

**A PHONOLOGICAL STUDY OF PALAUNG DIALECTS SPOKEN
IN THAILAND AND MYANMAR, WITH FOCUSES ON
VOWELS AND FINAL NASALS**

SUPAKIT BUAKEAW

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY
(LINGUISTICS)
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
2012**

COPYRIGHT OF MAHIDOL UNIVERSITY

Thesis
entitled
**A PHONOLOGICAL STUDY OF PALAUNG DIALECTS SPOKEN
IN THAILAND AND MYANMAR, WITH FOCUSES ON
VOWELS AND FINAL NASALS**

.....
Mr. Supakit Buakaw
Candidate

.....
Assoc. Prof. Sujaritlak Deepadung,
Ph.D.
Major advisor

.....
Prof. Somsonge Burusphat, Ph.D.
Co-advisor

.....
Assoc. Prof. Weera Ostapirat, Ph.D.
Co-advisor

Abroad

.....
Prof. Jerold A. Edmondson, Ph.D.
Co-advisor

.....
Prof. Banchong Mahaisavariya,
M.D., Dip Thai Board of Orthopedics
Dean
Faculty of Graduate Studies
Mahidol University

.....
Lect. Sumittra Suraratdecha, Ph.D.
Program Director
Doctor of Philosophy Program in
Linguistics
Research Institute for Languages and
Cultures of Asia
Mahidol University

Thesis
entitled
**A PHONOLOGICAL STUDY OF PALAUNG DIALECTS SPOKEN
IN THAILAND AND MYANMAR, WITH FOCUSES ON
VOWELS AND FINAL NASALS**

was submitted to the Faculty of Graduate Studies, Mahidol University
for the degree of Doctor of Philosophy (Linguistics)

on
April 27, 2012

.....
Mr. Supakit Buakaw
Candidate

.....
Lect. Chutamane Onsuwan, Ph.D.
Chair

.....
Assoc. Prof. Weera Ostapirat, Ph.D.
Member

.....
Assoc. Prof. Sujaritlak Deepadung,
Ph.D.
Member

Abroad

.....
Prof. Jerold A. Edmondson, Ph.D.
Member

.....
Prof. Somsong Burusphat, Ph.D.
Member

.....
Prof. Banchong Mahaisavariya,
M.D., Dip Thai Board of Orthopedics
Dean
Faculty of Graduate Studies
Mahidol University

.....
Assoc. Prof. Duangporn Kamnoonwatana,
M.A.
Director
Research Institute for Languages and
Cultures of Asia
Mahidol University

ACKNOWLEDGEMENTS

First, I would like to express my deepest gratitude to my major advisor, Assoc. Prof. Dr. Sujaritlak Deepadung. I have benefitted from her meticulous attention to details, her knowledge of linguistic fieldwork, and her interest in Mon-Khmer languages. I thank her for her guidance, support, and unlimited availability over the many years that I have been working on this topic at Mahidol.

I also would like to thank the members of my Ph.D. committee: Prof. Dr. Somsong Burusphat has also been a helpful source of advice throughout this thesis. I thank her for her commentary and for carefully examining this thesis for any potential misunderstandings. Assoc. Prof. Dr. Weera Ostapirat has been a positive force in this thesis, as well. His knowledge of historical linguistics helped me to look for patterns in the language that otherwise I would have missed.

My sincere appreciation also goes to Prof. Dr. Jerold A. Edmondson at the Department of Linguistics and TESOL, at the University of Texas at Arlington, for his kindly advice and assistance, and for warmly taking care of me during my stay in Arlington, Texas.

I am especially grateful to Dr. Chutamanee Onsuwan for being a great external examiner. I have benefitted profoundly from her helpful suggestions and valuable comments.

My education at Mahidol University and fieldwork research in Thailand and Myanmar was funded through a scholarship from the Thailand Research Fund (TRF) through the Royal Golden Jubilee Ph.D. Program (RGJ-Ph.D.). I thank RGJ-Ph.D. for making my work possible.

This work would not exist without the assistance of the Palaung people in Thailand and Myanmar: Dara-ang speakers in No-Lae Village, Chiang Mai Province and Da-ang speakers in Nyaung Gone Village, Kalaw, Shan State.

My special thanks goes to Ampika Rattanapitak, who has supported me in various ways as a classmate, research assistant, and Burmese interpreter.

Finally, I am, as always, grateful to my family for their unconditional love and unfailing support.

Supakit Buakaw

A PHONOLOGICAL STUDY OF PALAUNG DIALECTS SPOKEN
IN THAILAND AND MYANMAR, WITH FOCUSES ON
VOWELS AND FINAL NASALS

SUPAKIT BUAKEAW 4837496 LCLG/D

Ph.D. (LINGUISTICS)

THESIS ADVISORY COMMITTEE: SUJARITLAK DEEPADUNG, Ph.D., SOMSONGE
BURUSPHAT, Ph.D., WEERA OSTAPIRAT, Ph.D., JEROLD A. EDMONDSON, Ph.D.

ABSTRACT

The objective of this thesis is to describe the phonological system of Dara-ang and Da-ang, Palaung dialects spoken in Thailand and Myanmar, respectively. This investigation focuses on vowel length and word-final denasalization occurring in both dialects. Dara-ang data were collected at No-Lae Village, Chiang Mai Province, Thailand, while Da-ang data were collected at Nyaung Gone Village, Kalaw City, Shan State, Myanmar.

The finding reveals that initial consonant and vowel inventories in Dara-ang and Da-ang are identical. The Da-ang system of final consonants, however, differs from Dara-ang due to the diachronic development of the finals, i.e., *-ŋ merged with -n and *-ŋ denasalized to -k. The vowel system of Dara-ang and Da-ang has phonemic vowel length for non-high central vowels /ə ə̃ a/. Acoustic findings, in addition, show that difference in the duration of phonemic short and long vowels is statistically significant, while phonemic short and long vowels also differ in terms of vowel quality. As proposed in this study, in Dara-ang and Da-ang, there are two types of denasalization: partial and complete denasalization. Nasal place of articulation is the trigger of the complete denasalization in Da-ang. In addition to nasal place of articulation, vowel height and vowel length are the triggers of the partial denasalization in Dara-ang. The denasalization of word-final nasals originated at a velar point of articulation, but the process of spreading to another nasal place of articulation is dialect-specific. This study argues that denasalized nasal in Dara-ang, which is realized as a voiceless oral stop followed by voiced nasal release, is an allophone of the plain nasal. Furthermore, acoustic analysis suggests that duration of the preceding vowel had a significant effect on the oral closure portion of the denasalized nasals.

KEY WORDS: PALAUNG / PHONOLOGY / VOWEL LENGTH / DENASALIZATION

213 pages

ระบบเสียงภาษาปะหล่องที่พูดในประเทศไทยและพม่า: การศึกษาสระและพยัญชนะท้ายนาสิก
 A PHONOLOGICAL STUDY OF PALAUNG DIALECTS SPOKEN IN THAILAND AND
 MYANMAR, WITH FOCUSES ON VOWELS AND FINAL NASALS

ศุภกิต บัวขาว 4837497 LCLG/D

ปร.ด. (ภาษาศาสตร์)

คณะกรรมการที่ปรึกษาวิทยานิพนธ์: สุจิตลักษณ์ ศิผดุง, Ph.D., สมทรง บุญพัฒน์, Ph.D., วีระ
 โอสธากิรัตน์, Ph.D., JEROLD A. EDMONDSON, Ph.D.

บทคัดย่อ

วิทยานิพนธ์นี้มีวัตถุประสงค์เพื่อบรรยายระบบเสียงภาษาดะอองและคะออง ซึ่งเป็น
 ภาษาปะหล่องที่พูดในประเทศไทยและพม่า การศึกษานี้ยังได้วิเคราะห์ความสั้นยาวสระและการลด
 ความเป็นนาสิกท้ายคำที่ปรากฏในทั้งสองภาษา โดยภาษาดะอองเก็บข้อมูลที่บ้านนอแล จังหวัด
 เชียงใหม่ ประเทศไทย ส่วนภาษาคะอองเก็บข้อมูลที่บ้านหญ่าวโกง เมืองกะลอ รัฐฉาน ประเทศพม่า

ผลการศึกษาพบว่าจำนวนหน่วยเสียงพยัญชนะต้นในภาษาดะอองและคะอองมี
 จำนวนเท่ากัน ระบบสระของภาษาดะอองและคะอองมีลักษณะเหมือนกัน ระบบพยัญชนะท้าย
 ภาษาคะอองแตกต่างจากภาษาดะออง เนื่องด้วยการเปลี่ยนแปลงของพยัญชนะท้ายดั้งเดิม กล่าวคือ
 เสียง *-ŋ รวมกับเสียง -n และเสียง *-ŋ ลดความเป็นนาสิกเปลี่ยนเป็น -k ระบบสระภาษาดะออง
 และคะอองมีความสั้นยาวเฉพาะสระกลางที่ไม่เป็นสระสูง /อ อ ั a/ ผลการศึกษาทางกลศาสตร์
 แสดงให้เห็นว่าค่าระยะเวลาของสระสั้นและสระยาวแตกต่างกันอย่างมีนัยสำคัญ และตำแหน่งของ
 สระสั้นและสระยาวก็ยังแตกต่างกันอีกด้วย การศึกษานี้เสนอว่าการลดความเป็นนาสิกท้ายคำใน
 ภาษาดะอองและคะออง มี 2 ประเภท คือ การลดความเป็นนาสิกสมบูรณ์ และการลดความเป็น
 นาสิกบางส่วน ในขณะที่ฐานของพยัญชนะนาสิกเป็นตัวนำการลดความเป็นนาสิกสมบูรณ์ในภาษา
 คะออง แต่ในภาษาดะอองฐานพยัญชนะนาสิก ความสูงต่ำของสระ และความสั้นยาวสระเป็น
 ตัวนำการลดความเป็นนาสิกบางส่วน การลดความเป็นนาสิกนั้นเริ่มต้นที่พยัญชนะฐานเพดานอ่อน
 แต่การขยายไปสู่ฐานพยัญชนะอื่นเป็นลักษณะเฉพาะถิ่น การศึกษานี้เสนอว่าพยัญชนะท้ายที่ลดความ
 เป็นนาสิกซึ่งมีสัทลักษณะเป็นเสียงพยัญชนะกักไม่ก้องตามด้วยการปล่อยเสียงนาสิกจัดเป็นหน่วย
 เสียงย่อยของพยัญชนะนาสิกในภาษาดะออง และผลการศึกษาชี้ให้เห็นว่าระยะเวลาของสระที่
 นำหน้ามีผลอย่างมีนัยสำคัญต่อระยะเวลาของเสียงกักของพยัญชนะท้ายที่ลดความเป็นนาสิก

CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
ABSTRACT (ENGLISH)	iv
ABSTRACT (THAI)	v
LIST OF TABLES	xi
LIST OF FIGURES	xiii
CHAPTER I INTRODUCTION	1
1.1 Background of the study	1
1.2 Purposes of the study	3
1.3 Research questions	3
1.4 Scope of the study	4
1.5 Contributions of the study	5
1.6 The Palaung language and its speakers	5
1.6.1 Locations and numbers of Palaung speakers	6
1.6.2 Classification of the Palaung language	7
1.7 Organization of the study	10
CHAPTER II LITERATURE REVIEW	12
2.1 General works of the Palaung	12
2.2 Previous phonological studies on Palaung dialects	13
2.3 Palaung historical phonology	20
2.2.1 Proto-Palaung initials	20
2.2.2 Proto-Palaung vowels	21
2.2.3 Proto-Palaung finals	23
2.4 Related studies on vowel length and denasalization in Palaungic languages	24
CHAPTER III METHODOLOGY	30
3.1 Fieldwork	30

CONTENTS (cont.)

	Page
3.2 Wordlists	31
3.2.1 Wordlist for phonological analysis	31
3.2.2 Wordlist for acoustic analysis	31
3.3 Informants	35
3.3.1 Speakers of Dara-ang	35
3.3.2 Speakers of Da-ang	35
3.4 Elicitations and recordings	36
3.5 Phonological analysis	37
3.6 Acoustic analysis	38
3.6.1 Acoustic measurement I	38
3.6.2 Acoustic measurement II	39
3.7 Summary	40
CHAPTER IV DARA-ANG PHONOLOGY	41
4.1 Words	41
4.1.1 Monosyllabic words	41
4.1.2 Polysyllabic words	42
4.2 Syllables	43
4.2.1 Major syllables	43
4.2.2 Minor syllables	44
4.3 Initial consonants	47
4.3.1 Initial consonant inventory	47
4.3.2 Consonant cluster	57
4.4 Vowels	59
4.4.1 Monophthongs	59
4.4.2 Diphthongs	64
4.4.3 Off-glides	65

CONTENTS (cont.)

	Page
4.5 Final consonants	66
4.5.1 Stop	67
4.5.2 Nasals	67
4.5.3 Fricatives	71
4.5.4 Glides	71
4.6 Summary	72
CHAPTER V DA-ANG PHONOLOGY	73
5.1 Words	73
5.1.1 Monosyllabic words	73
5.1.2 Polysyllabic words	74
5.2 Syllables	75
5.2.1 Major syllables	75
5.2.2 Minor syllables	76
5.3 Initial consonants	79
5.3.1 Initial consonant inventory	79
5.3.2 Consonant cluster	88
5.4 Vowels	89
5.4.1 Monophthongs	89
5.4.2 Diphthongs	94
5.5 Final consonants	96
5.5.1 Stops	96
5.5.2 Nasals	99
5.5.3 Fricatives	101
5.5.4 Glides	102
5.6 Summary	102
CHAPTER VI VOWEL LENGTH	104
6.1 Vowel length in two Palaung dialects	105

CONTENTS (cont.)

	Page
6.1.1 Vowel length in Dara-ang	105
6.1.2 The phonological process evolving phonemic vowel length in Dara-ang	106
6.1.3 Vowel length in Da-ang	109
6.1.4 The phonological process evolving phonemic vowel length in Da-ang	111
6.2 Acoustic analysis of vowel length in Dara-ang	114
6.2.1 Methods	114
6.2.2 Results	114
6.2.3 Conclusion	120
6.3 Acoustic analysis of vowel length in Da-ang	121
6.3.1 Methods	121
6.3.2 Results	121
6.3.3 Conclusion	128
6.4 Acoustic comparison of vowel length in Dara-ang and Da-ang	128
6.4.1 Vowel duration	129
6.4.2 First and second formants (F1, F2)	130
6.4.3 Short vowel preceding final labial /*-ǎm/ > /-ǎm/ vs. /*-ǎm/ > /-ǎm/	133
6.5 Summary	134
CHAPTER VII WORD-FINAL DENASALIZATION	135
7.1 Denasalization in two Palaung dialects	135
7.1.1 Word-final denasalization in Dara-ang	135
7.1.2 Phonological contexts triggered denasalized nasals in Dara-ang	136
7.1.3 Denasalization in Da-ang	140

CONTENTS (cont.)

	Page
7.2 Phonetic realization of the target denasalized nasals in Dara-ang	142
7.2.1 Methods	143
7.2.2 Results	143
7.2.3 Conclusion	152
7.3 Temporal characteristics of denasalized final nasals in Dara-ang	152
7.3.1 Methods	152
7.3.2 Results	153
7.3.3 Conclusion	157
7.4 Summary	157
CHAPTER VIII CONCLUSION	158
8.1 Summary of findings	158
8.2 Discussion	161
8.2.1 The phonemic sound inventory of Palaung dialects	161
8.2.2 Is vowel length in Dara-ang preserved or is vowel length in Da-ang lost?	162
8.2.3 What are the triggers of denasalized nasals in Palaung dialects?	164
8.2.4 What denasalized nasal is phonetically realized?	165
8.3 Recommendations	167
BIBLIOGRAPHY	169
APPENDIX	174
Da-ang and Dara-ang wordlist	175
BIOGRAPHY	213

LIST OF TABLES

Table		Page
2.1	Proto-Palaung final *-r, *-l, *-s, *-h (Mitani, 1977)	24
3.1	Minimal pairs or near minimal pairs used for recordings in the acoustic study of vowel length	32
3.2	Wordlist B1 used for recording in the acoustic study of phonetic realization of denasalized nasal target	34
3.3	Wordlist B2 used for recording in the acoustic study of temporal characteristics of target denasalized nasals	35
4.1	Dara-ang major syllable structure	44
4.2	Dara-ang initial consonant phonemes	48
4.3	The co-occurrence of Dara-ang consonant cluster	58
4.4	Dara-ang vowel phonemes	59
4.5	Dara-ang diphthong phonemes	64
4.6	The co-occurrences of final consonants and diphthongs	65
4.7	Vowels before final palatal stop and final palatal nasal	66
4.8	Dara-ang final consonant phonemes	66
4.9	The restriction on vowels in accordance with the final glides	72
5.1	Da-ang major syllable structure	75
5.2	Da-ang initial consonant phonemes	79
5.3	The co-occurrence of Da-ang consonant cluster	88
5.4	Da-ang vowel phonemes	90
5.5	Da-ang diphthong phonemes	94
5.6	The co-occurrences of Da-ang final consonants and diphthongs	95
5.7	Da-ang final consonant phonemes	96
5.8	The restriction on vowels according to the final glides	102
6.1	The short and long vowels, /ə̃ ə/ and /ã a/ according to final consonants	107

LIST OF TABLES (cont.)

