

The Phonetic Realization of Denasalized Final Nasal Consonants in No Lae Palaung¹

Supakit Buakaw*
supakit_deutsch@hotmail.com

Abstract

In No Lae Palaung, a northern Mon-Khmer language of the Austroasiatic language family, nasals are denasalized in word final position. This paper investigates the phonetic realization of denasalized final nasal consonants in Palaung dialect spoken in No Lae village, northern Thailand. Based on acoustic evidence, it has been demonstrated that denasalized final nasal consonants in No Lae Palaung are realized by stops with voiced homorganic nasal release, which exhibit voicing variation during the moment of oral closure due to the preceding vowel duration.

Keywords: Palaung, Dara-ang, phonetics, nasals, denasalization

บทคัดย่อ

ภาษาปะหล่องบ้านนอแลเป็นภาษามอญ-เขมรเหนือ ในตระกูลภาษาออสโตรเอเชียติก พยัญชนะนาสิกได้เกิดการลดความเป็นนาสิกในตำแหน่งท้ายคำ บทความนี้จึงมุ่งศึกษาสภาพจริงทางเสียงของพยัญชนะท้ายนาสิกที่ลดความเป็นนาสิก จากหลักฐานทางกลศาสตร์แสดงให้เห็นว่าพยัญชนะท้ายนาสิกในภาษาปะหล่องบ้านนอแลปรากฏสภาพจริงทางเสียงเป็นพยัญชนะท้ายเสียงหยุด ตามด้วยการปล่อยเสียงพยัญชนะนาสิกก้องที่มีฐานกรณ์เดียวกัน โดยมีการแปรของความก้องระหว่างช่วงเวลาการก้องของฐานกรณ์ ซึ่งขึ้นอยู่กับค่าระยะเวลาของสระที่นำมาข้างหน้า

คำสำคัญ: ปะหล่อง, ดาระอาง, สัทศาสตร์, พยัญชนะนาสิก, การลดความเป็นนาสิก

* Ph.D. candidate, Research Institute for Languages and Cultures of Asia, Mahidol University

1. Introduction

The Palaung language is a member of the Palaungic branch of the Mon-Khmer subfamily in the Austroasiatic language family. This paper examines the phonetic realization of the word final nasal consonants that have been denasalized in No Lae Palaung, a dialect of the Palaung language spoken in No Lae village located on Doi Ang Khang, Fang District of Chiang Mai Province, northern Thailand.

It has been observed that the nasals weaken or lose nasality in word final position in a number of Palaung dialects, particularly in the group of Palaung called Pale or Silver Palaung. For instance, Janzen (1978, p. 14) reports there are preglottalized final nasals in Pale Palaung, a dialect which is closely related to No Lae Palaung, spoken in Kalaw area of Shan State of Myanmar. Janzen further explains that preglottalization occurring in Pale is a subphonemic feature which is connected frequently with velar /ŋ/ and also with labial /m/ and alveolar /n/ at the final. Gwaw Too (1982) who studied the phonology of Pale Palaung living in the same area as the Palaung described by Janzen (1978) reports that the nasal final consonant phoneme /ŋ/ is realized as “an implosive unreleased voiced velar nasal with simultaneous glottal closure”. This phonetic property, however, is not found in other places of articulation of final nasal phonemes: bilabial /m/, dental /n/, and palatal /ɲ/. The presence of denasalized final nasals in four places of articulation was reported by Kasisopa (2003). In Palaung dialect spoken at No Lae village, the same dialect as the present study, Kasisopa analyzes the denasalized final nasals as the syllable final allophones of voiced stop which is contrasted with the final plain nasal. That is to say, voiced stop has two allophones which occur in complementary distribution: plain voiced stop occurs in syllable initial position while voiced stop with homorganic nasal release occurs in syllable final position.

Historically, the denasalized final nasal consonants in Palaung dialects originate from the plain nasal and in most cases they usually do not contrast with the plain nasal consonants. Since nasal consonants are voiced before they develop denasalization, denasalized final nasal consonants should also be voiced. However, it is controversial in terms of voicing as reported in previous studies (e.g. Janzen, 1978; Gwaw, 1982; Kasisopa, 2003) as to whether the denasalized segments are realized as voiced or voiceless stops. In addition, the Palaungic languages (e.g. U

and Hu) in which the denasalization has taken place always reflect simple voiceless stops (Svantesson, 1988, 1991). Since the past studies are mostly descriptive works and few acoustic studies have been carried out, the main goal of the present study is to examine the detailed phonetic fact of the word final nasals that have been denasalized in No Lae Palaung.

