin River Basin*. Silpakorn University. (In Thai).

Appendix 1

Information on research sites (locations and villages) and number of participants interviewed in each location

Location	Research site		No. of participants	Research site		No. of participants
	Village			Location	Village	
1	Loe Village (M.2), Mueang Kao Subdistrict		3	31	Nong Prue Village (M.9), Ko Khanun Subdistrict	3
2	Mueang Maet Village (M.3), Mueang Kao Subdistrict		3	32		3
3	Chom Mani Village (M.4), Mueang Kao Subdistrict		3	33		3
4	Nong Sai Village (M.1), Nong Yao Subdistrict		3	34		1
5	Nong Patong		2	35		2
6	Tai Village (M.2), Nong Yao Subdistrict		1	36		3
7	Laeng Village (M.5), Nong Yao Subdistrict		3	37	Hin Dat Village (M.11), Ko Khanun Subdistrict	1
8	Na Lao Bok Village (M.6), Nong Yao Subdistrict		3	38		2

9	Nong Patong Nuea Village (M.12), Nong Yao Subdistrict	3	39	3
10	Khok Hua Khao Village (M.3), Tha Than Subdistrict	3	40	3
11	Nong Khet Village (M.7), Tha Than Subdistrict	3	41	Nong I Thon Village (M.12), Ko Khanun Subdistrict
12	Hua Krasang Village (M.5), Ban Song Subdistrict	3	42	3
13	Hua Krasang Village (M.10), Ban Song Subdistrict	3	43	2
14	Huai Plik Village (M.12), Ban Song Subdistrict	3	44	Bang Mafueang Village (M.1), Khu Yai Mi Subdistrict
15	Nong Saeng Village (M.6), Khao Hin Son Subdistrict	3	45	Phon Ngam Village (M.4), Khu Yai Mi Subdistrict
16	Nong Prue Village (M.14), Khao Hin Son Subdistrict	2	46	Tha Muang Village (M.9), Khu Yai Mi Subdistrict
17		1	47	Bueng Takhe Village (M.14), Khu Yai Mi Subdistrict
18	Pak Huai Village (M.7), Nong Nae Subdistrict	3	48	Tha Kloi Village (M.4), Tha Takiap Subdistrict

Information on research sites (locations and villages) and number of participants interviewed in each location (*cont.*)

Location	Research site		No. of participants	Research site		No. of participants
	Village			Location	Village	
19	Nong Bua Village (M.8), Nong Nae Subdistrict		3	49	Fang Khlong Village (M.21), Tha Takiap Subdistrict, Tha Takiap District	1
20			3	50		2
21	Khok Village (M.9), Nong Nae Subdistrict		2			
22			1			
23	Nong Nae Village (M.12), Nong Nae Subdistrict		3			
24	Pa Rai Village (M.14), Nong Nae Subdistrict		3			
25			1			
26			2			
27	Nong Suea Village (M.4), Ko Khanun Subdistrict		1			
28			1			
29			3			
30	Na Noi Village (M.6), Ko Khanun Subdistrict		3			

Note: Locations 1–43, Locations 44–47 and Locations 48–50 are in the Districts of Phanom Sarakham, Sanam Chai Khet and Tha Takiap, respectively.

Appendix 2

102 monosyllabic words adapted from Gedney's tone box (1972)