Table		Page
6.2	The co-occurrence of /ǎ/ and /ə/ with final labial and alveolar stops /-p, -t/ and final labial and alveolar nasals /-m, -n/	113
6.3	The average duration (in ms) and the duration ratio of /ǎ/, /ə/, /ǎ/, and /a/ in Dara-ang (two male speakers)	115
6.4	Mean F1 and F2 values (in Hz) of /ǎ/, /ə/, /ǎ/, and /a/ in Dara-ang (two male speakers)	118
6.5	The average duration (in ms) and the duration ratio of /ǎ/, /ə/, /ǎ/, and /a/ in Da-ang (two male speakers)	122
6.6	Mean F1 and F2 values (in Hz) of /ǎ/, /ə/, /ǎ/, and /a/ in Da-ang (two male speakers)	124
7.1	Dara-ang denasalization according to nasal place of articulation, vowel height and phonemic vowel length	137
7.2	Dara-ang denasalization according to palatal and velar places of articulation of final nasals	138
7.3	Denasalization of final labial nasal /-m/ according to central vowel height	139
7.4	Denasalization of final labial /-m/ and /-n/ nasals according to phonemic vowel length	140
7.5	Complete denasalization in Da-ang according to nasal place of articulation	141
8.1	Comparison of phonemic sound inventory between Dara-ang spoken in Thailand and Da-ang spoken in Myanmar	159

LIST OF FIGURES

Figure		Page
1.1	Locations of two Palaung dialects spoken in Thailand and Myanmar	5
1.2	Geographic distributions of Palaungic languages (Sidwell, 2008)	6
1.3	Austro-Asiatic language family (Diffloth, 2005, p. 79)	8
1.4	Classifications of Palaungic languages (Diffloth & Zide, 2003)	9
1.5	Ostapirat's (2009) classification of Palaung dialects	10
3.1	Wideband spectrogram (bottom panel) and waveform display (top panel) of the word /tǎn/ 'to lead by hand' produced by a Da-ang male speaker	39
3.2	Wideband spectrogram (bottom panel) and waveform display (top panel) of the word /ʔǎm/ 'rotten' produced by a Dara-ang male speaker	40
6.1	The average duration (in ms) of /ǎ/, /ə/, /ǎ̃/, and /a/ in Dara-ang (two male speakers)	116
6.2	Average first formant frequency (F1) values of /ǎ/, /ə/, /ǎ̃/, and /a/ in Dara-ang (two male speakers)	118
6.3	Average second formant frequency (F2) values of /ǎ/, /ə/, /ǎ̃/, and /a/ in Dara-ang (two male speakers)	119
6.4	The plot of average values F1 vs. F2 of short and long vowels, /ǎ/, /ə/, /ǎ̃/, and /a/ in Dara-ang (two male speakers)	120
6.5	The average duration (in ms) of /ǎ/, /ə/, /ǎ̃/, and /a/ in Da-ang (two male speakers)	123

LIST OF FIGURES (cont.)

Figure		Page
6.6	Average first formant frequency (F1) values of /ə̃/, /ə/, /ă/, and /a/ in Da-ang (two male speakers)	125
6.7	Average second formant frequency (F2) values of /ə̃/, /ə/, /ă/, and /a/ in Da-ang (two male speakers)	125
6.8	The plot of average values F1 vs. F2 of short and long vowels, /ə̃/, /ə/, /ă/, and /a/ in Da-ang (two male speakers)	127
6.9	Average first formant frequency (F1) values of short vowel preceding final labial /*-ə̃m/ > /-am/ (two male speakers)	128
6.10	The average duration in ms of /ə̃/, /ə/, /ă/, and /a/ in two dialects of Palaung: Dara-anag and Da-ang	129
6.11	Duration ratio of short and long vowel in two dialects of Palaung: Dara-ang and Da-ang	130
6.12	Average first formant frequency (F1) values (in Hz) of /ə̃/, /ə/, /ă/, and /a/ in two dialects of Palaung: Dara-anag and Da-ang	131
6.13	Average second formant frequency (F2) values (in Hz) of /ə̃/, /ə/, /ă/, and /a/ in two dialects of Palaung: Dara-anag and Da-ang	132
6.14	The plot of average values F1 vs. F2 of short and long vowels, /ə̃/, /ə/, /ă/, and /a/ in Da-ang (normal) in comparison with Dara-ang (<i>italic</i>)	132
6.15	Average first formant frequency (F1) values of short vowel preceding final labial /*-ə̃m/ > /-am/ in Da-ang in comparison with Dara-ang (/ə̃m/* stand for /*-ə̃m/ > /-am/ in Da-ang and /*-ə̃m/ > /ə̃m/ in Dara-ang)	133

LIST OF FIGURES (cont.)

Figure		Page
7.1	Waveform and spectrogram of /ʔim/ ‘water’	144
7.2	Waveform and spectrogram of /səm/ ‘to plant’	145
7.3	Waveform and spectrogram of /bən/ ‘to fry’	146
7.4	Waveform and spectrogram of /tən/ ‘to lead by hand’	146
7.5	Waveform and spectrogram of /cip/ ‘to sew’	148
7.6	Waveform and spectrogram of /n teɲ/ ‘road, path’	148
7.7	Waveform and spectrogram of /phiaŋ/ ‘wing’	149
7.8	Waveform and spectrogram of /rəŋ/ ‘post, pole’	150
7.9	Waveform and spectrogram of /puŋ/ ‘water container’	150
7.10	Waveform and spectrogram of /ɾəŋ/ ‘bamboo’	151
7.11	Waveform and spectrogram of /ɾaŋ/ ‘tooth’	151
7.12	Average durations in millisecond of vowels, oral closure portion, and nasal release, according to places of articulation	155
7.13	Average durations (in ms) of vowel, oral closure portion, and nasal release, according to phonetic short and long vowels, showing the relation between preceding vowel duration and oral closure duration	156
8.1	The representation of velic and oral gestures in denasalized nasals of Da-ang dialect of Palaung	167

CHAPTER I

INTRODUCTION

1.1 Background of the study

The Palaung language consists of several dialects. According to Howard and Wattanapun (2001), the Palaung can be divided culturally and linguistically into three main groups: the Ta-ang (also known as Shwe or Golden Palaung), the Rumai, and the Pale (also called Silver Palaung or Di-ang). The Palaung language speaking area covers three countries in Southeast Asia: Thailand, Myanmar, and China. As Ostapirat (2009) has shown, the original center of the Palaung people might have been in northern Shan State, Myanmar, extending north into Yunnan Province, China. The Palaung in northern Thailand migrated only recently.

Since 1982, the Palaung people have been migrating to Chiang Mai Province in northern Thailand as refugees escaping Myanmar's violence. They first settled at No-Lae Village on Doi Ang Khang, Fang District in Chiang Mai Province, located on the border between Myanmar and Thailand. Later, some of the Palaung people went to Chiang Dao and Mae Ai districts of Chiang Mai Province (Deepadung & Thongkumchum, 2005). Although in previous publications (e.g., Howard & Wattanapun, 2001) this group of Palaung has been called Pale or Silver Palaung, the group itself refers to its people as "Dara-ang" or "Red Palaung."

My fieldwork on the Palaung dialect spoken in Thailand began in March 2006 at No-Lae Village of Fang District, Chiang Mai Province, Thailand. While reviewing previous literature, I found few studies on the linguistics of the Palaung language. As Deepadung (2009) emphasized, British officials and Christian missionaries in the 1900s carried out most of the existing research on the Palaung language, and all of these earlier studies were about the Palaung living in northern Shan State. In Thailand, there was no study of this group until 1993.

The phonology of the Dara-ang dialect of Palaung spoken in Thailand was first described by Kasisopa (2003). The aim of her study was to classify the Dara-ang

into a Palaungic branch of Mon-Khmer. Kasisopa reported that the vowel system of Dara-ang had phonemic vowel length, although she could not find minimal pair except for the low central vowel /a/. However, the Da-ang dialect of Palaung spoken in Myanmar described by Janzen in 1978 had no phonemic vowel length. Since Palaung speakers of Dara-ang in Thailand recently migrated from Myanmar, it seems reasonable to believe that the vowel system, in particular the vowel length of Palaung spoken in Thailand, should not differ much from those spoken in Myanmar. However, as Diffloth (1991) suggested, one of the outstanding problems in the Palaung languages is the vowel length contrast. Palaung vowel length contrast is still operating, but the functional load is very small. Therefore, vowel length in the Palaung dialects spoken in Thailand and Myanmar should be clarified in order to create a better understanding of the phonological process, which involves the loss of phonemic vowel length.

The most outstanding segmental feature that fascinated me, and perhaps other linguists, is the denasalized nasals, which I discovered while I was doing fieldwork on Dara-ang spoken in Chiang Mai Province. Kasisopa (2003) called this segment “voiced plosive with homorganic nasal release.” Apart from being analyzed as allophones of voiced stops, the denasalized nasals were proposed to be triggered diachronically by the preceding phonemic vowel length. Meanwhile, Janzen (1978) called this segment “preglottalized nasals,” which is mostly associated with a final velar. However, since there has been no phonetic study of such a segment in the Palaung dialects spoken in Thailand and Myanmar, we do not know yet what the actual realizations of denasalized nasals are. Apart from that, we do not know whether denasalized nasals are triggered by preceding phonemic vowel length diachronically (Kasisopa, 2003), because vowel length in those Palaung dialects has not yet been clarified. Therefore, denasalization in Palaung dialects should be explored. An instrumental analysis of phonetic realization of denasalized nasals should be conducted in order to shed light on phonological process and sound change occurring in the Palaung dialects. Moreover, since denasalization has also taken place in other Palaungic languages (e.g., Hu, U) as discussed in Svantesson (1988, 1991), I expect that the findings in this thesis will contribute to more clarification of the phonetic implementation of denasalization.

Apart from what I have mentioned above, previous phonological studies (see Chapter 2) have shown the contradiction in terms of vowels and final consonants inventories. Besides, the phonology of Palaung dialects spoken in Thailand, and especially Palaung dialect spoken in Myanmar, have not been well described to date, due to difficulties of doing research in Myanmar. The phonological system of Dara-ang and Da-ang thus should be revisited. Therefore, this thesis will provide a more comprehensive study of phonetics and phonological aspects of Palaung dialects spoken in Thailand and Myanmar than previous works (e.g., Janzen, 1978; Kasisopa, 2003). Besides, the phonological system of the two Palaung dialects (Dara-ang and Da-ang), this study will furthermore focus on interesting phonological features of the Palaung dialects, including vowel length contrast, as well as denasalization of word-final nasals, which have not been phonetically studied in the Dara-ang Palaung dialect of No-Lae, Thailand and the Da-ang dialect of Kalaw, Myanmar.

1.2 Purposes of the study

The purposes of the present study include the following:

1.2.1 To describe the phonological system of Palaung dialects spoken in Thailand and Myanmar in order to contribute to current linguistic knowledge of the Palaung language.

1.2.2 To explore phonological features, including vowel length and word-final denasalization, in the Palaung language and to conduct acoustic analysis in order to investigate the phonetic realization of phonemic vowel length and denasalized nasals in Palaung dialects spoken in Thailand and Myanmar.

1.3 Research questions

This study is conducted in order to answer the following research questions:

1.3.1 How many phonemes are there in the Palaung dialects spoken in Thailand and Myanmar?

1.3.2 Has the vowel length in the Palaung dialect spoken in Myanmar been completely lost?

1.3.3 Is the vowel length in the Palaung dialect spoken in Thailand still fully preserved?

1.3.4 Is the word-final denasalization occurring in the Palaung dialects spoken in Thailand and Myanmar triggered by the preceding vowels?

1.3.5 What is the phonetic realization of the word-final denasalized nasals in the Palaung dialects spoken in Thailand and Myanmar?

1.4 Scope of the study

In this study, the Palaung dialects spoken in Thailand and Myanmar will be limited to two specific locations, as follows:

1.4.1 The Palaung dialect spoken in Thailand is the variety spoken by Palaung speakers who live in No-Lae Village, Mon Pin sub-district of Fang district, Chiang Mai Province, Thailand. This dialect of Palaung is the only dialect spoken in Thailand, and is also known as Dara-ang or Red Palaung.

1.4.2 The Palaung dialect spoken in Myanmar is the variety spoken by Palaung speakers living in Nyaung Gone Village of Kalaw city, Shan State, Myanmar. As mentioned in previous literature (e.g., Janzen, 1978), this Palaung dialect of Kalaw is also named Pale, Di-ang or Da-ang, Ngwe Palaung, and/or Silver Palaung. This study is limited only to the Da-ang dialect of Palaung, despite there being several Palaung dialects spoken in Myanmar (e.g., Ta-ang, Rumai). In addition to accessibility reasons regarding the research location in Myanmar, Janzen (1978) also already has reported that denasalization has taken place in this dialect.

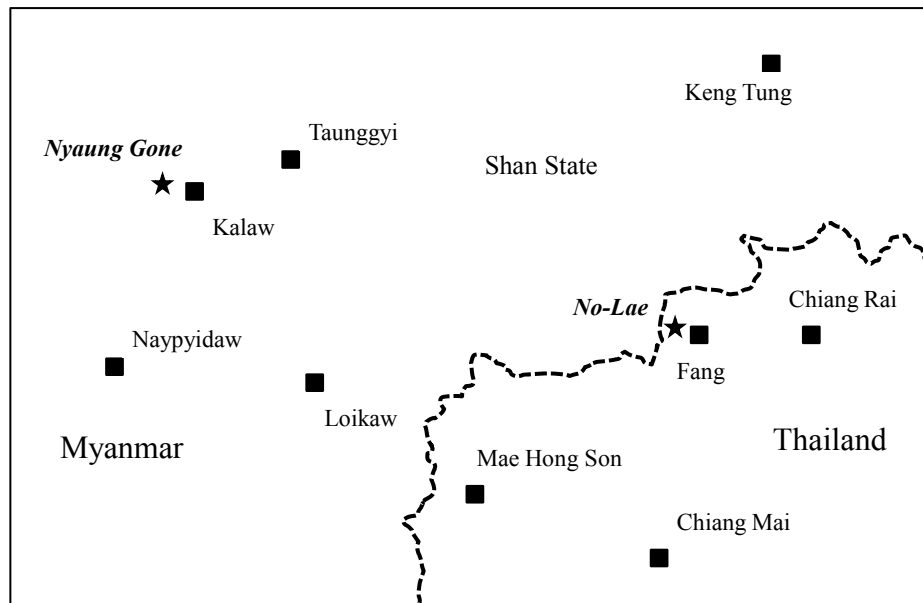


Figure 1.1 Locations of two Palaung dialects spoken in Thailand and Myanmar

1.5 Contributions of the study

1.5.1 The findings of this research on phonetic and phonological studies will hopefully lead to a better clarification of the phonetic facts and phonological processes occurring in the Palaung dialects spoken in Thailand and Myanmar.

1.5.2 A study of the Palaung vowel system and final nasals, in addition to its synchronic interest, will not only contribute to a better understanding of the historical sound changes in Palaungic and other Mon-Khmer languages, but it will also shed light on historical sound changes in general.

1.6 The Palaung language and its speakers

This section provides a brief introduction to the Palaung language and speakers of the language. It consists of locations and numbers of Palaung speakers, and a genetic classification of the Palaung language.

1.6.1 Locations and numbers of Palaung speakers

Geographically, as seen in Figure 1.2, the Palaung speaking area extends over southwestern Yunnan Province in China, northern Thailand, and the Shan State of Myanmar. Palaung speaking communities, additionally, are surrounded by two ethnic groups: Tai and Tibeto-Burman. Grimes (2003, pp. 182-184) reports that 139,000 Rumi Palaung speakers and around 150,000 speakers of Golden Palaung are living in Myanmar and China. In addition, about 200,000 speakers of Pale Palaung are living in Myanmar, China and northern Thailand.



Figure 1.2 Geographic distributions of the Palaungic languages (Sidwell, 2008)

Howard and Wattanapun (2001, p. 20) state that “it is difficult to determine precisely how long the Palaung have lived in what is now Burma,” although the name “Palaung” is of Burmese origin. Nowadays, there are approximately 600,000 Palaung in Myanmar. According to Grimes (2003, pp. 182-184), about 190,000 Pale Palaung are living in southern Shan State near Kalaw, a 10,000-square-mile area. In

Myanmar, Pale Palaung is also called Di-Ang, Ngwe Palaung, Silver Palaung or Palay. There are 137,000 speakers of Rumai Palaung in the northern Shan state. Another group found in the northern Shan state, but concentrated in Nam HSan, is the Shwe Palaung. There are around 148,000 speakers of Shwe Palaung, who are also known as Ta-Ang Palaung or Golden Palaung. Additionally, Grimes (2003) notes that Shwe Palaung, Rumai Palaung and Pale Palaung are closely related but are distinct languages. Therefore, Shan is the lingua franca for communication among Palaung and other language groups.

In China, the Palaung are classified as members of the De'ang, an officially recognized nationality mostly living in the far southwest of Yunnan province. To the Chinese authorities, they are known by their former name: Benglong (Howard & Wattanapun, 2001). According to Dai and Liu (1997), there are 15,462 speakers of De'ang nationality, most of whom live in two areas: Santaishan in Luxi county and Jinnong in Zhenkang county. Apart from these areas, the Palaung inhabit districts in the cities of Lianghe, Longchuan, Yingjiang, Ruili, Wanting, Baochan, Gengma, and Yongde.

In northern Thailand, Palaung settlement is the result of recent migration from Myanmar. Howard and Wattanapun (2001) note that they first settled in No-Lae village on Doi Ang Khang, Fang district, Chiang Mai province, and after that some No-Lae Palaung moved to Chiang Dao district in order to escape violence. With regard to their migration from Myanmar to Thailand, Deepadung and Thongkumchum (2005, pp. 6-9) report that about 200 speakers from the first group of Palaung migrated from Doi Lai, which is located between Chiangtong and Muang Pan, in the southern part of Kengtung in Shan State, to settle along the border between Thailand and Myanmar, which was later called No-Lae village. In Chiang Mai Province of northern Thailand today, there are around 5,000-7,000 Palaung speakers living in nine villages in three districts: Fang, Chiang Dao, and Mae Ai.

1.6.2 Classification of the Palaung language

Palaung belongs to a Palaungic branch of Mon-Khmer of the Austro-Asiatic language family (Diffloth, 1974). Palaung was first included in the Austro-Asiatic language family by Wilhelm Schmidt (1906). Later, the genetic grouping

within the Austro-Asiatic language family was clarified by Sebeok (1942), Shafer (1952), Thomas and Headley (1970) and Diffloth (1974). According to Diffloth's (1974) classification, the Austro-Asiatic language family (AA) primary split into three subfamilies: Mon-Khmer, Munda, and Nicobarease. However, Diffloth (2005), on his article "The Contribution of Linguistic Palaeontology to the Homeland of Austro-Asiatic," presents the most recent form of a possible AA tree, with a tentative calibration of time depths, as seen in Figure 1.3.