This paper is organized as follows: Section 2 discusses the phonemic status of denasalized final nasals in No Lae Palaung. After describing the method used in this study in Section 3, I illustrate the realization of various final nasals with selected spectrograms and waveforms in Section 4. In Section 5 a conclusion and discussion are provided.

2. The Phonemic Status of Denasalized Final Nasals in No Lae Palaung

The nasals examined in this study refer to the phonetic realization of the bilabial, alveolar, palatal, and velar final nasal consonants, /m, n, ɲ, ŋ/, which have become final stops with nasal release in particular environments. No Lae Palaung nasals have 2-way contrasts in voicing (voiced and voiceless) at four places of articulation: labial /m, m̥/, alveolar /n, n̥/, palatal /ɲ, ɲ̥/ and velar /ŋ, ŋ̥/. Both voiced and voiceless nasals occur phonemically in initial position but only voiced nasals can occur in final position. The nasals occurring in word final position in No Lae Palaung, in addition, have been denasalized.

Denasalized final nasals, in the present study, are considered as allophones of the simple nasals. There are several reasons for considering the denasalized final nasal as allophones of the nasals as follows:

First, in No Lae Palaung, denasalized nasals do not contrast with final simple nasals and occur in complementary distribution. That is, in word final position, velar nasals, preceded by all vowels, are realized as stops with nasal release, except that the final nasal, preceded by close central vowel /i/ and short mid central vowel /ə/, are realized as stops with nasal release in all places of articulation. Notably, denasalized velar nasals followed by front vowel /i, e/ have palatalized resulting in denasalized palatal consonants as shown in Table 2.1.

Table 2.1 Co-occurrence of vowels with denasalized final nasals

	/-m/	/-n/	/-ɲ/	/-ŋ/
/i/	m	n	c ⁿ	
/e/		n	ɟ ⁿ	
/ɛ/		n		g ^ŋ
/i/	p ^m			k ^ŋ
/ə/	p ^m	t ⁿ		
/ə:/	m	n		
/a/	m	n	ɲ	k ^ŋ
/a:/	m	n	ɲ	g ^ŋ
/u/		n	ɲ	k ^ŋ
/o/	m			k ^ŋ
/ɔ/		n		k ^ŋ
/ia/	m	n		g ^ŋ

Second, there is evidence to suggest those denasalized nasals are variants of simple nasals. That is, when the first syllable ends with a denasalized final nasal, it is always realized with a simple nasal. For instance, [ʔip^m] /ʔim/ ‘water’ is realized as [ʔim 'paⁱc'] /ʔim pac/ ‘saliva’. Third, the denasalized nasal in most cases can occur in free variation with simple nasal. For instance, the word ‘house’ can be pronounced as ['ka:ŋ] or ['ka:g^ŋ].

Fourth, the denasalized nasals are diachronically developed from simple nasals and have simple nasal reflexes in other Palaungic languages. For instance, [ʔip^m] /ʔim/ ‘water’ cognates with Hu /ʔðm/ ‘water’; U /ʔóm/ ‘water’; Lamet /ʔóom/ ‘water’ (Svantesson, 1988, p. 80). Fifth, there is a tendency for the simple nasals in word final position to develop into stops as reported in other Palaungic languages. The emergence of denasalized finals is also developed to prevent the merger of short and long vowels as in the case of short mid central vowel /ə/.

Thus, based on several factors indicated above, an analysis of denasalized nasals as allophones of simple nasals is preferable to one in which they are viewed as separate phonemes or as word final allophones of voiced stops.

3. Methodology

The data presented in this paper come from field recordings of a male, YM, aged 55, my principal informant, a native speaker of Palaung living in No Lae village in Chiang Mai Province. YM was born at Doi Lai in Shan State of Myanmar and migrated to No Lae village, northern Thailand when he was 27. He is a fluent speaker of Palaung and northern Thai and had no defect in speaking or hearing.

In order to record speech data, a list of meaningful monosyllabic and disyllabic words ending with final nasal consonants in No Lae Palaung was prepared. For the list of tokens recorded and analyzed, see the Appendix. Three repetitions of 39 words were randomized for a total of 117 words. The speaker was asked to pronounce the target words in isolation. Recordings were made directly into a computer notebook using a microphone. By using sound recording computer software, Cool Edit Pro (version 1.0), all data were digitally recorded at a sampling rate of 44.1 kHz and saved as .wav file on the computer. Spectrograms and waveforms were performed using the PRAAT program (version 5.1.02), speech analysis software produced by Paul Boersma and David Weenink (Boersma & Weenink, 2009).

4. Results

Spectrogram studies of the tokens of word denasalized final nasals in No Lae Palaung give a uniform picture of oral closure with nasal release but they also indicate that there is not always voiced during stops production as shown in the waveforms in the following sections. Since No Lae Palaung has denasalized final nasals in four places of articulation which co-occur with preceding vowels, the qualitative analysis of denasalized nasal is given by places of the consonant.