*A	*B	*C	*DL	*DS	
1	/huː ^{A1} / 'ear' /kʰaː ^{A1} / 'leg' /hua ^{A1} / 'head' /maː ^{A1} / 'dog' /soːŋ ^{A1} / 'two'	/kʰaː ^{B1} / 'egg' /pʰaː ^{B1} / 'to split' /kʰaː ^{B1} / 'knee' /kʰaː ^{B1} / 'galangal' /siː ^{B1} / 'four'	/kʰaː ^{C1} / 'rice' /suə ^{C1} / 'shirt' /kʰaː ^{C1} / 'to kill' /kʰaː ^{C1} / 'fever' /haː ^{C1} / 'five'	/kʰaː ^{DL1} / 'tom' /ŋuek ^{DL1} / 'gum' /haː ^{DL1} / 'to carry' /soːk ^{DL1} / 'elbow' /kʰaː ^{DL1} / 'centipede' /pʰaːk ^{DL1} / 'forehead' /kʰaːk ^{DL1} / 'to spilt'	/mat ^{DS1} / 'flea' /suk ^{DS1} / 'cooked, rice' /pʰak ^{DS1} / 'vegetable' /wat ^{DS1} / 'having a cold' /kʰap ^{DS1} / 'to drive away' /kop ^{DS2} / 'frog' /tap ^{DS2} / 'liver' /cep ^{DS2} / 'to hurt' /kat ^{DS2} / 'to bite' /kap ^{DS2} / 'things to eat with rice' /bet ^{DS3} / 'fishhook' /dip ^{DS3} / 'raw, unripe' /ʔok ^{DS3} / 'the chest' /det ^{DS3} / 'to pull out' /ʔap ^{DS3} / 'musty'
2	/piː ^{A2} / 'year' /taː ^{A2} / 'eye' /kin ^{A2} / 'to eat' /paː ^{A2} / 'fish' /kaː ^{A2} / 'crow'	/paː ^{B2} / 'forest' /kaː ^{B2} / 'chicken' /keː ^{B2} / 'senior' /kau ^{B2} / 'old' /kaːn ^{B2} / 'horizontal stripes on tube skirt'	/paː ^{C2} / 'aunt' /klaː ^{C2} / 'rice seedlings' /tom ^{C2} / 'to boil' /kaːu ^{C2} / 'nine' /kaːn ^{C2} / 'stem'	/pɔːt ^{DL2} / 'lung' /piːk ^{DL2} / 'wing' /tɔːk ^{DL2} / 'thin bamboo-stripe' /paːk ^{DL2} / 'mouth' /kaːp ^{DL2} / 'husk'	
3	/bin ^{A3} / 'to fly' /dɛːŋ ^{A3} / 'red' /daːw ^{A3} / 'star' /baːn ^{A3} / 'to bloom' /ʔaːw ^{A3} / 'father's younger brother'	/baː ^{B3} / 'shoulder' /baːw ^{B3} / 'young man' /daː ^{B3} / 'to scold' /ʔaːn ^{B3} / 'to read' /daːn ^{B3} / 'frontier'	/baː ^{C3} / 'crazy' /baːn ^{C3} / 'village' /ʔaː ^{C3} / 'to open (the month)' /ʔuəi ^{C3} / 'older sister' /ʔaːi ^{C3} / 'older brother'	/dɛːt ^{DL3} / 'sunshine' /ʔaːp ^{DL3} / 'to bathe' /dɔːk ^{DL3} / 'flower' /baːt ^{DL3} / 'to be cut by a knife' /daːp ^{DL3} / 'sword'	

102 monosyllabic words adapted from Gedney's tone box (1972) (cont.)

	*A	*B	*C	*DL	*DS
4	/mu:˩˥/ 'hand'	/pʰiː˩˥˩˥/ 'older sibling'	/na:m˩˥˩˥/ 'water'	/miːt˩˥˩˥˩˥/ 'knife'	/nok˩˥˩˥˩˥/ 'bird'
	/kʰwa:i˩˥˩˥/ 'water buffalo'	/pʰɔː˩˥˩˥˩˥/ 'father'	/nɔːŋ˩˥˩˥˩˥/ 'younger sibling'	/lu:k˩˥˩˥˩˥˩˥/ 'one's child'	/mat˩˥˩˥˩˥˩˥/ 'to tie up'
	/naː˩˥˩˥/ 'ricefield'	/mɛː˩˥˩˥˩˥/ 'mother'	/mai˩˥˩˥˩˥/ 'wood'	/luət˩˥˩˥˩˥˩˥/ 'blood'	/lak˩˥˩˥˩˥˩˥/ 'to steal'
	/kʰaː˩˥˩˥/ 'to be stuck'	/kʰaː˩˥˩˥˩˥/ 'value'	/maː˩˥˩˥˩˥/ 'horse'	/nɔːk˩˥˩˥˩˥˩˥/ 'outside'	/wat˩˥˩˥˩˥˩˥/ 'temple'
	/kʰan˩˥˩˥/ 'itchy'	/kʰuː˩˥˩˥˩˥/ 'pair'	/kʰaː˩˥˩˥˩˥/ 'trade'	/kʰa:p˩˥˩˥˩˥˩˥/ 'to hold in the jaws'	/kʰap˩˥˩˥˩˥˩˥/ 'tight'