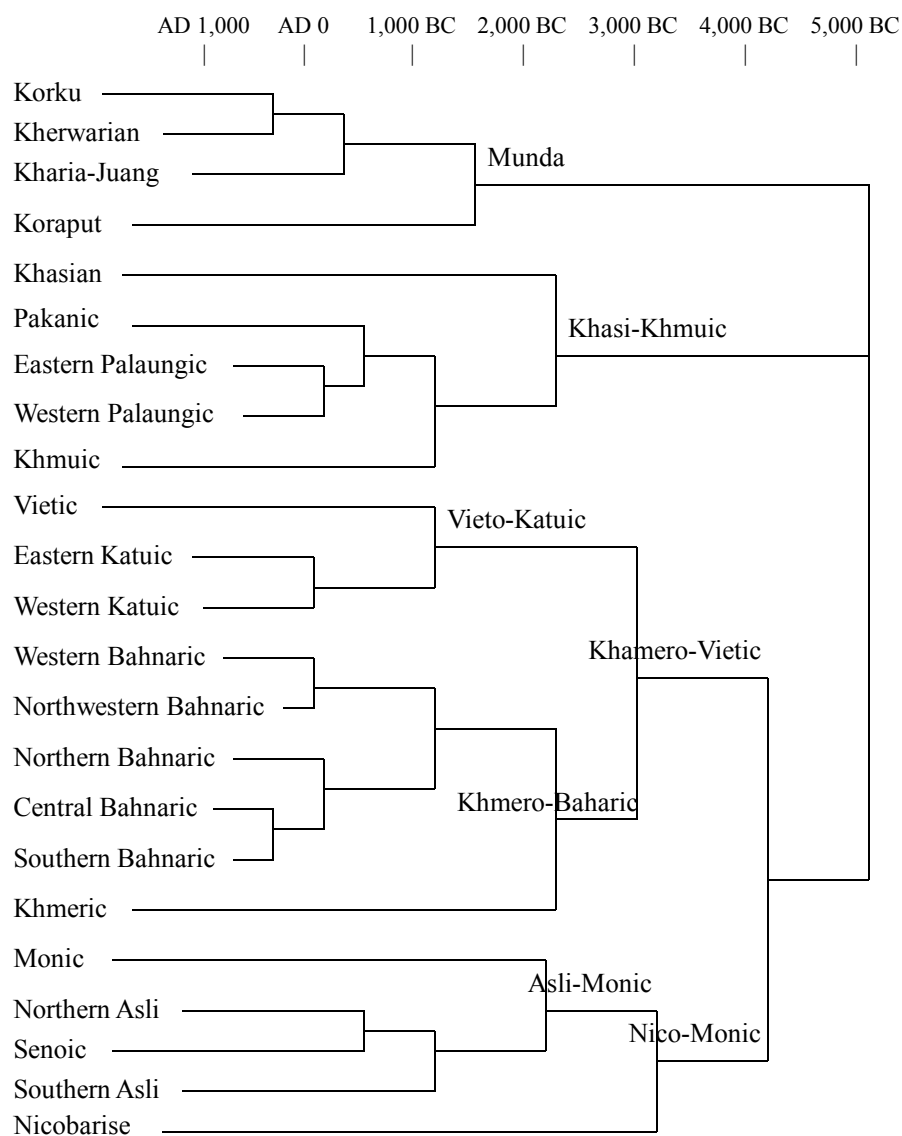


Figure 1.3 Austro-Asiatic language family (Diffloth, 2005, p. 79)

The Palaungic branch, formerly called Palaung-Wa, is divided into two sub-branches: Western and Eastern (Diffloth & Zide, 2003). The Western sub-branch of Palaungic includes three language groups: Lametic, Anguic, and Waic. The Waic group includes Bulang, Lawa dialects and Wa languages. The Anguic group contains small and unknown languages: Angku, U, Hu, Mok, Man Met, and Kiorr. The Eastern sub-branch contains Danau, the Riang dialects, and several Palaung dialects (see Figure 1.4).

As mentioned above, Palaung consists of several dialects. Ostapirat (2009) notes that in general we may recognize at least three main Palaung dialects: Ta-ang, Rumai, and Da-rang. Based on phonological innovation among Palaung dialects, he suggests that the primary split is between the Ta-ang and the Rumai-Darang groups. Later, the Rumai-Darang group was split into Rumai and Darang groups. The Darang group includes Na-ang, Darang, Da-ang, and Dara-ang, as shown in Figure 1.5.

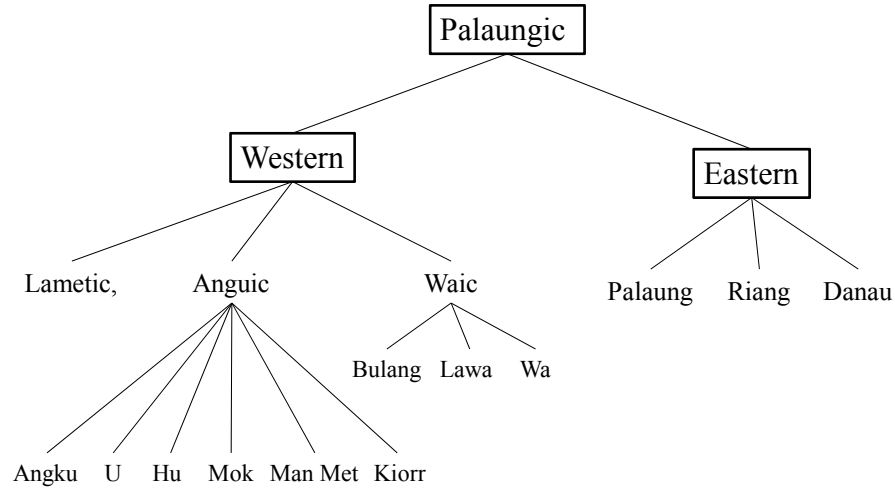


Figure 1.4 Classifications of Palaungic languages (Diffloth & Zide, 2003)

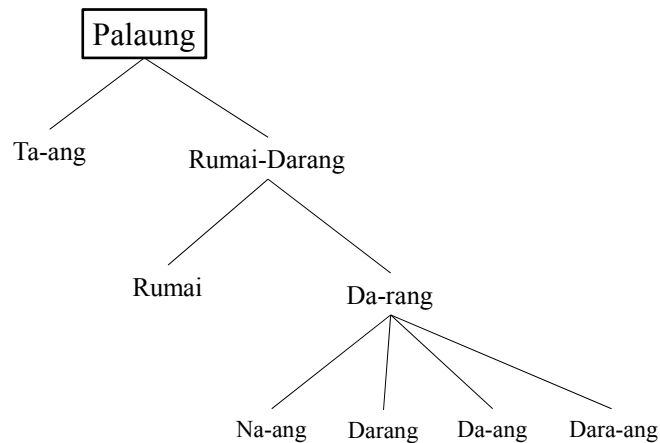


Figure 1.5 Ostapirat's (2009) classification of Palaung dialects

The present research focuses on Da-ang and Dara-ang dialects belonging to the Darang group of dialects. Da-ang is a Palaung variety spoken in Nyaung Gone Village near Kalaw city in Shan State, Myanmar. Dara-ang is a Palaung variety spoken in No-Lae Village of Fang District, Chiang Mai Province, northern Thailand. In previous literature, it has been reported that the word-final denasalization process has taken place in both dialects. As Janzen (1978) acknowledged, this process is not found in Ta-ang and Rumai dialects. In the next chapter, previous phonological studies of Palaung dialects will be provided.

1.7 Organization of the study

This thesis consists of eight chapters. This chapter is an introduction. It contains general information on the Palaung. Chapter 2, a literature review, consists of previous works on the Palaung, previous phonological research on two Palaung dialects spoken in Thailand and Myanmar, a historical phonology of Proto-Palaung, and a literature review on vowel length and denasalization in Palaungic languages. Chapter 3 describes the methodology employed throughout the research process. Chapter 4 presents the phonological system of the Dara-ang dialects spoken in Thailand. Chapter 5 presents the phonological system of the Da-ang dialects spoken in

Myanmar. Chapters 4 and 5 both cover consonant and vowel inventories and phonological processes. Chapter 6 addresses the question of vowel length by looking at the phonological status of vowel length contrast. It also presents an acoustic analysis of vowel length in the two Palaung dialects spoken in Thailand and Myanmar. Chapter 7 analyzes the phonetic realization of word-final denasalization, which previously was only described impressionistically by looking at spectrographic evidence and acoustic measurement. Chapter 8 concludes the thesis with a summary of findings and discussion of the findings from previous chapters. A brief recommendation for further research is also provided.

CHAPTER II

LITERATURE REVIEW

The literature review is divided into four sections. The first section, section 2.1, provides a brief overview of previous works on the Palaung. Section 2.2 gives a review of the previous studies on the phonology of Palaung dialects spoken in Myanmar and Thailand, respectively. Section 2.3 reviews Proto-Palaung in previous publications. The final section, section 2.4, reviews related studies on vowel length and final denasalization in Palaungic languages.

2.1 General works of the Palaung

“Palaung” is the name used for a Mon-Khmer speaking people who live in the area of Shan State, on the border areas with China, and in the southern part of Kachin State in Myanmar (Howard & Wattanapun, 2001). The earliest work referring to Palaung is by Michael Symes (1800) and was mentioned by Howard and Wattanapun (2001, pp. 5-11), who noted that Henry Yule (1858), Sao Saimong Mangrai (1965) and Scott and Hardiman (1900) provided more information about Palaung. According to Deepadung (2009), British colonial officers and Christian missionaries (e.g., Milne, 1921, 1931; Shorto, 1960, 1963; Janzen, 1976a, 1976b, 1978) conducted most previous studies on the Palaung language in the 1900s.

A detailed ethnography on the Palaung can be found in Milne (1910, 1924), the first and only person to do a lengthy and systematic study on the Palaung in the Shan State of Myanmar. Shorto (1960) studied word and syllable patterns of Ta-ang, a dialect of Palaung spoken in Namhsan, Myanmar. Janzen (1978) presented phonological comparison between Pale, Rumai and Gold Palaung. Milne (1921) first described the Palaung grammatical structure. Janzen (1976a, 1976b) also investigated the clause and phrase structure of Pale dialect of Palaung. By using the written records of previous studies, some linguists have proposed a reconstruction of Proto-Palaung

and clarified some points in historical phonology of its vowel system (e.g., Mitani, 1977, 1979; Diffloth, 1991).

2.2 Previous phonological studies on Palaung dialects

Janzen (1978) studied the phonology of the Da-ang dialect of Palaung. His work focused on Palaung varieties spoken in villages near Kalaw city, in southern Shan State, Myanmar. These Palaung people call themselves “Da-ang,” but are called “Pale” or “Di-ang” in Janzen’s paper.

Based on approximately 5,000 words collected from written texts and the spoken language with informants, he found from his study of major syllable structure that the Da-ang dialect of Palaung has 31 consonant phonemes. The phonemes are summarized in (1). Stops have a threefold contrast at four places of articulation: bilabial, alveolar, palatal, velar, and glottal. Nasals, liquids, glide, and labio-dental fricative have twofold opposition in terms of voicing.

(1) Da-ang consonant phoneme inventory in Janzen (1978)

	Labial	Alveolar	Palatal	Velar	Glottal
Stops	p ^h p b	t ^h t d	c ^h c dʒ	k ^h k g	ʔ
Nasals	m m̥	n n̥	ɲ ɲ̥	ŋ ŋ̥	
Fricatives	f v	s			h
Liquids		r r̥, l l̥			
Glides			j j̥		

There are 12 final consonant phonemes, as shown in (2). Final stops are all voiceless and unreleased. As for final nasals, there is an opposition at four places of articulation. Janzen (1978, p. 14) found that preglottalization is a sub-phonemic

feature of the final nasal. That is, the final nasals may be preceded by glottal closure. He said that this feature is most frequently connected with the final velar nasal /-ŋ/. It is also connected with the final bilabial /-m/ and alveolar /-n/ nasals. Janzen notes that the preglottalization does not occur in Gold Palaung and Rumai dialects of Palaung

(2) Da-ang final consonant phoneme inventory in Janzen (1978)

	Labial	Alveolar	Palatal	Velar	Glottal
Stops	-p	-t	-c	-k	-ʔ
Nasals	-m	-n	-ɲ	-ŋ	
Fricative					-h
Glides	-w		-j	(-ɥ)	

Janzen (1978, p. 16) reports that apart from the basic vowels, there are 40 phonetic vowel clusters, of which 35 are double clusters and another five are triple vowel clusters. However, according to phonological contrast, he noted that those vowels can be grouped as separate phonemes by comparing the rhyme syllables. The vowel phonemes of Da-ang are shown in (3).

(3) Da-ang vowel phoneme inventory in Janzen (1978)

	Front	Central	Back
High	i	ɯ	u
Mid	e	ə	o
Low	ɛ	ʌ	ɔ
		a	
Diphthongs	iʌ, uʌ		

There are 10 monophthongs and two diphthongs: /iΛ/ and /uΛ/. There is no phonemic length contrast of vowels (Janzen, 1978, p. 4). An important point is that Da-ang central low vowels are contrastive in regard to quality, though Janzen stated that phonetically /a/ is long and /Λ/ is short. It has been shown that Da-ang has lost vowel length from Proto-Palaung, as reconstructed by Mitani (1977, 1979) and Diffloth (1991).

Gwaw Too (1982) also described the phonology of Palaung, a speech variety in the same area as the one studied by Janzen (1978). Based on his account of Palaung speakers living in villages near Kalaw, Gwaw Too reported that the Da-ang dialect of Palaung has 31 initial consonants (see (1)), which is the same number found by Janzen (1978). Gwaw Too, however, found that there are 17 final consonants in this Palaung dialect, as shown in (4). Besides final stops, nasals, fricative, and glides, Gwaw Too (1982, p. 8) proposed four glottalized glides: /wʔ/, /wh/, /jʔ/, and /jh/ in the final consonant system of Da-ang.

As for final nasals, his study reported that final velars are realized as “unreleased voiced velar implosive with simultaneous glottal closure” whereas final nasals in other places of articulation – bilabial, alveolar, and palatal – are realized as plain nasals.

(4) Final consonant phonemes in Da-ang in Gwaw Too (1982)

	Labial	Alveolar	Palatal	Velar	Glottal
Stops	p	t	c	k	ʔ
Nasals	m	n	ɲ	ŋ	
Fricative					h
Glides	w		j	ɥ	
Glottalized-	wʔ,		jʔ,		
glides	wh		jh		

Gwaw Too (1982) divided Da-ang vowels into two subtypes: vowels in open and closed syllables. Vowel phonemes are summarized in (5) and (6).

(5) Da-ang vowel phonemes in open syllable in Gwaw Too (1982)

	Front	Central	Back
High	i		u
Mid	e		o
Low	ɛ		ɔ
		a	
Diphthongs	ua		

(6) Da-ang vowel phonemes in closed syllable in Gwaw Too (1982)

	Front	Central	Back
High	i	ĩ, ɨ	u
Mid	e	ə	o
Low	ɛ	ʌ, a	ɔ
Diphthongs	iʌ, uʌ, əʌ		

In open syllable, there are seven vowel phonemes, including one diphthong, while in closed syllable there are 11 vowel phonemes, including three diphthongs. Gwaw Too noted that there is no contrastive tone in this dialect of Palaung. He also reported that “vowels may vary freely in their length, except in long /a/ [a:] and short /ʌ/ [ʌ̃]”.

Kasisopa (2003) studied the phonology of Dara-ang spoken in No-Lae village, Fang district in Chiang Mai province, northern Thailand. By using a phonemics approach, she proposed that the consonant system of Dara-ang comprises

of 31 consonant phonemes, as shown in (7). Many of these consonants have voiced and voiceless counterparts, including stops, nasals, liquids, and palatal glides. The consonants that do not participate in this contrast are /f/, /s/, /h/, and /w/.

(7) Dara-ang consonant phonemes inventory in Kasisopa (2003)

	Labial	Alveolar	Palatal	Velar	Glottal
Stops	p ^h p b	t ^h t d	c ^h c j	k ^h k g	ʔ
Nasals	m m̩	n n̩	ɲ ɲ̩	ŋ ŋ̩	
Fricative	f	s			h
Liquids		r r̩, l l̩			
Glides	w		j j̩		

Kasisopa (2003, pp. 29-35) stated that in a major syllable, all of the consonant phonemes in (7) can occur in the initial position, whereas in a minor syllable only six consonant phonemes /d k ʔ m s w/ can occur in the initial position. She noted that Dara-ang syllable structure is divided into two types: major and minor syllables. The major syllables carry most of the lexical meaning; on the other hand, the minor syllables carry some grammatical meaning.

There are 16 phonemes that occur in word-final position, as shown in (8). There are five places of articulation: labial, alveolar, palatal, velar, and glottal. In addition to two series of final stops (voiceless and voiced) claimed by Kasisopa (2003), there are nasals, glottal fricative and glides.

(8) Dara-ang final consonant phonemes inventory in Kasisopa (20003)

	Labial	Alveolar	Palatal	Velar	Glottal
Stops	p b	t d	c ʝ	k g	ʔ
Nasals	m	n	ɲ	ŋ	
Fricative					h
Glides	w		j		

Kasisopa (2003, p. 35) stated that final voiced stops /b/, /d/, /ʝ/, and /g/ are realized as voiced stops with homorganic nasal release. Voiced stops in Dara-ang consist of two allophones, which occur in complementary distribution; plain voiced stops occur syllable-initially, whereas voiced stops with homorganic nasal release occur syllable-finally. For instance, the phoneme /b/ is pronounced as [b] when it occurs as an initial consonant but is pronounced as [bm] when occurs as a final consonant. Note that, regarding the phonemic status of final voiced stops /b d ʝ g/, Kasisopa's study does not show any evidence that final voiced and voiceless stops are contrast in final position.

Chaichompoo (2010, pp. 55-63), nevertheless, analyzed such a denasalized final consonant as a glottalized vowel. He described that "there is a complete closure of the vocal folds in simultaneity with the production of vowels preceding the release of the final consonants of words." Phonemically, in his work, Chaichompoo showed there is a phonological contrastive between glottalized vowels and non-glottalized vowels. He concluded that there are phonemic glottalized vowels in the Dara-ang Palaung language spoken in No-Lae Village, as summarized in (9). However, Chaichompoo (2010, p. 57) noted that glottalized vowel are always followed by final nasal consonants /-m, -n, -ɲ, -ŋ/. In addition, the palatal final nasal /-ɲ/ only occurs with /i^ʔ/ and /e^ʔ/.