4.1 Realization of final /-m/

Final /-m/ is realized as voiceless labial stop with voiced homorganic nasal release [-p^m]. Sample spectrogram and waveform of final stop with nasal release in the word /ʔim/ ‘water’ and /səm/ ‘to plant’ are given in Figure 4.1 and Figure 4.2.

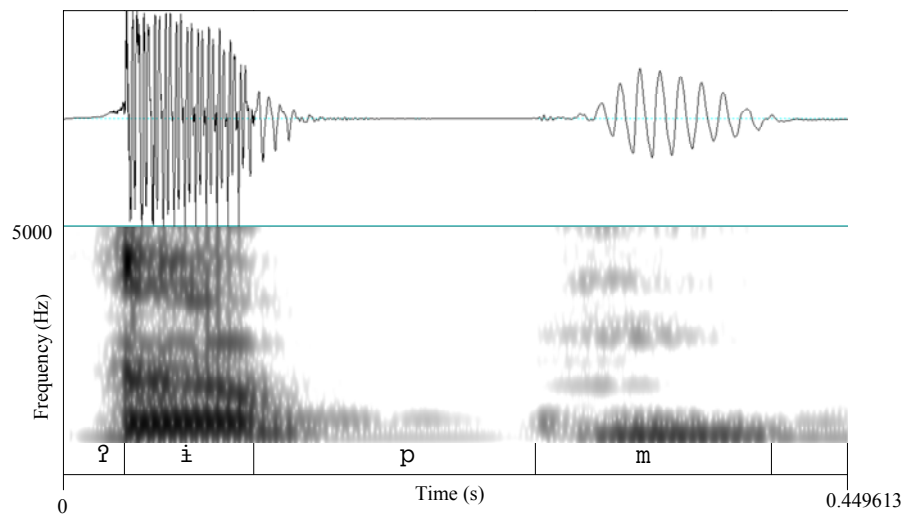


Figure 4.1 Waveform and spectrogram of /ʔim/

The word final labial nasal becomes denasalized only after close central vowel /i/ and short mid central vowel /ə/. This means that, apart from /i, ə/, final labial nasal preceded by other vowels do not become stops in word final position.

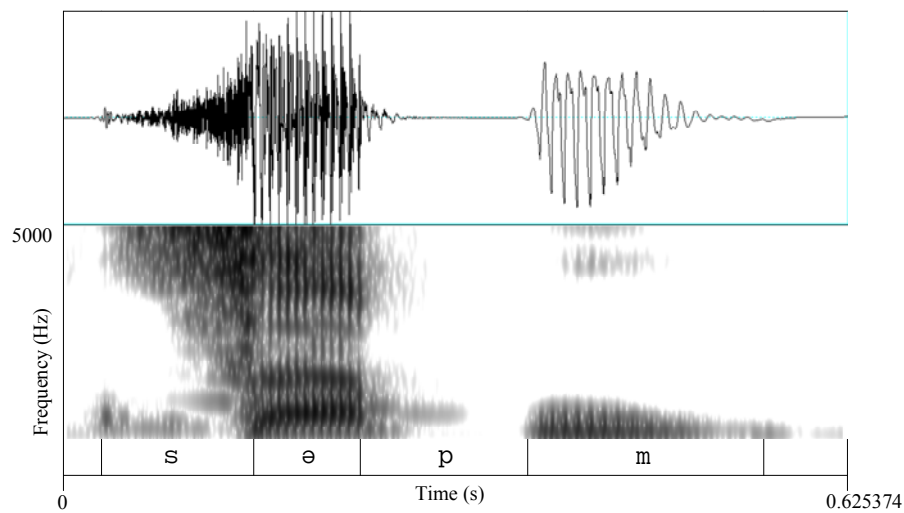


Figure 4.2 Waveform and spectrogram of /səm/

As shown in both figures (4.1 and 4.2) there is still vocal fold vibration at the beginning of the stop closure from the offset of vowel duration until the energy was no longer detected. From recorded examples of word final denasalized labial nasal it is demonstrated that before the velic is lowered, the nasal release, there is complete silence during the closure indicating no vocal fold pulsing.

4.2 Realization of final /-n/

The alveolar final /-n/ becomes stop only after the short mid central vowel /ə/. As illustrated by the word /bən/ ‘to fry’ and /tən/ ‘to lead by hand’ in Figure 4.3 and Figure 4.4, the final /-n/ is realized as a full stop indicating partial voicing in the moment of oral closure before releasing nasal.

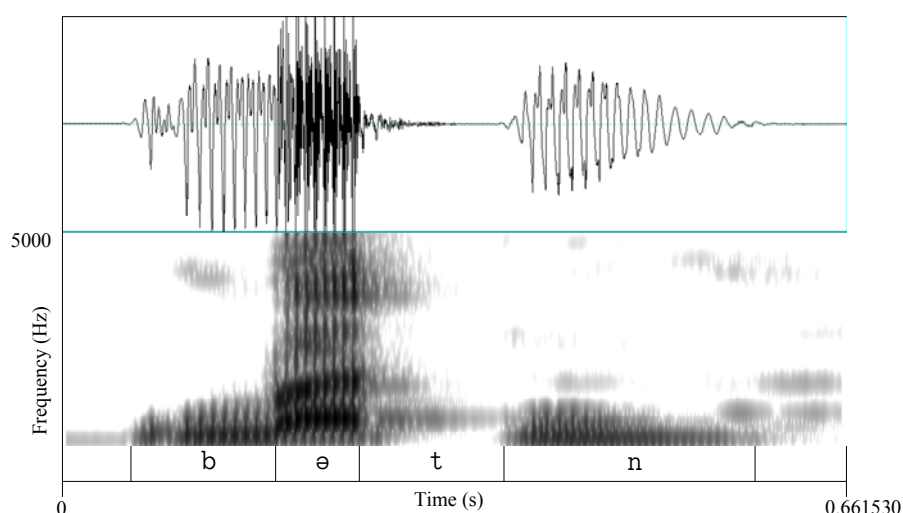


Figure 4.3 Waveform and spectrogram of /bən/

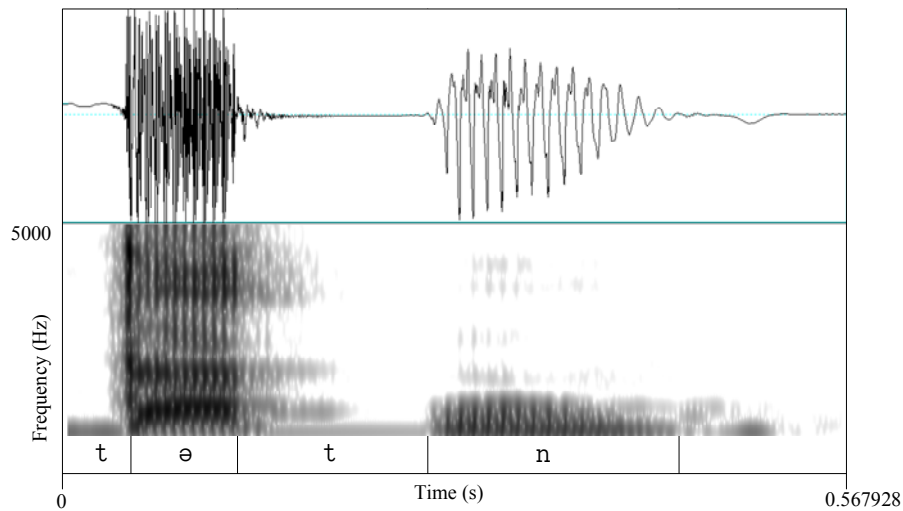


Figure 4.4 Waveform and spectrogram of /tən/

4.3 Realization of final /-ŋ/

Final palatal /-ŋ/ is quite rare in No Lae Paluang and co-occurred with the vowels /i, e, u, a, a:/. However, only final palatal nasals preceded by front vowels /i, e/ are realized as stops. Figures 4.5 and 4.6 illustrate instances of the word ending with palatal nasal that becomes stop with nasal release.