(9) Glottalized vowels in the Dara-ang Palaung in Chaichompoo (2010)

	Front	Central	Back
High	iʔ	ɨʔ	uʔ
Mid	eʔ	əʔ	oʔ
Low	ɛʔ	aʔ	ɔʔ

However, as reported in Kasisopa (2003), there are 18 vowel phonemes in the Dara-ang vowel system. It consists of nine short and nine long vowels, as shown in (10).

(10) Dara-ang vowel phoneme inventory in Kasisopa (2003)

	Front	Central	Back
High	i i:	ɨ ɨ:	u u:
Mid	e e:	ə ə:	o o:
Low	ɛ ɛ:	a a:	ɔ ɔ:
Diphthongs	iə, ia, ai, au, uə, ua		

Kasisopa (2003, p. 36) claimed that vowel length in Dara-ang is phonologically contrastive, although she cannot find any minimal pairs for vowel length contrast, except central low vowels: /a/ and /a:/.

In summary, from the earlier phonological studies discussed above, the inventories of vowels and final consonants are still problematic. The phonemic status of final nasals and vowel length in both Da-ang and Dara-ang need to be reexamined. Moreover, the study of how the final nasals are produced and how acoustically this sound is realized need to be conducted. The process of denasalization and the relationship between finals and vowel length have to be clarified both synchronically

and diachronically. In the next section, the historical phonology of Palaung from previous publications will be discussed.

2.3 Palaung historical phonology

Reconstruction of a Proto language can be used as historical evidence for sound pattern analysis, as stated by Blevins and Garrett (2004, p.118):

explanations for phonological patterns may reside in synchronic analysis and diachronic evolution. Which explanation will emerge in any case is a matter to be resolved based on evidence, but since historical accounts permit simpler grammatical models, they are preferable wherever possible.

The phonological reconstructions reviewed in this section come from two sources: Mitani (1977) and Mitani (1979). Mitani (1977), on his article “Palaung Dialects: A Preliminary Comparison,” presents phonological correspondences and Proto-Palaung (PP) by comparing four dialects of Palaung: Ta-ang, Rumai, Ra-ang, and Darang. He comments that the most conservative dialect is Ta-ang. The Proto-Palaung including initials, vowels, and finals are summarized as follows.

2.2.1 Proto-Palaung initials

The Proto-Palaung initial consonants reconstructed by Mitani (1977) from four Palaung dialects are summarized in (11).

(11) Proto-Palaung initials (Mitani, 1977)

p	t	c	k	ʔ	pr	pl	kr	kl
ph	(th)	(ch)	kh				kh	kh
b	d	j	g		br	bl	gr	
m	n	ɲ	ŋ					
hm	hn		hŋ					
v		y			r	l		
f	s	hy		h	hr	hl		

Mitani says there are no difficulties in the reconstruction of initial consonants. In most cases, they have been preserved in the Ta-ang dialect. As for initial stops series, Ta-ang has not undergone the devoicing of original voiced stops, but in Darang, original voiceless unaspirated stops become voiced, and original voiced stops have become voiceless. However, voiceless aspirated stops have not been changed, as shown in (12), as follows.

(12) A different types of changes of the initial stops occurred in Darang

*p- > b-	*t > d- (> l, n)	*c- > y-	*k- > g-
*b- > p-	*d- > t-	*j- > ch (sh, hs)	*g- > k-
*ph- > ph-	*th- > th-	*ch- > ch-	*kh- > kh-

2.2.2 Proto-Palaung vowels

Ten vowels were reconstructed by Mitani (1977) for Proto-Palaung. There are three front vowels, three back vowels, and four central short and long vowels: /**ũ* **ǎ* **u* **a*/. Mitani notes that it is not clear whether front and back vowels have a phonemic vowel length. The inventory of Proto-Palaung vowels is listed in (13).

(13) Proto-Palaung vowel system (Mitani, 1977)

i	u	ũ	u
e			o
ε (~ iə) ¹			ɔ
	a	ǎ	

Notes

1. Mitani (1977, p.202) noted that it might be better to reconstruct the proto-vowel *iə for Proto-Palaung instead of *ε, since the correspondences of proto-vowel *ε in closed syllables have not been established clearly.

In 1979, when comparing Palaung and Riang, Mitani tentatively proposed Proto-Palaung-Riang vowels as presented in (14). The Riang data used in his study mostly came from Luce's article on Danaw (Luce, 1965).

(14) Ten vowel system of Proto-Palaung-Riang (Mitani, 1979)

i			u
e	ǎ	ə	o
ε (~ iə)			ɔ
	ǎ	a	

Despite the fact that the vowel system of Proto-Palaung-Riang has the same number as the one in Proto-Palaung, Mitani reconstructs central vowels as *ǎ, *ə, *ǎ, *a. However, he has no particular reason why he reconstructs the high central vowels as *ǎ, *ə instead of *ũ, *u. Apart from that, in the article he used *ǎ, *ə for both Proto-Palaung and Proto-Palaung-Riang.

2.2.3 Proto-Palaung finals

Mitani (1977) reconstructs Proto-Palaung final consonants, as shown in (15).

(15) Proto-Palaung finals (Mitani, 1977)

-p	-t	-c	-k
-m	-n	-ɲ	-ŋ
	-r		
	-l		
	-s		-h
(-w)		-y	

Generally, Mitani comments that there is no difficulty in reconstructing Proto-Palaung final stops and nasals. The main problem in the reconstruction is final liquids and spirants, *-r, *-l, *-s, *-h. Therefore, in the article, Mitani (1977) particularly discusses the reconstruction of final liquids and spirants. However, he briefly notes that Proto-Palaung has four final liquids and spirants: *-r, *-l, *-s, *-h, which are preserved in Riang, but in Ta-ang there are only two finals: -r and -h. Mitani (1977), additionally, noted that the Proto-Palaung preserved all four finals: *-r, *-l, *-s, *-h, which are clearly shown in correspondence among the four dialects of Palaung. The correspondence of the finals between the four dialects in Mitani (1977) is summarized in Table 2.1.

Table 2.1 Proto-Palaung final *-r, *-l, *-s, *-h (Mitani, 1977)

PP	Ta-ang	Rumai	Ra-ang	Darang	cf. Riang.
*-r	-r	{-y/*ă _ ∅	{∅ /*back, *u _ r	-n, -ng	-r
*-l				{-w/i, e _ ∅	-l
*-s					-s
*-h	-h	∅	-h	-gh, ∅	∅

2.4 Related studies on vowel length and denasalization in Palaungic languages

This section reviews and discusses the issue of vowel length and final denasalization in Palaungic languages, based on the available literature on linguistic studies of the Palaungic branch of Mon-Khmer.

Vowel length is phonologically contrastive in many Mon-Khmer languages, but in Palaungic languages, particularly Waic languages, vowel duration is not phonologically contrastive. According to Diffloth (1980), the opposition between long and short vowels has been lost in all Waic languages. Even though the loss of contrastive vowel length is a distinct phonological innovation shared in Waic languages, it cannot be defined as a feature of Waic, as Diffloth mentions:

the loss of vowel length, although it is a distinct innovation, cannot be used as a defining feature for Waic since it also took place in all the Palaungic languages West of the Salween: Palaung, Riang and Danau; it is an areal feature which cuts across historical classifications (Diffloth, 1980, p. 92).

The languages belonging to the Angkuic group (e.g. U and Hu) also share this innovation of the loss of vowel length, as discussed in Svantesson (1988, 1991). In

U, Svantesson shows that the Proto-Palaungic phonemic of short and long vowels has been lost in U. Besides, Svantesson (1988, pp. 86-92) shows that vowel length is one of the four factors involved in U tonogenesis. That is, the process of acquiring tones in U is closely related to the original short and long vowels of Proto-Angkuic, which have been lost in modern U.

This kind of tonogenesis is also found in Hu, the language spoken in Jinghong County, Xishuang Banna in Yunnan Province, China. Svantesson (1991) proposes that there are two tones in Hu: low and high tones. Svantesson furthermore claims that the two tones developed from the loss of vowel length, i.e. the low tone is conditioned by original long vowels and the high tone is conditioned by original short vowels, as exemplified in (16). Note that Svantesson compared Hu with Lamet examples since Lamet is a Palaungic language, which retains the Proto-Palaungic vowel phonemic vowel length.

(16) Proto-Palaungic vowel length and Hu tones (Svantesson, 1991, p. 72)

	Hu	Lamet	
*short vowels	yám	yàm	‘to die’
	paθán	phán	‘five’
	méɲ	krmìɲ	‘star’
	ncén	kcèn	‘heavy’
*long vowels	yàm	yàam	‘to cry’
	lèk	lìik	‘pig’
	ʔəm	ʔòom	‘water’
	nasòk	yóok	‘ear’

As for the Palaung language, previous publications have reported that some dialects have no phonemic vowel length, whereas some dialects have length opposition. In Myanmar, Janzen (1978) and Gwaw Too (1982) recognize only one set

of vowels in the Palaung dialect spoken in Kalaw (i.e. the length of vowels has no phonemic significance (see section 2.2)).

In China, however, vowels of some dialects of Palaung spoken in Yunnan Province mentioned in Dai and Liu (1997, p. 96) show length distinctions. Dai and Liu (1997) notes that Palaung, belonging to the De'ang nationality, has three dialects: Bulei, Liang, and Rumai. In Guangka, a sub-dialect of the Rumai dialect of Palaung spoken in Guangka Village, Dai and Liu showed that Guangka has 119 rhymes comprised of 11 monophthongs without tense-lax or phonemic length. There are also 22 diphthong rhymes and 86 rhymes with final consonants. Apart from that, Guangka, as Dai and Liu claim, has three tones: high, high falling, and falling rising. Dai and Liu (1997) further report that Chayeqing, another Rumai sub-dialect of Palaung spoken in Yunnan has two tones: high and high falling. It also has phonemic vowel length, which occurs in a few syllables: so-called coda-bearing syllables and diphthong-final syllables in the article. Meanwhile, Yunqian, a sub-dialect of Bulei, does not have tones. However, it has phonemic vowel length with some rhymes. That is, when /ε a ɔ u/ occur with final consonants, they always carry a phonemic length. The vowels /i u uu/ also have length distinction when they are followed by finals alveolar /n t r/. The diphthongs /ai au ɔi/, in addition, have length contrast. Despite the fact that some rhymes are pronounced as long and short, the rest of the rhymes have no contrastive length. A dialect with length opposition is Xiaochanggou, a sub-dialect of the Liang dialect of Palaung. Xiaochanggou has no tones, but vowel length is contrastive for monophthong finals. There is also a partial opposition in syllables with final consonants.

Although she could not find minimal pairs except for open central vowels /a/, Kasisopa (2003) proposes a vowel system for the Palaung dialect in northern Thailand that fully opposes short and long vowels (see (9) in section 2.2).

In the Palaungic languages, this loss of vowel length is closely related to the process of final denasalization. In U language, as discussed by Svantesson (1988), final nasal denasalization has taken place. That is, U final nasals are completely denasalized, i.e., final nasal has become a stop if it was preceded by an original short

vowel. Furthermore, to prevent merging with words that have original final stops, tone contrasts are developed. Words in which a final nasal has been denasalized to a stop now have low tone, whereas words with an original final stop have high tone or rising tone, depending on vowel length, as shown in (17).

(17) Nasal coda denasalization in U (Svantesson, 1988, p. 80)

PPal	PAang	U	U	Hu	Lamet	
*AAN	*AAN	ˊ ^ AC	yâm	yàm	yàam	‘to cry’
			ʔóm	ʔòm	ʔóom	‘water’
			phón	ʔaphòn	póon	‘four’
			pán	pàŋ	pàaŋ	‘five’
*AN	*AN	ˋ AC	yàp	yám	yàm	‘to die’
			kèt	ncèn	kcèn	‘heavy’
			ŋkhèt	khíŋ	kép	‘tooth’
*AAN	*AAC	ˋ AC	ʔót	ʔòt	-----	‘to stay at’
			ntshăt	nθàc	máac	‘sand’
*AC	*AC	ˊ AC	khát	khát	kát	‘cold’
			mpét	pét	péc	‘to spit’
*IIN	*IN	ˋ IC	ʔìp	ʔím	ʔíim	‘alive’
			sùp	θúm	húum	‘to bathe’
			ŋqhùt	mɛ́úŋ	prùuŋ	‘termite’
*IN	*IN	ˋ IC	phèt	phín	rmpín	‘female’
			samèt	méŋ	krmèŋ	‘star’
*IIN	*IN	ˋ IC	sút	-----	húuc	‘to sting’

The examples given in (17) show that, although vowel length contrast has been lost in U, traces remain in the final consonant, i.e., original final nasals are retained after proto long vowels, while after proto shorts vowel original final nasals have become final stops. To compensate for the loss of vowel length, U and Hu have developed their own particular ways. Hu has lost its vowel length distinction (long vs. short). In Hu, however, there is no final denasalization, and it has acquired two tones to distinguish meaning; for example, the words /yàm/ “to cry” and /yám/ “to die.” In U language, after the loss of vowel length, the final nasal was denasalized. Then a tone in U emerged. The process of acquiring tones, as discussed in details by Svantesson (1988), is complicated. There are at least four factors involved: vowel length, vowel quality, final consonant type, and initial consonant type. As for Lamet, phonemic vowel length is fully preserved. Denasalization, additionally, has not taken place.

According to (17), an interesting finding is that in U language, a final nasal preceded by a high vowel (e.g., /i/, /u/, and perhaps /i/) has been denasalized. Svantesson (1988, p. 79) suggests that in U, the long high vowel is treated as a short vowel, since short and long vowels have already merged in Proto-Angkuic (PAng). Thus, he states the rule for final nasal denasalization as: “a nasal coda has become the corresponding stop if it was preceded by a short vowel in Proto-Angkuic, or, equivalently, by a short non-high or any high vowel in Proto-Palaungic.” That is why there are no rhymes /*-um/, /*-im/, and /*-im/ in U. This means, however, that in this process, not only vowel length is involved, but vowel height also plays an important role. Svantesson also says that this denasalization rule is applied to those so-called U languages, including P’u-man and Pao Ma, although the conditioning factors may be different. Moreover, he notes that this process is not found in Angkuic languages or other Palaungic languages in general.

In summary, as reported in previous studies, the vowel length of Palaung dialects is probably lost except for low central vowels. After the loss of vowel length, Palaung may follow U because a nasal coda in Palaung dialects has been denasalized. By contrast, Palaung dialects will perhaps develop a process of denasalization in their own ways. However, most previous studies are based only on descriptive phonological studies. There has been no in-depth phonetic and phonological study of vowels and

final nasals in Palaung dialects. The present research, therefore, will contribute to a greater understanding of phonological processes that have taken place in Palaung dialects, especially in the Dara-ang and Da-ang dialects of Palaung spoken in Thailand and Myanmar.

CHAPTER III

METHODOLOGY

This chapter provides an overview of the methodology used in this research. With regard to data, I first collected a 1,000-item wordlist from the Palaung dialects spoken in Thailand and Myanmar for phonological analysis. Then, I selected a short wordlist for acoustic analysis. In this chapter, I will introduce the fieldwork conditions for the two locations. I will then give details about the wordlist, informants, elicitations and sound recordings, and I will discuss the methods of phonological and acoustic analysis in subsequent sections.

3.1 Fieldwork

In March 2006, when I took the LCLG 503 Field Methods in Linguistics class, I began my fieldwork on the Dara-ang dialect of Palaung, a variety spoken at No-Lae Village of Fang District, Chiang Mai Province, Thailand. No-Lae is located on the top of Doi Ang Khang at a height of 1,350 meters above sea level. Most of the Palaung people living in No-Lae earn their living by working for the Ang Khang Royal Project. I had an opportunity to conduct fieldwork again in No-Lae in March 2007. Later, in August 2009 and January 2010, I conducted additional fieldwork on this Palaung dialect. I also conducted fieldwork on-site in No-Lae Village, and at the people's homes. I conducted all fieldwork with native speakers of the Dara-ang dialect of Palaung.

In February 2010, I carried out fieldwork on the Palaung dialect spoken in Shan State, Myanmar. I worked in Kalaw city, in southern Shan State. Kalaw city is a famous tourist destination in Shan State, Myanmar. After surveying the location of Palaung village, I found that there were about five villages of Palaung people located around Kalaw city. I chose Nyaung Gone Village as research the site rather than other villages since it took only three hours by car to get there. The route we took to reach

the village was also the most convenient. There was some difficulty accessing the village since in Myanmar tourists are not permitted to stay overnight in the village. Therefore, my fieldwork was mostly conducted at a hotel in Kalaw city. I invited the Da-ang Palaung speakers to come to my place for linguistic data elicitations and recordings.

3.2 Wordlists

3.2.1 Wordlist for phonological analysis

The phonological description presented in this study is based on words elicited by a 1,000-item wordlist. The wordlist originated from a 285 Southeast Asian Wordlist (Mahidol University Field Methods-revised 1990), created by combining the Morris Swadesh 100 wordlist and 200 wordlist (Samarin, 1967) and revised by David Thomas, an Austroasiatic scholar. For collecting data, the basic wordlist was expanded to a 1,000-item wordlist based on the unpublished Pale-English-Myanmar and English-Pale dictionaries compiled by Margarete Janzen (1991). The lexical items in the wordlist were categorized by semantic domain to ease elicitation, as follows:

- | | |
|------------------------|--------------------------------|
| 1. Nature | 11. Material culture |
| 2. Religion and belief | 12. Place/House |
| 3. Plants | 13. Deictics/Grammatical words |
| 4. Space/Time | 14. Adjectives |
| 5. Food | 15. Colors |
| 6. Animals | 16. Numbers |
| 7. Body parts | 17. Quantifiers |
| 8. Verbs | 18. Question words |
| 9. Human | 19. Classifiers |
| 10. Pronouns | 20. Unit of measurement |

3.2.2 Wordlist for acoustic analysis

The target words in the wordlist for acoustic analysis were selected from an elicitation wordlist, which was used for phonological analysis. For the acoustic analysis, two wordlists were compiled and recorded: Wordlists A and B (1, 2). The

first one includes minimal pairs or near minimal pairs of phonemic vowel length. The second wordlist is much longer. It consists of words with combinations of vowels and final nasals in all places of articulation.