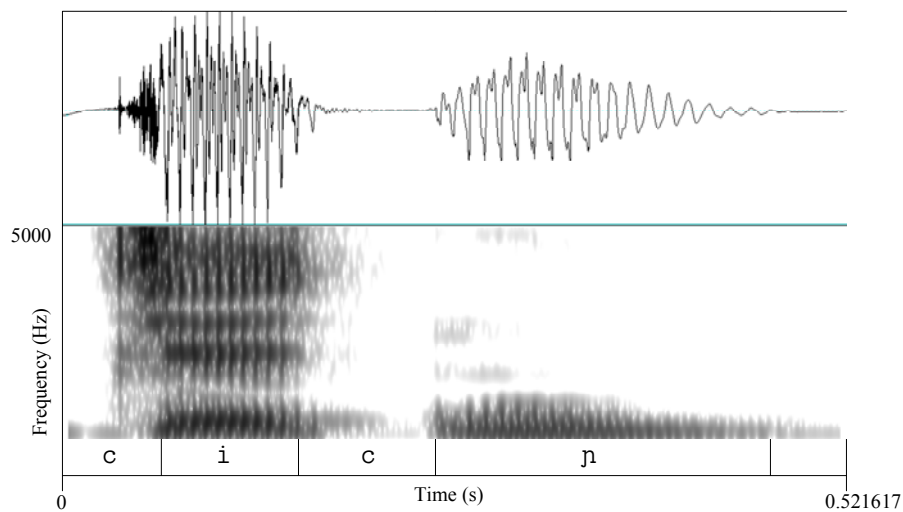


Figure 4.5 Waveform and spectrogram of /ciŋ/

As shown in figure 4.5, final palatal /-ɲ/ is realized as voiceless palatal stop followed by nasal release. However, a palatal /-ɲ/ preceded by the vowel /e/ which is phonetically long are realized as voiced stop. Duration of oral closure of the voiced palatal, in addition, is visually shorter than other places of articulation: labial, alveolar and velar. Non-significant diphthongization has also been observed in vowel before palatal consonant as indicated by the increase of the second formant frequency (F2). Samples of spectrogram and waveform of word final palatal in the words /bleɲ/ ‘sky’ and /n teɲ/ ‘road, path’ are given in Figures 4.6 and 4.7.

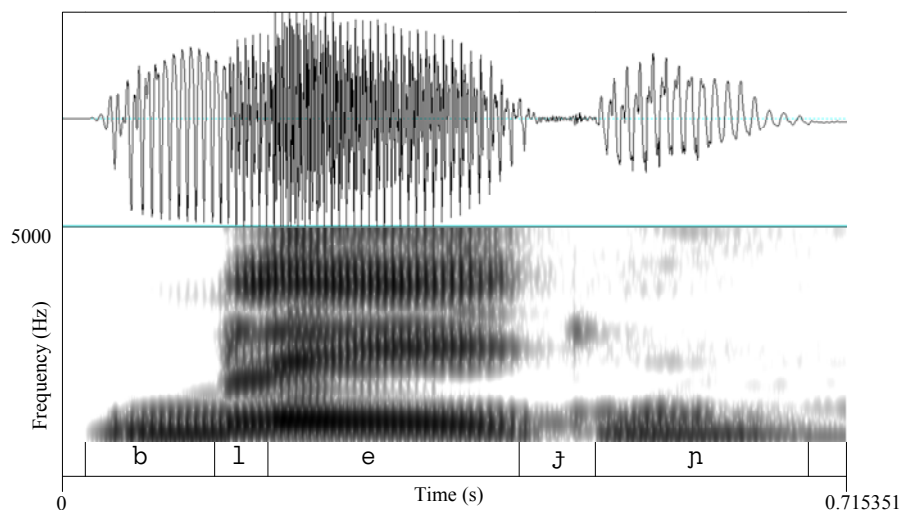


Figure 4.6 Waveform and spectrogram of /bleɲ/

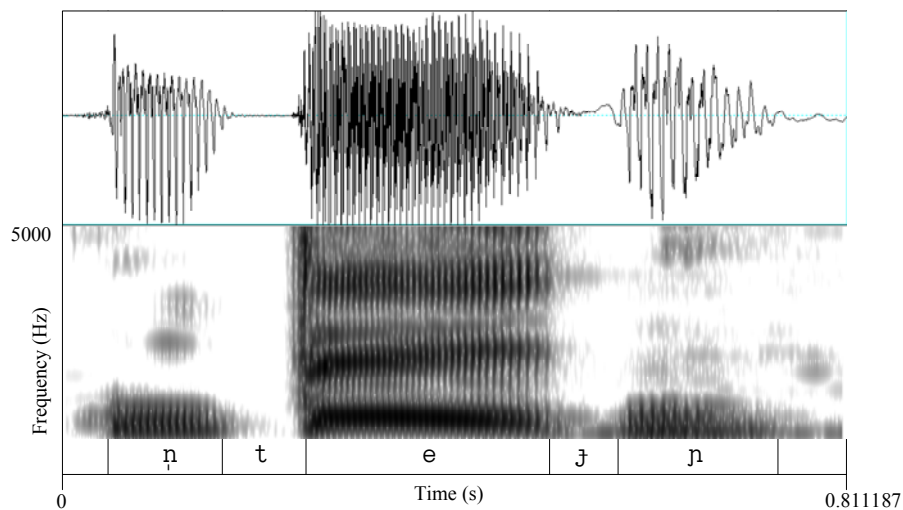


Figure 4.7 Waveform and spectrogram of /n teŋ/

It should be also noted that, in fact, the word final palatal nasals that become stops are historically developed from final velar nasals reflected in other Mon-Khmer languages (Diffloth, 1991, p. 22-24). This means that denasalization and palatalization have taken place. W. Ostapirat (personal communication, May 17, 2009) has suggested that the former process is more likely to happen before the second process since velar nasal preceded by all vowels tend towards denasalization, otherwise the words ending with original final palatals are not denasalized.