3.2.2.1 Wordlist A

This study proposes that non-high central vowels /ə ə ǎ a/ have contrastive lengths. In order to investigate acoustic realization of phonemic vowel length in Dara-ang and Da-ang, a set of words was selected from the wordlist, which was used for phonological analysis, as listed in Table 3.1.

Table 3.1 Minimal pairs or near minimal pairs used for recordings in the acoustic study of vowel length

	/-ən/		/-ən/	
1.	tən	‘to lead by hand’	tən	‘that’
2.	sapən	‘lips’	pən	‘eggs’
3.	bən	‘fly’	mən	‘crawl’
	/*-əm/ > /-am/		/*-əm/ > /-əm/	
4.	phəm	‘fart’	phəm	‘breath’
5.	ʔəm	‘rotten’	makəm	‘pillow’
6.	səm	‘plant’	məm	‘good’
	/ǎ/		/a/	
7.	hǎp	‘put into’	hap	‘curry’
8.	lǎʔ	‘ladle’	laʔ	‘sharpen’
9.	ʔǎʔ	‘crossbow’	ʔaʔ	‘spicy’
10.	jǎm	‘die’	jam	‘weep, cry’
11.	lǎm	‘sharp’	lam	‘guess’
12.	rǎŋ/rǎk	‘bamboo’	rəŋ/rək	‘tooth’

Wordlist A consisted of eight minimal pairs and four near-minimal pairs of meaningful words differing in vowel length. The target words were the form CVC and CV:C, where the initial consonant C was /t p b m ph ʔ k s m h l j r/; V was short

vowels /ə ǎ/; V: was long vowels /ə a/, and final consonants C was a nasal or a voiceless stop consonant: /m n ŋ (k) p ʔ/. Since the selection of target words based primarily on minimal pairs and the minimal pairs were quite limited, the consonantal context of the vowels could not be controlled.

3.2.2.2 Wordlist B

In order to explore the phonetic realization of target words, the final nasal is denasalized in the Dara-ang dialect of Palaung spoken in Thailand. A set of words, wordlist B, was selected from the elicitation wordlist. According to the aim of the acoustic study, this list was divided into two sets: wordlists B1 and B2.

Wordlist B1 is used for spectrographic analysis of the denasalized target, composed of 39 meaningful monosyllabic or disyllabic words ending with final nasals. The target words in wordlist B1 were the nasal rhyme form VN, where V was /i e ε ǐ ə ǎ a u o ɔ ia/, and N was final nasal consonants: /-m/, /-n/, /-ŋ/, and /-ŋ/ which were denasalized in the word-final position, as listed in Table 3.2.

Wordlist B2 is used to investigate temporal characteristics of target denasalized nasals. This list is comprised of 13 meaningful monosyllabic or disyllabic words. The target words in wordlist B2 were the form CVN, where C was a voiceless initial consonant /p ph t c ʔ ɿ/, V was /i e ε ǐ ə ǎ a u o ɔ ia/, and N was final nasal consonants: /-m/, /-n/, /-ŋ/, and /-ŋ/ which were denasalized in the word-final position, as listed in Table 3.3.

Table 3.2 Wordlist B1 used for recording in the acoustic study of phonetic realization of denasalized nasal target

	/-iŋ/			/-ǎŋ/	
1.	gɨŋ	‘head’	20.	ɾǎŋ	‘bamboo’
2.	cɨŋ	‘to sew’	21.	dǎŋ	‘to cook’
	/-eŋ/		22.	jǎŋ	‘meat’
3.	deŋ	‘yellow’		/-aŋ/	
4.	bleŋ	‘sky’	23.	ɾaŋ	‘teeth’
5.	reŋ	‘red’	24.	glaŋ	‘skirt’
6.	nteŋ	‘road, path’	25.	kaŋ	‘house’
	/-eŋ/		26.	kaʔaŋ	‘bone’
7.	reŋ	‘wall’		/-uŋ/	
8.	bleŋ	‘river’	27.	puŋ	‘water container’
9.	deŋ	‘above’	28.	ʔuŋ	‘saw (place)’
10.	nteŋ	‘ladder’		/-oŋ/	
	/-im/		29.	goŋ	‘to hold in hand’
11.	gim	‘thigh’	30.	toŋ	‘far, long’
12.	ʔim	‘water’	31.	boŋ	‘piece (cls.)’
	/-iŋ/			/-oŋ/	
13.	khriŋ	‘cloth’	32.	roŋ	‘post, pole’
	/-əm/		33.	coŋ	‘to stand’
14.	səm	‘to plant’	34.	soŋ	‘bitter’
15.	ʔəm	‘rotten’	35.	poŋ	‘bamboo shoot’
16.	sanəm	‘medicine’		/-iaŋ/	
17.	kanəm	‘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’

Table 3.3 Wordlist B2 used for recording in the acoustic study of temporal characteristics of target denasalized nasals

1.	ʔim	‘water’	8.	raŋ	‘teeth’
2.	ʔəm	‘rotten’	9.	pəŋ	‘bamboo shoot’
3.	təŋ	‘to lead by hand’	10.	toŋ	‘far, long’
4.	ciŋ	‘to sew’	11.	puŋ	‘water container’
5.	nteŋ	‘road, path’	12.	phiŋ	group of animal
6.	ntəŋ	‘ladder’	13.	phiaŋ	‘wings’
7.	raŋ	‘bamboo’			

Note that, as seen in Table 3.3, Wordlist B2 is a subset of Wordlist B1. All target words included in Wordlist B2 were selected from Wordlist B1 in order to avoid the voicing effect on vowel duration of the initial consonants C of the CVN.

3.3 Informants

3.3.1 Speakers of Dara-ang

My main informant is a 55-year-old man (Speaker 1), a native speaker of Palaung living in No-Lae Village in Fang district of Chiang Mai Province, Thailand. Speaker 1 was born at Doi Lai in Myanmar’s Shan State and migrated to No-Lae village in northern Thailand when he was 27. He is a fluent speaker of Palaung and northern Thai and has no defects in speaking or listening. For recordings of the wordlist A, B1, and B2, in addition to Speaker 1, Speaker 2 and Speaker 3 are recorded. Speaker 2 and Speaker 3 are male native speakers of Dara-ang living in No-Lae. They are between 35 and 60 years old.

3.3.2 Speakers of Da-ang

The main informant for elicitation data in the wordlist is a male native speaker of Da-ang living in Nyaung Gone Village of Kalaw city, in Myanmar’s Shan State. He is designated as Speaker 4. At the time of recording, Speaker 4 was 30 years old. In addition to Speaker 4, Speaker 5 was recorded for wordlist A, B1, and B2. At

the time of recording, Speaker 5 was 53 years old. Both speakers were born and raised in Nyaung Gone Village. They had defects in neither speaking nor listening.

3.4 Elicitations and recordings

A wordlist of a 1,000 lexical items was elicited from two main informants of the two dialects of Palaung spoken in Thailand and Myanmar. The main informants of each dialect were asked to pronounce each word two or three times. I then repeated the words until the informant was sure they were being correctly pronounced. The data were transcribed immediately with IPA phonetic symbols, the International Phonetic Alphabet (revised in 2005), in my field notes. A wordlist was elicited from one person; in some cases, people around the speaker would help him think of the words. I often had to provide explanations and context to the speaker to help him find the target word in Palaung. Since my fieldwork was done in two countries, two languages were used as languages of elicitation. Thai was used for collecting data at No-Lae Village, Thailand, but Burmese was used as the language of elicitation in the Da-ang dialect spoken in Myanmar. Since I am a native speaker of Thai and do not speak Burmese, my classmate, a Burmese teacher in the Department of Oriental Languages, Chiang Mai University, participated in the fieldwork as a research assistant and Burmese interpreter.

For acoustic analysis, wordlists A and B (1, 2) were recorded. In regard to the recording of speech data, I first planned to place the target words in a carrier sentence. Unfortunately, when the carrier sentence was used for recording, it seemed that the speakers felt uncomfortable and the recording procedure seemed unnatural. Therefore, I decided to record the target words in isolation.

While the recording was taking place, the speakers were asked to pronounce the target words in isolation. The meaning of each target word was given in Thai (by me) or in Burmese (by my interpreter) in case of the Da-ang speaker, and then the speaker said the target word in his language. Five repetitions of target words produced in isolation were recorded. The speakers were instructed to produce the target words naturally at a normal speaking rate. The recording of each word was redone when an unusual pronunciation was detected. Note that the recording was

repeated once or twice in order to get high-quality recorded words free from the noise of children, or from chickens that were present during speech data recording sessions.

The recorded speech sounds were acoustically analyzed by Praat program (see section 3.6). As for recordings methods, in No-Lae Village, Thailand, 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 a .wav file on the computer. Meanwhile, for fieldwork in Kalaw, Myanmar, all tokens were recorded using a Sony DAT recorder and an Aiwa microphone. The recordings were digitized on Cool Edit Pro (version 2.00) at a sample rate of 44.1 kHz and stored as .wav files to be processed by Praat program.

As for the number of tokens derived from recording, the acoustic analysis of vowel length in Dara-ang presented in Chapter 6 consists of 240 tokens (2 Dara-ang speakers x 24 words x 5 repetitions = 240 tokens). Meanwhile, the acoustic analysis of vowel length in the Da-ang dialect of Kalaw city also consists of 240 tokens (2 Da-ang speakers x 24 words x 5 repetitions = 240 tokens). However, there are 117 tokens (1 Dara-ang speaker x 39 words x 3 repetitions = 117 tokens) for the study of phonetic realization of target denasalized nasal in Dara-ang (see Section 7.2). Additionally, in order to examine the temporal characteristics of denasalized nasals in Dara-ang, 195 tokens (3 Dara-ang speakers x 13 words x 5 repetitions = 195 tokens) were measured.

3.5 Phonological analysis

The phonological analysis of Palaung dialects has been carried out using phonemic analysis or “phonemicization.” Phonemicization is a body of knowledge and techniques that can be used to work out the phonological system of a language. This technique has been in existence for several decades and has been used on many languages. The method of phonemicization is to look for minimal pairs. Two sounds that appear in a minimal pairs are almost always distinct phonemes. In cases in which minimal pairs could not be found, near-minimal pairs are used for establishing phonemes. To establish that two sounds are the same phonemes, the method of

compiling local environment is used to establish that two sounds are in complementary distribution (Hayes, 2009).

The phonological analysis in this study will be supported by evidence from the historical phonology of Palaung. The comparative method is also applied when earlier stages of the language are needed to explain the process of sound change occurring in the Palaung dialects. Reconstruction of Proto Palaung in previous publications (e.g., Matani, 1977, 1979) will also be consulted in order to give an explanation of the sound pattern of the language.

3.6 Acoustic analysis

The sound recordings were analyzed acoustically using Praat software (version 5.1.02). The Praat program is acoustic analysis software that was created by Paul Boersma and David Weenink of the Institute of Phonetics Sciences of the University of Amsterdam (Boersma & Weenink, 2009). By using the Praat program, we can analyze, synthesize, and manipulate speech, and create high-quality pictures of speech sound. The acoustic analysis in this dissertation includes two measurements: Acoustic measurements I and II.

The first measurement was made to determine the actual realizations of central vowel length contrast and seeks to confirm the phonological description of vowels. The second measurement was done in order to examine the detailed phonetic fact of the word final nasals that have been denasalized in Palaung dialects.

3.6.1 Acoustic measurement I

The measurements of vowel duration and formant frequency were taken using the Praat program. Duration of mid- and low-central vowels was measured. The beginning and end of the target vowel were marked by examining both waveforms and wide-band spectrograms. Formant frequencies (F1, F2) were obtained at the midpoint from the steady-state region of the vowels, as illustrated in Figure 3.1. A plot of F1 vs. F2 then was made by JPlotFormants v1.4, the formant-plotting computer software created by Billerey-Mosier (2001). The plot of F1 represents vowel height, while the plot of F2 characterizes vowel backness (Ladefoged, 2003).

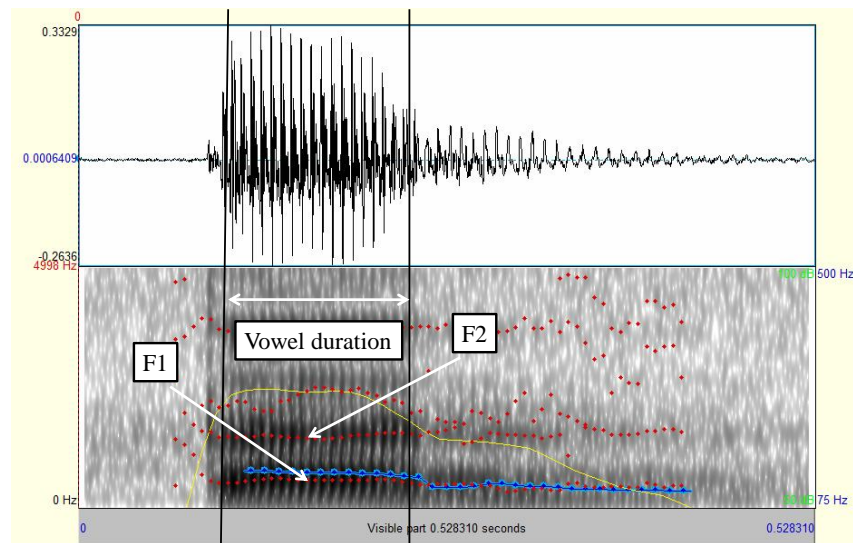


Figure 3.1 Wideband spectrogram (bottom panel) and waveform display (top panel) of the word /tən/ [tən] ‘to lead by hand’ produced by a Da-ang male speaker

3.6.2 Acoustic measurement II

In the second measurement, target denasalized nasals were analyzed. Apart from examining spectrograms and waveforms, the stop closure, preceding vowel duration, and nasal release duration were also measured. Since the duration of oral closure portion of denasalized nasals is variable, the measurements of duration of target segments were made in order to determine whether preceding vowel duration effects duration of oral closure portion of denasalized nasals.

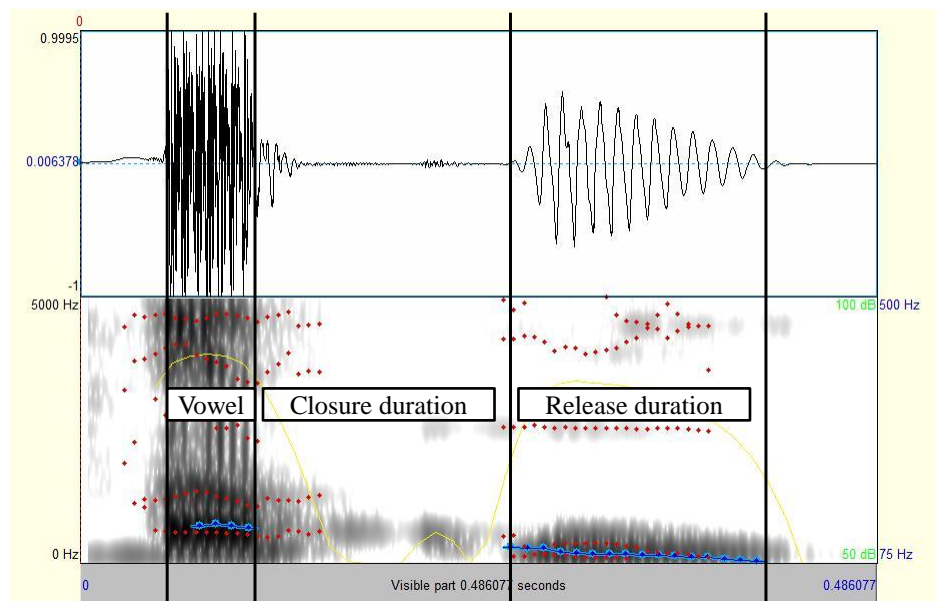


Figure 3.2 Wideband spectrogram (bottom panel) and waveform display (top panel) of the word /ʔəm/ [ʔəm] ‘rotten’ produced by a Dara-ang male speaker

3.7 Summary

The goal of this chapter was to lay out the procedures involved in collecting, analyzing, and measuring the data. After giving the reader an overview of the methodology used in this study for investigating the phonological system of the dialects of Palaung, and the phonetic realization of phonemic vowel length and target final denasalized nasals, we can now turn to the first important result chapter of this thesis. In the next chapter, Chapter 4, I will present the phonological system of the Dara-ang dialect of Palaung spoken in No-Lae Village, Chiang Mai, Thailand, including words, syllables, initial consonants, vowels, and final consonants.

CHAPTER IV

DARA-ANG PHONOLOGY

In this chapter, I will give a phonological description of the Dara-ang dialect of Palaung spoken in No-Lae Village, Chiang Mai Province, Thailand. It is important to note that the phonological descriptions presented in this chapter and the next chapter are based solely on my first-hand elicited wordlist. Regarding my fieldwork on Palaung dialects, I collected lexical items and speech data from two dialects of Palaung: Dara-ang and Da-ang. As mentioned in the previous chapter, Dara-ang is a Palaung dialect spoken in No-Lae Village, Thailand, while Da-ang is a dialect of Palaung spoken in Kalaw, southern Shan State, Myanmar.

The description in this chapter will begin with a discussion of what constitutes a word. A description of syllables will follow the word, and then a description of consonant and vowel phonemes. The distribution and phonetic realization of each phoneme will also be discussed. The phonological system analyzed in this chapter and the next chapter will be supported by evidence from historical phonology and acoustic analysis in subsequent chapters (Chapter 6 and Chapter 7).

4.1 Words

Words in Dara-ang can be monosyllabic or polysyllabic. Polysyllabic words (words with more than one syllable) consist of a presyllable and a major syllable.

4.1.1 Monosyllabic words

A typical monosyllabic word in Dara-ang begins with a consonant, followed by a vowel. The basic syllable structure for monosyllabic words is CV. Dara-ang monosyllabic words can be open syllables, as in (1a-c), or closed syllables, a syllable having a final consonant, CVC, as shown in example (1d-f).

- | | | | | | | |
|-----|----|------|---------|----|-------|------------|
| (1) | a. | /dɛ/ | ‘hand’ | d. | /kăt/ | ‘old-aged’ |
| | b. | /ŋɔ/ | ‘fire’ | e. | /moc/ | ‘mouth’ |
| | c. | /hə/ | ‘vomit’ | f. | /dăk/ | ‘smoke’ |

4.1.2 Polysyllabic words

There are two main types of polysyllabic words in the Dara-ang Palaung dialect of No-Lae: sequisyllabic words and compound words.