4.4 Realization of final /-ŋ/

Final velar is realized as stop with nasal release in most contexts of preceding vowels: single vowels /ɛ, i, a, a:, u, o, ɔ/ and diphthong /ia/, except for short mid central vowel /ə/. An example of /-ŋ/ in the word /dian/ ‘to drink’ is given in Figure 4.8.

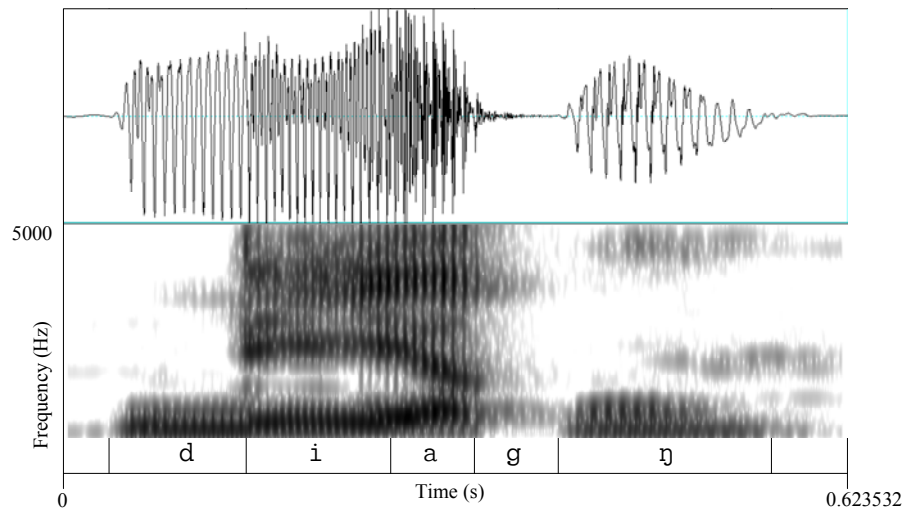


Figure 4.8 Waveform and spectrogram of /dian/

Final /-ŋ/ is realized as either voiced or voiceless stop which is always followed by voiced homorganic nasal release as illustrated by the words /rɔŋ/, ‘post, pole’ and /rɛŋ/ ‘wall’, in Figure 4.9 and Figure 4.10 respectively.

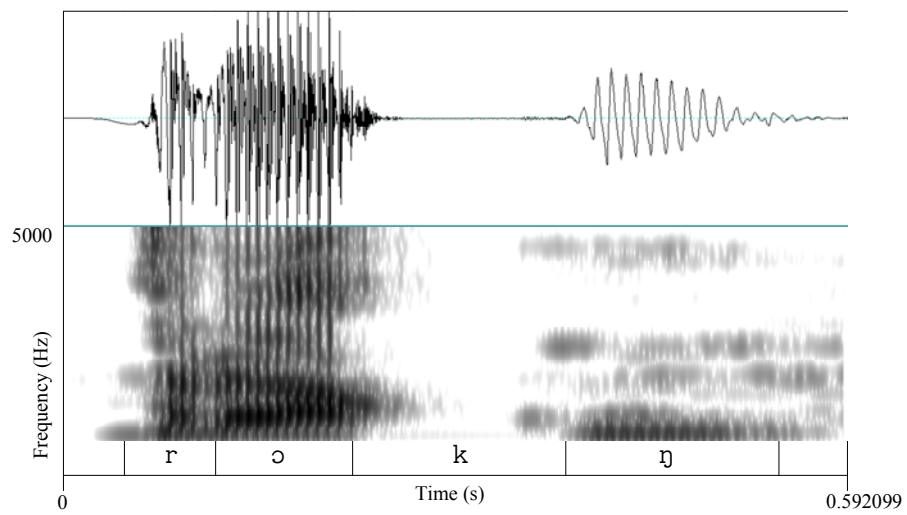


Figure 4.9 Waveform and spectrogram of /rɔŋ/

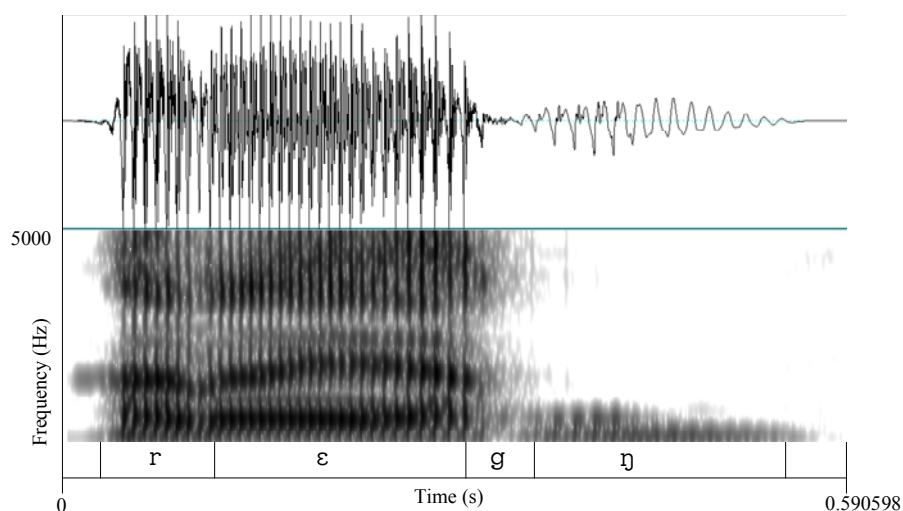


Figure 4.10 Waveform and spectrogram of /rɛŋ/

However, as seen in Figures 4.9 and 4.10, stop closure of velar nasal that has been denasalized, is visually not equal in terms of duration. Final /ŋ/ in the /rɔŋ/ is realized as voiceless velar stop with homorganic nasal release [-k^h] preceded by phonetically short vowel [ɔ], whereas final /ŋ/ in the /rɛŋ/ is realized as voiced velar stop with homorganic nasal release [-g^h] preceded by phonetically long vowel [ɛ].

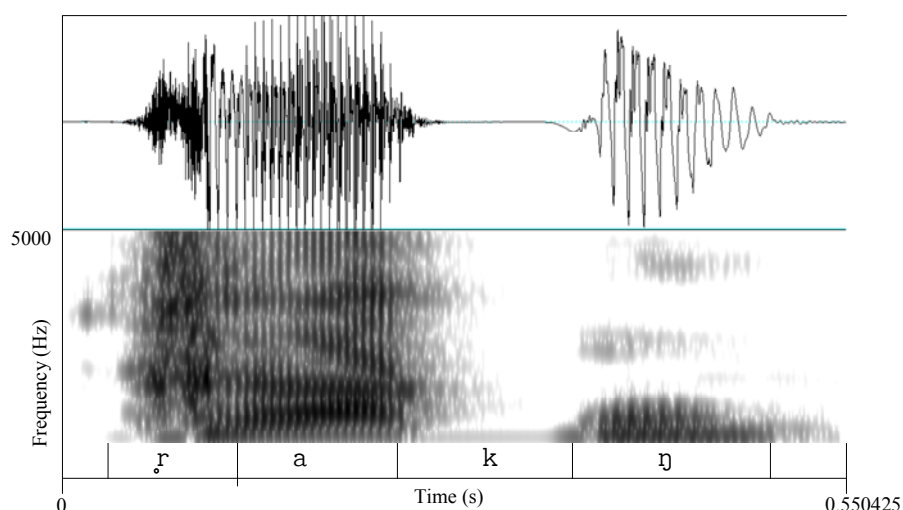


Figure 4.11 Waveform and spectrogram of /raŋk/

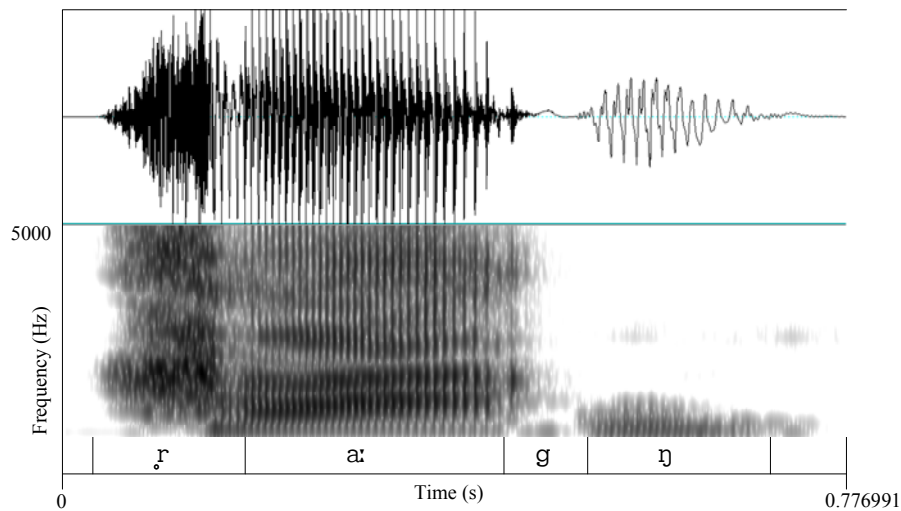


Figure 4.12 Waveform and spectrogram of /ra:ŋ/

The correlation between voicing of stop and preceding vowel duration is also true for velar nasal preceded by open central vowels /a, a:/ which has contrastive length (see Figure 4.11 in comparison with Figure 4.12). In fact, all words ending with final velar which is preceded by both phonetic and phonemic long vowels are always denasalized. It is hypothesized that in No Lae Palaung denasalization is not conditioned by preceding phonemic vowel length.