The first type of polysyllabic words is called sequisyllabic. As found in other Mon-Khmer languages, sequisyllabic words have a stressed main syllable, which is preceded by an unstressed and phonological reduced minor syllable (Matisoff, 1973). The minor syllable can either be presyllable CV, as in (2a-b), or presyllabic nasal, as in (2c-d). Note that in Dara-ang the major stressed syllable of sequisyllabic words can be preceded by two presyllables CVCV, as in (2e-f).

- | | | | | | | |
|-----|----|----------|-----------------|----|-------------|-------------|
| (2) | a. | /dɨgaw/ | ‘pounded rice’ | d. | /ɲ căh/ | ‘comb’ |
| | b. | /ʔimaj/ | ‘male, husband’ | e. | /ma ŋ giah/ | ‘porcupine’ |
| | c. | /m phăn/ | ‘five (5)’ | f. | /madɨgliah/ | ‘crab’ |

The second type of polysyllabic words are compound words, which are made by combining two words. Compounding can occur between two monosyllabic words, as in (3a-b), between a monosyllabic word and a sequisyllabic word, as in (4a-b), and between a sequisyllabic word and a sequisyllabic word, as in (5a-b). Each type of combining unit is shown with examples below.

- | | | | | | | | |
|-----|----|-----------|---|--------|---|------------|-----------|
| (3) | a. | /ble/ | + | /jouʔ/ | = | /ble jouʔ/ | ‘earring’ |
| | | ‘fruit’ | | ‘ear’ | | | |
| | b. | /hik/ | + | /gɨɲ/ | = | /hik gɨɲ/ | ‘hair’ |
| | | ‘feather’ | | ‘head’ | | | |

- (4) a. /piʔian/ + /plɔ/ = /piʔian plɔ/ ‘ankle bone’
 ‘egg’ ‘leg’
- b. /ceŋ/ + /saŋɛ/ = /ceŋ saŋɛ/ ‘rainbow’
 ‘foot’ ‘sun’
- (5) a. /ʔikăt/ + /ʔibǎn/ = /ʔikăt ʔibǎn/ ‘older sister’
 ‘old’ ‘female’
- b. /naleih/ + /saŋɛ/ = /naleih saŋɛ/ ‘east’
 ‘outside’ ‘sun’

4.2 Syllables

In the Dara-ang dialect of Palaung spoken in Thailand, there are two types of syllables: the major syllable and the minor syllable.

4.2.1 Major syllables

Major syllables in Dara-ang can be open syllables or closed syllables. The major syllable can begin with a single initial consonant or a consonant cluster formed by an initial bilabial and velar stops with voiced liquid and glide (see section 4.3.2). The most basic syllable template of major syllables in Dara-ang is CV. An example of the maximal syllable template of major syllables is given in Table 4.1.

Table 4.1 Dara-ang major syllable structure

Open syllables	CV	/dɔ/	‘vegetable’
	CV	/dua/	‘give’
	CCV	/pla/	‘scar’
	CCV	/bria/	‘hail’
Closed syllables	CVC	/bom/	‘rice (cooked rice)’
	CCVC	/khrəm/	‘rich’
	CCVC	/khrauh/	‘sprinkle (water)’

4.2.2 Minor syllables

There are two types of minor syllables: presyllables and presyllabic nasals.

4.2.2.1 Presyllables

The consonants occupying the initial position of presyllables are restricted to /p-/ , /b-/ , /d-/ , /c-/ , /kh-/ , /k-/ , /ʔ-/ , /m-/ , /n-/ , /s-/ , and /l-/. Vowels that can occur in the presyllables are restricted to /i ε ɨ ə a ɔ u/. The central vowels /ɨ/, /ə/, and /a/ are the most common, but the most frequently occurring vowel in presyllables is low central vowel /a/. In connected speech or fast speech, the vowel /a/ might be reduced to schwa [ə]. In the entire elicited wordlist, the vowels /i ε ɔ u/ in presyllables occur only in a few instances.

According to functions, there are two classes of presyllables in Dara-ang. They are of a non-specified class and a class of presyllables that have grammatical and semantic functions. The presyllables /ka-/ , /ma-/ , and /sa-/ are the most common. These presyllables are listed with examples as follows:

/ka-/ is a presyllable with a non-specified use, as in (6a-b). The presyllable /ka-/ also can be a prefix of reciprocal verbs, as in (6c-d).

- (6)
- | | | |
|----|----------|------------------------|
| a. | /kasəŋ/ | ‘joint’ |
| b. | /kafaŋ/ | ‘fireplace’ |
| c. | /kathǎʔ/ | ‘clap’ |
| d. | /katom/ | ‘scoop with two hands’ |

/ma-/ is a non-specified use, as in (7a-b). However, the presyllable /ma-/, found in my database, functions as an animal prefix, as in (7c-f).

- (7)
- | | | |
|----|---------|--------------------|
| a. | /mano/ | ‘teach’ |
| b. | /manǎk/ | ‘beam of the roof’ |
| c. | /maso/ | ‘dog’ |
| d. | /masim/ | ‘bird’ |

/sa-/ is the third most frequent presyllable found in the elicited wordlist. However, in Dara-ang, the presyllable /sa-/ has a non-specified use, as in (8a-d).

- (8)
- | | | |
|----|----------|-----------------------------|
| a. | /sato/ | ‘shirt’ |
| b. | /sagloc/ | ‘make the hair into a knot’ |
| c. | /saŋaih/ | ‘delicious’ |

/di-/ is a presyllable with a non-specified use, as in (9a-b). Note that in Dara-ang /di/ is a polysemy. Besides being a presyllable in sentences, it can also be a particle that functions as a future marker or locative marker. The particle /di/, in addition, can be a linker in serial verb construction.

- (9)
- | | | |
|----|---------|--------|
| a. | /diṁəʔ/ | ‘ask’ |
| b. | /diḷaw/ | ‘play’ |

/na-/ is a presyllable that functions as a locative prefix, as in (10a-d). I have found a few instances of this prefix in my database.

- (10) a. /narec/ 'outside'
 b. /nakheŋ/ 'inside'
 c. /nadεŋ/ 'on, above'
 d. /nakhrim/ 'below, under'

/ʔa-/ is a presyllable with a non-specified use, as in (11a-b).

- (11) a. /ʔar̩ik/ 'corn'
 b. /ʔat̩im/ 'knife (razor)'

/ʔi-/ is a presyllable that functions as a person prefix, as in (12a-b).

- (12) a. /ʔikãt/ 'older brother or older sister'
 b. /ʔimaj/ 'male, husband'
 c. /ʔiŋauh/ 'killer'

/da-/ is a presyllable that functions as an ethnic prefix, as in (13a-b).

- (13) a. /dakhe/ 'Chinese people'
 b. /dasiam/ 'Tai people'
 c. /daraʔaŋ/ 'Palaung people'

4.2.2.2 Presyllabic nasals

In Dara-ang, besides presyllables, a presyllabic nasal /m n ɲ ŋ/ is another type of minor syllable. Presyllabic nasals are phonetically realized as [m̩, n̩, ɲ̩, ŋ̩]. They can carry a grammatical function, as in (14) or have a non-specified use, as in (15).

(14) Presyllabic nasal as a nominalizer

- | | | | | | |
|----|----------|---------|----|--------|-------------------|
| a. | /m bih/ | ‘broom’ | c. | /bih/ | ‘sweep’ |
| b. | /n louʔ/ | ‘hoe’ | d. | /louʔ/ | ‘hack with a hoe’ |

(15) Presyllabic nasal with a non-specified use

- | | | |
|----|---------|--------------|
| a. | /n teɲ/ | ‘road, path’ |
| b. | /ŋ him/ | ‘nail’ |

4.3 Initial consonants

This section presents the initial consonant phoneme inventory and the distribution of each phoneme. Initial consonant clusters will also be discussed.

4.3.1 Initial consonant inventory

The phonemic consonant inventory of Dara-ang is shown in Table 4.1. Dara-ang has 31 initial consonant phonemes.

The full inventory of consonants surfaces in initial position of the major syllable. There are five places of articulations: labial, alveolar, palatal, velar, and glottal. In addition to three series of stops (plain voiceless, voiceless aspirated, and voiced stops), there are nasals, fricatives, trills, laterals, and glides.

Table 4.2 Dara-ang initial consonant phonemes

	Labial	Alveolar	Palatal	Velar	Glottal
Stops	p	t	c	k	ʔ
	ph	th	ch	kh	
	b	d	ɟ	g	
Nasals	m̚	n̚	ɲ̚	ŋ̚	
	m	n	ɲ	ŋ	
Fricatives	f	s			h
	v				
Liquids		ɾ̚			
		r			
		l̚			
		l			
Glides			ɟ̚		
			j		

4.3.1.1 Stops

There are 13 phonemic stops that occur at five places of articulation: bilabial /p ph b/, alveolar /t th d/, palatal /c ch ɟ/, velar /k kh g/, and glottal /ʔ/. All of these stops occur in syllable initial position. The stop consonant phonemes are listed with examples below.

Unaspirated stops /p/, /t/, /c/, /k/, /ʔ/

/p/ is a voiceless bilabial stop. It is realized as [p]. /p/ appears word-initially as in (16a); /p/ appears word-medially as an initial consonant of a main syllable, as in (16b).

- (16) a. /pu/ [pu:] ‘breast, udder’
 b. /sapəñ/ [sa¹pətn] ‘lips’

/t/ is a voiceless alveolar stop. It is realized as [t]. /t/ appears word initially, as in (17a); /t/ appears word-medially as an initial consonant of a main syllable, as in (17b).

- (17) a. /tɔ̃/ [tɔ̃:] 'escape'
 b. /katauh/ [ka'tauh] 'forehead'

/c/ is a voiceless palatal stop. This phoneme is realized as a voiceless alveolo-palatal affricate [tɕ] in syllable initial position. It appears word-initially, as in (18a); /c/ appears word-medially as an initial consonant of main syllable, as in (18b). /c/ also can occur at word initial position as an initial consonant of presyllable /ca/, as in (18c).

- (18) a. /cǎn/ [tɕan] 'heavy'
 b. /ʔicǎk/ [ʔi'tɕak̚] 'few'
 c. /cadək/ [tɕa'dək̚] 'box'

/k/ is a voiceless velar stop. It is realized as [k]. /k/ appears word-initially, as in (19a); /k/ appears word-medially as an initial consonant of a main syllable, as in (19b). /k/ also occurs in the initial position of a presyllable /ka/, as in (19c-d).

- (19) a. /kaŋ/ [ka:kŋ] 'house'
 b. /ʔikǎt/ [ʔi'kat̚] 'older brother or older sister'
 c. /kaʔaŋ/ [ka'ʔa:kŋ] 'seed, bone'
 d. /makaʔǎʔ/ [ˌmaka'ʔaʔ] 'bat'

/ʔ/ is a voiceless glottal stop. It is realized as [ʔ]. /ʔ/ appears word-initially, as in (20a); /ʔ/ appears word-medially as an initial consonant of a main syllable, as in

(20b). The phoneme /ʔ/ can also occupy the initial position of a presyllable /ʔa/, as in (20c).

(20)	a.	/ʔəm/	[ʔəpm]	‘rotten’
	b.	/kaʔih/	[kaʔiç]	‘hate’
	c.	/ʔaʔäh/	[ʔaʔah]	‘right side’

Aspirated stops /ph/, /th/, /ch/, /kh/

/ph/ is a voiceless bilabial aspirated stop [p^h]. It appears word-initially, as in (21a); /ph/ appears word-medially as an initial consonant of a main syllable, as in (21b).

(21)	a.	/phauh/	[p ^h auh]	‘dye’
	b.	/maphian/	[ma ^h p ^h ian]	‘bee’

/th/ is a voiceless alveolar aspirated stop. It is realized as [t^h]. /th/ appears word-initially, as in (22a); /th/ appears word-medially as an initial consonant of a main syllable, as in (22b).

(22)	a.	/thoŋ/	[t ^h oŋ]	‘shine on’
	b.	/kathăʔ/	[ka ^h t ^h aʔ]	‘clap’

/ch/ is a voiceless palatal aspirated stop. The phoneme /ch/ is realized as a voiceless alveolo-palatal aspirated affricate [tʃ^h] in syllable initial position. It appears word-initially, as in (23a); /ch/ appears word-medially as an initial consonant of a main syllable, as in (23b).

(23)	a.	/chiʔ/	[tʃ ^h iʔ]	‘beautiful’
	b.	/kachoŋ/	[ka ^h tʃ ^h oŋ]	‘bed’

/kh/ is a voiceless velar aspirated stop. It is realized as [k^h]. /kh/ appears word-initially, as in (24a); /kh/ appears word-medially as an initial consonant of a main syllable, as in (24b).

- (24) a. /kham/ [k^ha:m] 'husk'
 b. /kakhiaʔ/ [ka^hk^hiaʔ] 'narrow'

Voiced stops /b/, /d/, /j/, /g/

/b/ is a voiced bilabial stop. It is realized as [b]. /b/ appears word-initially, as in (25a); /b/ appears word-medially as an initial consonant of a main syllable, as in (25b).

- (25) a. /bouh/ [bouh] 'flower'
 b. /kabāk/ [ka^hbak^h] 'break'

/d/ is a voiced alveolar stop. It is realized as [d]. /d/ appears word-initially, as in (26a); /d/ appears word-medially as an initial consonant of a main syllable, as in (26b).

- (26) a. /dɛ/ [dɛ:] 'hand'
 b. /kadaj/ [ka^hda:j] 'earth, soil'

/j/ is a voiced palatal stop. The phoneme /j/ is realized as a voiced alveolo-palatal affricate [dʒ] in syllable initial position. It appears word-initially, as in (27a); /j/ appears word-medially as an initial consonant of a main syllable, as in (27b).

- (27) a. /jām/ [dʒam] 'arrive'
 b. /majon/ [ma^hdʒokŋ] 'grasshopper'

/g/ is a voiced velar stop. It is realized as [g]. /g/ appears word-initially, as in (28a); /g/ appears word-medially as an initial consonant of a main syllable, as in (28b).

- | | | | | |
|------|----|---------|----------|------------|
| (28) | a. | /gɔn/ | [gɔ:n] | ‘child’ |
| | b. | /dəgia/ | [də'gia] | ‘cucumber’ |

4.3.1.2 Nasals

There are eight phonemic nasals occurring at bilabial /m̥ m/, alveolar /n̥ n/, palatal /ɲ̥ ɲ/, and velar /ŋ̥ ŋ/. In syllable initial position, the nasals are a contrast in terms of voicing: voiced and voiceless. Below both voiced and voiceless nasals are listed some examples.

/m̥/ is a voiceless bilabial nasal. It is realized as [m̥]. /m̥/ appears word-initially, as in (29a); /m̥/ appears word-medially as an initial consonant of a main syllable, as in (29b).

- | | | | | |
|------|----|-----------|------------|---------|
| (29) | a. | /m̥ət/ | [m̥ət̚] | ‘catch’ |
| | b. | /d̥im̥ɔʔ/ | [d̥i'm̥ɔʔ] | ‘ask’ |

/n̥/ is a voiceless alveolar nasal. It is realized as [n̥]. /n̥/ appears word-initially, as in (30a); /n̥/ appears word-medially as an initial consonant of a main syllable, as in (30b-c).

- | | | | | |
|------|----|------------|---------------|---------|
| (30) | a. | /n̥am/ | [n̥a:m] | ‘blood’ |
| | b. | /maɲaj/ | [ma'n̥a:j] | ‘rat’ |
| | c. | /lakan̥en/ | [,laka'n̥e:n] | ‘same’ |

/ɲ/ is a voiceless palatal nasal. It is realized as [ɲ]. /ɲ/ appears word-initially, as in (31a); /ɲ/ appears word-medially as an initial consonant of a main syllable, as in (31b).

- (31) a. /ɲɔʔ/ [ɲɔʔ] ‘smell’
 b. /kaɲa/ [ka'ɲa:] ‘tomorrow’

/ŋ/ is a voiceless velar nasal. It is realized as [ŋ]. /ŋ/ appears word-initially, as in (32a) and (32b). There are only two instances of the phoneme /ŋ/ found in this study.

- (32) a. /ŋǎw/ [ŋǎw] ‘paddy rice’
 b. /ŋun/ [ŋun] ‘fragrant’

/m/ is a voiced bilabial nasal. It is realized as [m]. /m/ appears word-initially as an initial consonant of main and presyllable, as in (33a-b). This phoneme /m/ also appears word-medially as an initial consonant of a main syllable, as in (33b).

- (33) a. /ma/ [ma:] ‘mother’
 b. /mamǎk/ [ma'mak̚] ‘cow’

/n/ is a voiced alveolar nasal. It is realized as [n]. /n/ appears word-initially, as in (34a); /n/ appears word-medially as an initial consonant of a main syllable, as in (34b).

- (34) a. /nɔn/ [nɔ:n] ‘mountain’
 b. /kanuc/ [ka'nu'c̚] ‘heel’

/ɲ/ is a voiced palatal nasal. It is realized as [ɲ]. /ɲ/ appears word-initially, as in (35a); /ɲ/ appears word-medially as an initial consonant of a main syllable, as in (35b).

- | | | | | |
|------|----|--------|----------|---------|
| (35) | a. | /ɲɔj/ | [ɲɔ:j] | ‘waist’ |
| | b. | /kaɲa/ | [ka'ɲa:] | ‘right’ |

/ŋ/ is a voiced velar nasal. It is realized as [ŋ]. /ŋ/ appears word-initially, as in (36a); /ŋ/ appears word-medially as an initial consonant of a main syllable, as in (36b).

- | | | | | |
|------|----|--------|----------|---------|
| (36) | a. | /ŋauh/ | [ŋauh] | ‘kill’ |
| | b. | /saŋa/ | [sa'ŋa:] | ‘clear’ |

4.3.1.3 Fricatives

There are four fricatives occurring at labio-dental /f v/, alveolar /s/, and glottal /h/ points of articulation. Only labio-dental fricatives form a contrast in terms of voicing (voiceless and voiced). The fricative phonemes are shown below with examples.

/f/ is a voiceless labio-dental fricative. It is realized as [f]. /f/ appears word-initially, as in (37a); /f/ appears word-medially as an initial consonant of a main syllable, as in (37b).