5. Discussion and Conclusion

The results in Section 4 show that in No Lae Palaung the denasalized final nasal consonants are realized as stop followed by homorganic nasal release, while the voicing during the moment of the oral closure can vary due to the preceding vowel duration. It can be concluded from the present study that denasalized final nasals in word final position are realized as voiced stops with homorganic nasal release when preceded by a long vowel, whereas denasalized final nasals following short vowels are realized as voiceless stops with homorganic nasal release. Such a voicing difference between denasalized nasal consonants within the same language is also found in the Bonggi language which has [ᵐ] [ᵑ] but [ᵑ], as was reported by Blust (1997, p. 156). Historically, since the denasalized consonant originates

from a simple nasal which is voiced, some scholars propose that the denasalized consonant should be voiced. However, in No Lae Palaung the denasalized final nasal may be either voiced or voiceless. Blust (1997, p. 172) discusses the issue that “since there are many languages that do not interrupt voicing in the production of preploded nasal, it is particularly puzzling why some do. Perhaps voicing is simply irrelevant in such context, and so varies freely in some languages”. In addition, Blust mentions further that “to date, no language has been reported with voicing contrast in the onsets of preploded nasals”.

The phonetic difference between final voiced and voiceless stops with homorganic nasal release is possibly the difference in the relative length of oral closure. More visually seen in spectrogram in the previous section, the stop closure of the denasalized final is longer in the final voiced stop with nasal release than in the final voiceless stop with nasal release. Although vowel is lengthened before the final voiced consonant, the duration of oral closure plays an important role in differentiating voiced and unvoiced final consonants as pointed out by Pickett (1980, p. 142) who notes “vowels before syllable-final consonants that are not pre-boundary also show a lengthening effect depending on voiced and voiceless consonant but it is much smaller difference, being on the order of the difference in duration of closure”.

In No Lae Palaung, since all recorded words required nasal release, it suggests that a nasal release is a phonetic cue distinguishing them from other final consonants. Unfortunately, only simple final stops in Palaungic languages spoken geographically in Shan State of Myanmar and Yunnan Province of China have been reported where nasal final denasalization has taken place. It is plausible to speculate that those languages have gone further towards the complete denasalization and devoicing process. We hope that more detailed acoustic and comparative studies of dialects will shed further light on the change of denasalized final nasal to simple stops in Palaungic languages.

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Endnotes

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Appendix

List of the No Lae Palaung used for recording in this study

-iŋ			-aŋ		
1.	giŋ	‘head’	20.	raŋ	‘bamboo’
2.	ciŋ	‘to sew’	21.	daŋ	‘to cook’
-eŋ			22.	jaŋ	‘meat’
3.	deŋ	‘yellow’	-a:ŋ		
4.	bleŋ	‘sky’	23.	ra:ŋ	‘teeth’
5.	reŋ	‘red’	24.	gla:ŋ	‘skirt’
6.	n teŋ	‘road, path’	25.	ka:ŋ	‘house’
-eŋ			26.	ka ʔa:ŋ	‘bone’
7.	reŋ	‘wall’	-uŋ		
8.	bleŋ	‘river’	27.	puŋ	‘water container’
9.	deŋ	‘above’	28.	ʔuŋ	‘sawing place’
10.	n teŋ	‘ladder’	-oŋ		
-im			29.	goŋ	‘to hold in hand’
11.	giŋ	‘thigh’	30.	toŋ	‘far, long’
12.	ʔim	‘water’	31.	boŋ	‘piece (cls.)’
-iŋ			-əŋ		
13.	khriŋ	‘cloth’	32.	rəŋ	‘post, pole’
-əm			33.	cəŋ	‘to stand’
14.	səm	‘to plant’	34.	səŋ	‘bitter’
15.	ʔəm	‘rotten’	35.	pəŋ	‘bamboo shoot’
16.	sa nəm	‘medicine’	-iaŋ		
17.	ka nəm	‘thunder’	36.	phiaŋ	‘wings’
-ən			37.	ʔiaŋ	‘excrement’
18.	bən	‘to fly’	38.	diaŋ	‘to drink’
19.	tən	‘to lead by hand’	39.	briaŋ	‘fat’