- | | | | | |
|------|----|--------|----------|----------|
| (37) | a. | /fauʔ/ | [fauʔ] | ‘hang’ |
| | b. | /mafa/ | [ma'fa:] | ‘monkey’ |

/v/ is a voiced labio-dental fricative. It is realized as [v] and occurs in free variation with [v]. /v/ appears word-initially, as in (38a); /v/ appears word-medially as an initial consonant of a main syllable, as in (38b-c).

- (38) a. /va/ [va:] ~ [va:] ‘younger sibling’
 b. /sivăh/ [si'vah] ~ [si'vah] ‘morning’
 c. /maravaj/ [ˌmara'va:j] ~ [ˌmara'va:j] ‘tiger’

/s/ is a voiceless alveolar fricative. It is realized as [s]. /s/ appears word-initially, as in (39a); /s/ appears word-medially as an initial consonant of a main syllable, as in (39b). The phoneme /s/ also appears word-initially as an initial consonant of the presyllable /sa/, as in (39c).

- (39) a. /sin/ [si:n] ‘ripe’
 b. /masim/ [ma'si:m] ‘bird’
 c. /samăj/ [sa'maːj] ‘star’

/h/ is a voiceless glottal fricative. It is realized as [h]. /h/ appears word-initially, as in (40a); /h/ appears word-medially as an initial consonant of a main syllable, as in (40b).

- (40) a. /hin/ [hi:n] ‘iron’
 b. /kahauh/ [ka'hauh] ‘dry, withered’

4.3.1.4 Liquids

There are four liquids in the Dara-ang dialect of Palaung spoken at No-Lae Village. They occur only at the alveolar position and form contrasts in terms of voicing. All liquid sounds /r̥ r l l/ can only occupy the initial position. These phonemes are listed below with examples.

/r̥/ is a voiceless alveolar trill. It is realized as [r̥]. /r̥/ appears word-initially, as in (41a); /r̥/ appears word-medially as an initial consonant of a main syllable, as in (41b).

- (41) a. /raŋ/ [ra:kŋ] ‘tooth’
 b. /di_ərew/ [di_əˈre:w] ‘thin’

/r/ is a voiced alveolar trill. It is realized as [r]. /r/ appears word-initially, as in (42a); /r/ appears word-medially as an initial consonant of a main syllable, as in (42b).

- (42) a. /rauh/ [rauh] ‘choose’
 b. /marouʔ/ [maˈrouʔ] ‘frog’

/l̥/ is a voiceless alveolar lateral approximant. It is realized as [l̥]. /l̥/ appears word-initially, as in (43a); /l̥/ appears word-medially as an initial consonant of a main syllable, as in (43b).

- (43) a. /la/ [la:] ‘leave’
 b. /di_əɔ/ [di_əˈɔ:] ‘rest’

/l/ is a voiced alveolar lateral approximant. It is realized as [l]. /l/ appears word-initially, as in (44a); /l/ appears word-medially as an initial consonant of a main syllable, as in (44b).

- (44) a. /luj/ [lu:j] ‘white’
 b. /kalǎŋ/ [kaˈlakŋ] ‘round’

4.3.1.5 Glides

In syllable initial position in Dara-ang, there are only two glides /j j/ occurring at the palatal point of articulation. Palatal glides are contrastive in

terms of voicing: voiced and voiceless. These glide phonemes are listed below with examples.

/j̥/ is a voiceless palatal approximant. It is realized as [j̥]. /j̥/ appears word-initially, as in (45a); /j̥/ appears word-medially as an initial consonant of a main syllable, as in (45b).

- | | | | | |
|------|----|---------|-------------------------|-------------------|
| (45) | a. | /j̥ouʔ/ | [j̥ouʔ] | ‘ear’ |
| | b. | /ʔaʔaŋ/ | [ʔa ^h ja:kŋ] | ‘female (animal)’ |

/j/ is a voiced palatal approximant. It is realized as [j]. /j/ appears word-initially, as in (46a); /j/ appears word-medially as an initial consonant of a main syllable, as in (46b).

- | | | | | |
|------|----|----------|------------------------|------------|
| (46) | a. | /jǎʔ/ | [jaʔ] | ‘shoulder’ |
| | b. | /majauh/ | [ma ^h jauh] | ‘hundred’ |

Note that, in regard to Proto-Palaung initial consonants, as stated in Mitani (1979), there is no special sound change from Proto-Palaung to modern dialects for that of the initial fricatives and the initial sonorant (nasals, liquids, and glides). Dara-ang dialect of No-Lae persevered all of those Proto-Palaung initial consonants.

4.3.2 Consonant cluster

In Dara-ang, consonant clusters only occur at the main syllable initial position. There is a very limited set of initial consonant clusters.

As shown in Table 4.3, the first consonant members are restricted to labial /p-, ph-, b-/ and velar /k-, kh-, g-/ stop consonants. The second members of the consonant cluster are sonorants: liquids /-r-/ and /-l-/, and glide /-j-/.

Table 4.3 The co-occurrence of Dara-ang consonant cluster

	-r-	-l-	-j-
p-	pr-	pl-	pj-
t-			
c-			
k-	kr-	kl-	
ph-	phr-	phl-	
th-			
ch-			
kh-	khr-		khj-
b-	br-	bl-	bj-
d-			
j-			
g-	gr-	gl-	

There are 14 consonant clusters in Dara-ang. Below, all possible consonant clusters I found in my database are listed with examples, as shown in (47a-n).

- (47) a. /pr-/ /prɛ/ [prɛ:] ‘forest, jungle’
- b. /pl-/ /kaplǎʔ/ [ka^hplaʔ] ‘split with a knife’
- c. /pj-/ /kapjǎc/ [ka^hpja:^hc^h] ‘teared’
- d. /kr-/ /kro/ [kro:] ‘things’
- e. /kl-/ /ŋ kliʔ/ [ŋ^hkliʔ] ‘scraped’
- f. /phr-/ /phruh/ [p^hruh] ‘spit out the water’
- g. /phl-/ /phlan/ [phla:n] ‘poor’
- h. /khr-/ /khrɪŋ/ [k^hrikŋ] ‘cloths’
- i. /khj-/ /sakhja/ [sa^hk^hja:] ‘good’
- j. /br-/ /brec/ [bre^hc^h] ‘side (of body)’
- k. /bl-/ /bleŋ/ [ble:cŋ] ‘sky’

l.	/bj-/	/kabjaw/	[ka ^h bja:w]	‘bag’
m.	/gr-/	/grɪŋ/	[grɪkŋ]	‘drum’
n.	/gl-/	/maglaŋ/	[ma ^h gla:kŋ]	‘hawk’

4.4 Vowels

The Dara-ang vowel system consists of 11 monophthongs: front vowels /i e ε/, central vowels /ɨ ǎ ə ă a/, and back vowels /u o ɔ/ plus six diphthongs: /ia ei ai au ou ua/, which are described as follows:

4.4.1 Monophthongs

Dara-ang has 11 phonemic vowels. There are three front vowels /i e ε/, three back vowels /u o ɔ/, and five central vowels /ɨ ǎ ə ă a/. Except for a high central vowel /ɨ/, the vowel length of central vowels is phonemically distinctive (see, in details, Chapter 6). The phonemic vowel sounds are presented in Table 4.4. It is important to mention that phonemically, short vowels are marked since they occur in more restricted environment than long vowels.

Table 4.4 Dara-ang vowel phonemes

	Front	Central		Back
		Short	Long	
High	i	ɨ		u
Mid	e	ǎ	ə	o
Low	ε	ă	a	ɔ

4.4.1.1 Front vowels

/i/ is a high front vowel. This vowel phoneme occurs both in open and closed syllables, as in (48a-b). In a closed major syllable /i/ is realized as [i], while in an open major syllable it is realized as a diphthongized vowel [ii].

(48) /i/ → [i] / ___ C

→ [ii] / ___ #

- | | | | |
|----|--------|-----------|-----------------|
| a. | /dih/ | → [diç] | ‘mushroom’ |
| b. | /duʔi/ | → [duʔii] | ‘person, human’ |

/e/ is a mid front vowel. This vowel phoneme occurs both in open and closed syllables, as in (49a-b). In a closed major syllable /e/ is realized as [e], while in an open major syllable it is realized as diphthongized vowel [ei].

(49a-b) /e/ → [e] / ___ C

→ [ei] / ___ #

- | | | | |
|----|---------|-------------------------|--------|
| a. | /m bew/ | → [m ^h be:w] | ‘mat’ |
| b. | /he/ | → [hei] | ‘tree’ |

In Dara-ang, however, the mid front vowel /e/ in an open major syllable is not diphthongized in case of the plural personal pronouns, as exemplified in (49c-f).

- | | | | |
|----|------|-------|-------------------------------------|
| c. | /be/ | [be:] | ‘you (pl.)’ |
| d. | /ge/ | [ge:] | ‘they (3 rd person pl.)’ |
| e. | /ʔe/ | [ʔe:] | ‘we (pl. incl.)’ |
| f. | /je/ | [je:] | ‘we (pl. excl.)’ |

/ɛ/ is a low front vowel. The vowel phoneme /ɛ/ occurs both in open and closed syllables, as in (50a-b). While in a closed major syllable /ɛ/ is realized as [ɛ], in an open major syllable it is realized as [ɛ:].

(50) /ɛ/ → [ɛ] / ___ C

→ [ɛ:] / ___ #

- a. /d̪it̪ɛʔ/ → [d̪i't̪ɛʔ] 'small'
 b. /d̪ɛ/ → [d̪ɛ:] 'hand'

4.4.1.2 Central vowels

/i/ is a high central vowel. The vowel phoneme /i/ occurs in closed syllables, as in (51a). But, in an open syllable, it occurs rarely and there are only three words found in my database, as shown in (51b-d). While in a closed major syllable /i/ is realized as [i], in an open major syllable it is realized as [i:].

(51) /i/ → [i] / ___ C

→ [i:] / ___ #

- a. /ʔim/ → [ʔipm] 'water'
 b. /d̪i/ → [d̪i:] 'at'
 c. /ci/ → [t̪ɕi:] 'name'
 d. /ŋ si/ → [ŋ'si:] 'straight'

/ə/ is a short mid central vowel. It is realized as [ə]. The vowel phoneme /ə/ occurs only in closed syllables, as in (52a-d).

- (52) a. /jəp/ [jəp̚] 'fan, beckon'
 b. /hət/ [hət̚] 'thick'

- c. /sǎm/ [səpm] 'to plant'
 d. /sakǎh/ [sa'kəx] 'look up'

/ə/ is a long mid central vowel [ə:]. This vowel phoneme occurs both in open and closed syllables, as in (53a-b). In a closed major syllable /ə/ is realized as [ə:], while in an open major syllable it is realized as a diphthongized vowel [əu].

(53) /ə/ → [ə:] / ___ C

→ [əu] / ___ #

- a. /mən/ → [mə:n] 'crawl'
 b. /hə/ → [həu] 'vomit'

/ǎ/ is a short low central vowel. It is realized as [a]. The vowel phoneme /a/ occurs only in closed syllables, as in (54a-e).

- (54) a. /jǎm/ [jam] 'die'
 b. /phǎn/ [p^han] 'five'
 c. /bǎŋ/ [ba'ŋ] 'shoot'
 d. /nǎp/ [nap^ɿ] 'know'
 e. /manǎk/ [ma'nak^ɿ] 'beam of the roof'

/a/ is a long low central vowel. It is realized as [a:]. This vowel phoneme occurs both in open and closed syllables, as in (55a-b).

- (55) a. /ma/ [ma:] 'mother'
 b. /maga/ [ma'ga:] 'fish'
 c. /jam/ [ja:m] 'cry, sweep'

d. /daraʔaŋ/ [daraʔa:kŋ] ‘Palaung’

4.4.1.3 Back vowels

/u/ is a high back vowel. This vowel phoneme occurs both in open and closed syllables, as in (56a-b). While in a closed major syllable /u/ is realized as [u], in an open major syllable it is realized as [u:].

(56) /u/ → [u] / ___ C

→ [u:] / ___ #

a. /buʔ/ → [buʔ] ‘blow’

b. /pu/ → [pu:] ‘breast, udder’

/o/ is a mid back vowel [o]. This vowel phoneme occurs both in open and closed syllables, as in (57a-b). In a closed major syllable /o/ is realized as [o], while in an open major syllable it is realized as a diphthongized vowel [ou].

(57) /o/ → [o] / ___ C

→ [ou] / ___ #

a. /moc/ → [moⁱc^ɿ] ‘mouth’

b. /ʔo/ → [ʔou] ‘I’

/ɔ/ is a low back vowel [ɔ]. This vowel phoneme occurs both in open and closed syllables, as in (58a-b). While in a closed major syllable /ɔ/ is realized as [ɔ], in an open major syllable it is realized as [ɔ:].

(58) /ɔ/ → [ɔ] / ___ C

→ [ɔ:] / ___ #

- a. /pɔŋ/ [pɔkŋ] ‘bamboo shoot’
 b. /dɔ/ [dɔ:] ‘vegetable’

4.4.2 Diphthongs

In Dara-ang, there are two vowel sequences that would be called diphthongs. The inventory of diphthong phonemes is listed in Table 4.5.

Table 4.5 Dara-ang diphthong phonemes

Diphthongs			
ia			ua
ei			ou
	ai	au	

Examples of diphthong phonemes are listed in (59) below:

- (59) /ia/ /maʔian/ [maʔian] ‘chicken’
 /ei/ /keih/ [keiç] ‘fall down’
 /ai/ /taih/ [taih] ‘give’
 /au/ /ʔauh/ [ʔauh] ‘swollen’
 /ou/ /tough/ [tough] ‘taro’
 /ua/ /katuan/ [kaʔuan] ‘crow’

However, there are restrictions on the occurrence of diphthongs according to final consonants. As shown in Table 4.6, the diphthongs /ia ua/ occur more widely, while the diphthongs /ei au ai ou/ occur only before glottal stops /-ʔ/ and glottal fricative /-h/.

Table 4.6 The co-occurrences of final consonants and diphthongs

	-p	-t	-c	-k	-ʔ	-m	-n	-ɲ	-ŋ	-h	-w	-j
/ia/	iap ^ɿ				iaʔ	iam	ian		iaŋ	iah		
/ei/					eiʔ					eiç		
/au/					auʔ					auh		
/ai/					aiʔ					aih		
/ou/					ouʔ					ouh		
/ua/					uaʔ		uan			uah		

The diphthongization in Dara-ang is due to the diachronic development of diphthongs and final consonants. Diachronically, by comparing to Rumai and Raojin, the dialects of Palaung spoken in China, we will see that the debuccalization of Proto-Palaung final stops (*-k > -ʔ) result in diphthongization (*ɔ > au, *o > ou), as shown in (60).

(60) Diachronic development of diphthongs in Palaung dialects

Diphthong	Rumai	Raojin	Dara-ang	
/au/	kək	kɔʔ	kauʔ	‘bite’
	fək	fɔʔ	fauʔ	‘hang’
/ou/	hək	houʔ	houʔ	‘ascend’
	lok	louʔ	louʔ	‘hack with a hoe’

4.4.3 Off-glides

Note that, regarding final palatals, as seen in Table 4.7, vowels that occur before the final palatal stops /-c/ and the final palatal nasal /-ɲ/ always have a high front off-glide.

Table 4.7 Vowels before final palatal stop and final palatal nasal

	i	e	ɛ	ǎ	a	ɔ	o	u	ĩ	ǎ̃	ə̃
-c	ic ^ɿ	e ⁱ c ^ɿ		a ⁱ c ^ɿ	a: ⁱ c ^ɿ	ɔ ⁱ c ^ɿ	o ⁱ c ^ɿ	u ⁱ c ^ɿ			
-ŋ	iŋ	e: ⁱ cŋ	ɛ: ⁱ ŋ	a: ⁱ ŋ	a: ⁱ ŋ			u: ⁱ ŋ			

The off-glide occurs with all vowels except for the high front vowel /i/ and central vowels /ĩ, ǎ̃, ə̃/. This can be written by the rule as in (61). Examples are listed below in (61a-d).

(61) /V/ → [Vⁱ] / ___ C[palatal]

- a. /hɔc/ → [hɔⁱc^ɿ] ‘already, finished’
- b. /malac/ → [mala:ⁱc^ɿ] ‘needle’
- c. /reŋ/ → [re:ⁱŋ] ‘red’
- d. /bǎŋ/ → [ba:ⁱŋ] ‘shoot’

4.5 Final consonants

The Dara-ang dialect has 12 final consonant phonemes. There is only one series of final stops: plain voiceless /-p, -t, -c, -k, -ʔ/. Apart from final voiceless stops, there are nasals /-m, -n, -ŋ, -ŋ/ glottal fricative /-h/, and glides /-w, -j/, as shown in Table 4.8.

Table 4.8 Dara-ang final consonant phonemes

	Labial	Alveolar	Palatal	Velar	Glottal
Stops	-p	-t	-c	-k	-ʔ
Nasals	-m	-n	-ŋ	-ŋ	
Fricative					-h
Glides	-w		-j		

4.5.1 Stops

There are five phonemic stops /-p, -t, -c, -k, -ʔ/ that can occur at the final position of the major syllables, as in (62). But, apart from /-ʔ/, when the four stops /p, t, c, k/ occur in a syllable final position, they are realized as unreleased stops [p̚, t̚, c̚, k̚].

(62)	a.	/nǎp/	[nap̚]	‘know’
	b.	/hǎt/	[hət̚]	‘thick’
	c.	/tuc/	[tu̚c̚]	‘sit’
	d.	/rik/	[rik̚]	‘throw water’
	f.	/sadǎʔ/	[sadaʔ]	‘tongue’

4.5.2 Nasals

In this section, the final nasal phonemes will be described. The phonemic status of denasalized nasals will also be discussed.

4.5.2.1 Final nasal phonemes

Recall from the previous section that Dara-ang nasals have two-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 the initial position. In the initial position, the nasal voiced and voiceless nasal phonemes, /m-, n-, ɲ-, ŋ-/ and /m̥-, n̥-, ɲ̥-, ŋ̥-/ are realized as [m-, n-, ɲ-, ŋ-] and [m̥-, n̥-, ɲ̥-, ŋ̥-], respectively.

However, in the final position, only voiced nasals /m n ɲ ŋ/ can occur. In addition, the nasal consonants labial, alveolar, and palatal in the final position surface two allophones: plain nasals [-m, -n, -ɲ,] and denasalized nasals [-pm, -tn, -cɲ,], which are conditioned by the preceding vowels. But for velar nasal /-ŋ/ in the final position, it always surfaces as a denasalized nasal [-kŋ], as described here:

/-m/ is a voiced bilabial nasal. In the final position, the final phoneme /-m/ is realized as a final plain nasal [-m], as in (63c-d). But, when it is preceded by a high central vowel /i/ [ɨ] and short mid central vowel /ə/ [ə], the final nasal /-m/ is realized as a denasalized nasal [-pm], as in (63a-b).

(63) /-m/ → [-pm] / [ɨ], [ə] ____ #

→ [-m] / elsewhere

- | | | | |
|----|--------|----------|----------|
| a. | /ʔim/ | → [ʔipm] | ‘water’ |
| b. | /ʔəm/ | → [ʔəpm] | ‘rotten’ |
| c. | /jäm/ | → [jam] | ‘die’ |
| d. | /tiam/ | → [tiam] | ‘short’ |

/-n/ is a voiced alveolar nasal. In a final position, the final phoneme /-n/ is realized as a final plain nasal [-n], as in (64c-d). But, when it is preceded by a short mid central vowel /ə/ [ə], the final nasal /-n/ is realized as a denasalized nasal [-tn], as in (64a-b).

(64) /-n/ → [-tn] / [ə] ____ #

→ [-n] / elsewhere

- | | | | |
|----|---------|-----------------------|------------------|
| a. | /bən/ | → [bətɳ] | ‘fly’ |
| b. | /sapən/ | → [sa'pətɳ] | ‘lips’ |
| c. | /phän/ | → [p ^h an] | ‘five (5)’ |
| d. | /katun/ | → [ka'tun] | ‘murky of water’ |

/-ɲ/ is a voiced palatal nasal. In the final position, the final phoneme /-ɲ/ is realized as a final plain nasal [-ɲ], as in (65c-d). But, when it is preceded by a high

front vowel /i/ [i] and mid front vowel /e/ [e], the final /-ŋ/ is realized as a denasalized nasal [-cŋ], as in (65a-b).

(65) /-ŋ/ → [-cŋ] / [i], [e] ____ #
 → [-ŋ] / elsewhere

- | | | | |
|----|----------|-----------------------------------------|--------------|
| a. | /gɨŋ/ | → [gicŋ] | ‘head’ |
| b. | /n teŋ/ | → [n ^h te: ^h cŋ] | ‘road, path’ |
| c. | /mapruŋ/ | → [ma ^h pru: ^h ŋ] | ‘ant’ |
| d. | /samǎŋ/ | → [sa ^h ma ^h ŋ] | ‘star’ |

/-ŋ/ is a voiced velar nasal. In the final position, the final phoneme /-ŋ/ is realized as a denasalized velar nasal [-kŋ], as in (66a-b).

(66) /ŋ/ → [kŋ] / ____ #

- | | | | |
|----|---------|---------------------------|--------------|
| a. | /kaŋ/ | → [ka:kŋ] | ‘house’ |
| b. | /kaʔaŋ/ | → [ka ^h ?a:kŋ] | ‘seed, bone’ |

Note that, the denasalized velar nasal allophone [-kŋ] that occurs in the final position is not conditioned by preceding vowel height and vowel length, since in the final position velar nasal /-ŋ/ preceded by all vowels is denasalized to [-kŋ] (see Chapter 7).

4.5.2.2 The phonemic status of final denasalized nasals

[-pm, -tn, -cŋ, -kŋ]

As mentioned in the previous section (section 4.5.2.1), the final nasal in Dara-ang surfaces two allophones: plain nasals and denasalized nasals. In this study, the denasalized final nasal is considered an allophone of the plain nasal (see Chapter 7). I would suggest that there are five reasons for considering the denasalized final nasals as allophones of the nasals, as follows:

- First, in Dara-ang, denasalized final nasals do not contrast with final plain nasals and they occur in complementary distribution as shown by rules (63) – (66) in the previous section (section 4.5.2.2).
- Second, there is evidence to suggest that 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, the word /ʔim/ [ʔipm] ‘water’ is realized as /ʔim'pac/ [ʔim'pa'c] ‘saliva’.
- Third, the denasalized nasal, in some cases, can occur in free variation with a simple nasal. For instance, the word /kaŋ/ ‘house’ can be pronounced as [ka:ŋ] or [ka:kŋ].
- Fourth, the denasalized nasals are diachronically developed from simple nasals and have simple nasal reflexes in other Palaung dialects and Palaungic languages. For instance, /ʔim/ ‘water’ cognates with Hu /ʔɔ̃m/ ‘water’; U /ʔóm/ ‘water’; Lamet /ʔóom/ ‘water’ (Svantesson, 1988, p. 80).
- Fifth, there is a tendency for the simple nasals in the word final position to develop into stops as reported in other Palaungic languages. Note that the emergence of denasalized finals is also developed to prevent the merger of short and long vowels, as in the case of the short and long mid central vowel /ə̃ ə/.

Therefore, based on the five reasons described above, an analysis of denasalized final nasals as allophones of simple nasals is preferable to one in which they are viewed as separate phonemes (cf. Kasisopa, 2003), or as word-final

allophones of voiced stops. More details on phonetics of final denasalized nasals are discussed in Chapter 7.

4.5.3 Fricatives

There is only one fricative: glottal fricative /-h/ occurring at the final position of a major syllable. It has three allophones: [h], [ç], and [x] conditioned by preceding vowel height, as shown in (67). Examples are listed in (67a-d).

(67) /-h/ → [h] / elsewhere

→ [ç] / [i] ___ #

→ [x] / [ə] ___ #

- | | | | |
|----|---------|------------|---------------------------------|
| a. | /dih/ | → [diç] | ‘mushroom’ |
| b. | /cǎh/ | → [tçəx] | ‘buy’ |
| c. | /pǎh/ | → [pah] | ‘carry on one’s head using bag’ |
| d. | /kapuh/ | → [ka'puh] | ‘dust’ |

4.5.4 Glides

In Dara-ang, there two final glides: voiced labial-velar approximant /-w/ and voiced palatal approximant /-j/. They occur at the final position of a major syllable, as in (64a-b).

- | | | | |
|---------|---------|-----------|------------------------|
| (64) a. | /kalɛw/ | [ka'lɛ:w] | ‘armpit’ |
| b. | /kaloj/ | [ka'lo:j] | ‘remaining, left over’ |

There is a restriction on vowels in accordance with the final consonants that they preceded, as seen in Table 4.11 below. Predictably, the back vowels /ɔ o u/ do not occur before the final labial-velar glide /-w/. The front vowels /i e ε/ are

restricted in that they do not occur before the final palatal glide /-j/. The vowel /ǎ/ and /a/ is the most unrestricted vowel occurring in both before /-w, -j/.

Table 4.9 The restriction on vowels in accordance with the final glides

	i	e	ɛ	ǎ	a	ɔ	o	u	ɨ	ǎ	ə
-w	i:w	e:w	ɛ:w	aw	a:w						
-j				aj	a:j	ɔ:j	o:j	u:j			ə:j

4.6 Summary

The phonological description of the Dara-ang dialect of Palaung spoken in No-Lae Village, Chiang Mai Province, Thailand can be summarized as follows. Dara-ang words are either monosyllabic or polysyllabic words. Polysyllabic words consist of sequisyllabic syllabic and compound words. Dara-ang sequisyllabic syllabic words can be preceded by either one or two presyllable (CV or CVCV), or presyllabic nasal. There are 31 phonemic initial consonants, 11 phonemic vowels that have a phonemic length of central mid vowels /ǎ ə/ and low mid vowels /ǎ a/. Besides, there are 12 phonemic consonants occupying the word-final position. In the word-final position, Dara-ang final nasals, in addition, have been denasalized.

In the next chapter, I will describe the phonological system of the Da-ang dialect of Palaung spoken in Nyaung Gone Village of Kalaw city, southern Shan State, Myanmar.

CHAPTER V

DA-ANG PHONOLOGY

This chapter is a companion chapter of Chapter 4. In this chapter, I will give a phonological description of the Da-ang dialect of Palaung spoken in Nyaung Gone Village in Kalaw city, southern Shan State, Myanmar. As with my descriptions of Dara-ang, the descriptions in this chapter will also begin with the words, followed by the syllables. A description of consonant and vowel phonemes will be presented, and the distribution and phonetic realization of each phoneme will also be discussed.

5.1 Words

As in Dara-ang spoken in Thailand, in the Da-ang dialect of Palaung spoken in Myanmar there are two main types of words: monosyllabic and polysyllabic words. Da-ang polysyllabic words (words having more than one syllable) consist of a presyllable and a main syllable.

5.1.1 Monosyllabic words

Da-ang monosyllabic words typically begin with a consonant and are followed by a vowel. The basic syllable structure for the monosyllabic words is CV. Da-ang monosyllabic words can be open syllables, as in (1a-c), or closed syllables, a syllable having a final consonant, CVC, as shown in examples (1d-f).

- | | | | | | | |
|-----|----|-------|------------------|----|-------|-----------|
| (1) | a. | /pʰɛ/ | ‘full, satiated’ | d. | /hɪp/ | ‘blanket’ |
| | b. | /tɔ/ | ‘escape’ | e. | /păt/ | ‘spit’ |
| | c. | /no/ | ‘remember’ | f. | /păk/ | ‘tie’ |

5.1.2 Polysyllabic words

As discussed before, in Palaung, there are two main types of polysyllabic words: sequisyllabic and compound words.

The first type of polysyllabic word in the Da-ang Palaung dialect of Kalaw city is a sequisyllabic word, which has a stressed main syllable that is preceded by an unstressed and phonological reduced minor syllable. The minor syllable can either be presyllable CV, as in (2a-b), or presyllabic nasal, as in (2c-d). Note that, as found in Dara-ang, a major stressed syllable of a sequisyllabic word in Da-ang can be preceded by two presyllables CVCV, as in (2e-f).

- | | | | | | | |
|-----|----|---------|-----------------|----|------------|-------------------|
| (2) | a. | /kamik/ | ‘shadow’ | d. | /n douh/ | ‘fall out (hair)’ |
| | b. | /ʔimaj/ | ‘male, husband’ | e. | /marabouʔ/ | ‘owl’ |
| | c. | /m bew/ | ‘mat’ | f. | /makalouʔ/ | ‘pipe’ |

In Da-ang, the second type of polysyllabic words is compound words. The compounding can occur between two monosyllabic words, as in (3a-b), between a monosyllabic word and a sequisyllabic word, as in (4a-b), and between a sequisyllabic word and a sequisyllabic word, as in (5a-b). Each type of combining is shown below with examples.

- | | | | | | | | |
|-----|----|-----------|---|----------|---|------------|-----------|
| (3) | a. | /ble/ | + | /jouʔ/ | = | /ble jouʔ/ | ‘earring’ |
| | | ‘fruit’ | | ‘ear’ | | | |
| | b. | /hik/ | + | /ɲaj/ | = | /hik ɲaj / | ‘eyebrow’ |
| | | ‘feather’ | | ‘eye’ | | | |
| (4) | a. | /maso/ | + | /pre/ | = | /maso pre/ | ‘fox’ |
| | | ‘dog’ | | ‘forest’ | | | |
| | b. | /bom/ | + | /saŋɛ/ | = | /bom saŋɛ/ | ‘lunch’ |
| | | ‘rice’ | | ‘sun’ | | | |

- (5) a. /ʔikăt/ + /ʔimaj/ = /ʔikăt ʔimaj/ ‘elder brother’
 ‘old’ ‘male’
- b. /katɛ/ + /saŋɛ/ = /katɛ saŋɛ/ ‘noon’
 ‘mid’ ‘sun’

5.2 Syllables

In the Da-ang dialect of Palaung spoken in Myanmar, there are two types of syllables: major and minor syllables.

5.2.1 Major syllables

The most basic syllable template of major syllable in Da-ang is CV. The maximal syllable template of major syllables is given in Table 5.1. In Da-ang, major syllables can be open or closed syllables. The major syllable can begin with a single initial consonant or consonant cluster formed by initial bilabial and velar stops /p ph b k kh g/ with voiced liquid /-r-, -l-/ and glide /-j-/ (see section 5.3.2).

Table 5.1 Da-ang major syllable structure

Open syllables	CV	/da/	‘grandfather’
	CV	/dua/	‘give’
	CCV	/bla/	‘arrow’
	CCV	/bria/	‘hail’
Closed syllables	CVC	/ʔim/	‘raw, live’
	CCVC	/bjit/	‘wake someone up’
	CCVC	/prouh/	‘bark (dog)’

5.2.2 Minor syllables

There are two types of minor syllables in Da-ang: presyllables and presyllabic nasals.

5.2.2.1 Presyllables /CV/

Consonants occupying the initial position of presyllables in Da-ang are restricted to /p-, b-, d-, c-, kh-, k-, ʔ-, m-, n-, s-, l-/. Vowels that can occur in the presyllables are restricted to /i ε ɨ ə a ɔ u/. However, as found in Dara-ang, the central vowels /ɨ/, /ə/, and /a/ are the most common, but the most frequently occurring vowel in presyllable is the low central vowel /a/. The vowel /a/ might be reduced to schwa [ə] in fast speech. As for the vowels /ε ɔ u/ in presyllables, only a few were found in the entire elicited wordlist.

As in Dara-ang, which is spoken in Thailand, there are two classes of presyllables in Da-ang. These include a non-specified class and a class of presyllable that have grammatical and semantic functions. The presyllables /ka-/ is the first most found. The second and third are presyllables /ma-/ and /sa-/ respectively. The presyllables found in Da-ang are listed with examples as follows:

/ka-/ is a presyllable that has a non-specified use, as in (6a-b). The presyllable /ka-/ also can be prefix of reciprocal verbs, as in (6c-d).

- (6)
- | | | |
|----|----------|-----------------|
| a. | /kamaj/ | ‘new’ |
| b. | /kahauh/ | ‘dry, withered’ |
| c. | /katuh/ | ‘bump against’ |
| d. | /kajuʔ/ | ‘combine’ |

/ma-/ is a non-specified use, as in (7a-b). In Da-ang, however, the presyllable /ma-/ that is mostly found in my database functions as an animal prefix, as in (7c-f).

- (7) a. /mana/ 'flat bamboo tray'
 b. /mavew/ 'flat gong'
 c. /mabraiʔ/ 'squirrel'
 d. /maprǎʔ/ 'peacock'
 f. /madivaj/ 'tiger'

/sa-/ is the third most presyllable found in the elicited wordlist. However, in Da-ang, the presyllable /sa-/ has a non-specified use, as in (8a-c).

- (8) a. /sada/ 'tail'
 b. /saglan/ 'chew'
 c. /sablouh/ 'small basket'

/di-/ is a presyllable with non-specified use, as in (9a-d).

- (9) a. /diṛew/ 'thin'
 b. /diṅǎn/ 'gums'
 c. /diḷɔ/ 'rest'
 d. /diteʔ/ 'small'

/na-/ is a presyllable that functions as a locative prefix, as in (10a-c).

- (10) a. /nakhek/ 'inside'
 b. /napǎn/ 'behind, in the back'
 c. /naʔac/ 'ahead, before'

/ʔa-/ is a presyllable with non-specified use, as in (11a-b).

- (11) a. /ʔarim/ 'pickled and dried soybean'

- b. /ʔaʔǎh/ ‘right side’

/ʔi-/ is a presyllable that functions as a person prefix, as in (12a-b).

- (12) a. /ʔikǎt/ ‘older brother or older sister’
 b. /ʔibǎn/ ‘male, husband’

/da-/ is a presyllable that functions as an ethnic prefix, as in (13a-c).

- (13) a. /dathe/ ‘Thai people’
 b. /dasiam/ ‘Tai people’
 c. /daʔak/ ‘Palaung people’

5.2.2.2 Presyllabic nasals

Apart from presyllables, in Da-ang, there is another type of minor syllable: the presyllabic nasals /m n ŋ/. The presyllabic nasals are realized as [m̥ n̥ ŋ̥]. They can have a grammatical function, as in (14), or a non-specified use, as in (15).

- (14) Presyllabic nasal as a nominalizer

- a. /ŋ cǎh/ ‘comb (n.)’ c. /cǎh/ ‘comb (v.)’
 b. /n louʔ/ ‘hoe’ d. /louʔ/ ‘hack with a hoe’

- (15) Presyllabic nasal as a non-specified use

- a. /m praj/ ‘fix’
 b. /ŋ gouh/ ‘chopping board’
 c. /ŋ vaiʔ/ ‘sickle’

5.3 Initial consonants

In this section, the initial consonant phoneme inventory of Da-ang will be presented. The distribution of each phoneme will also be shown.

5.3.1 Initial consonant inventory

The phonemic consonant inventory of Da-ang is listed in Table 5.2. There are 31 initial consonant phonemes. The full inventory of consonants surfaces in initial position of the major syllable. There are five places of articulation: labial, alveolar, palatal, velar, and glottal. In addition to three series of stops (plain voiceless, voiceless aspirated, and voiced stops), there are nasals, fricatives, trills, laterals, and glides.

Table 5.2 Da-ang initial consonant phonemes

	Labial	Alveolar	Palatal	Velar	Glottal
Stops	p	t	c	k	ʔ
	ph	th	ch	kh	
	b	d	ɟ	g	
Nasals	m̚	n̚	ɲ̚	ŋ̚	
	m	n	ɲ	ŋ	
Fricatives	f	s			h
	v				
Liquids		r̚			
		r			
		l̚			
		l			
Glides			ɟ̚		
			ɟ		

5.3.1.1 Stops

There are 13 phonemic stops that occur at five places of articulation: bilabial /p ph b/, alveolar /t th d/, palatal /c ch ɟ/, velar /k kh g/, and

glottal /ʔ/. All of these stops occur in syllable initial position. The stop consonant phonemes are listed with examples below.

Unaspirated stops /p/, /t/, /c/, /k/, /ʔ/

/p/ is a voiceless bilabial stop. It is realized as [p] and appears word-initially, as in (16a). The phoneme /p/ also can occur word-medially as an initial consonant of a main syllable, as in (16b).

- (16) a. /pauʔ/ [pauʔ] ‘ride’
 b. /mapo/ [ma'pou] ‘onion’

/t/ is a voiceless alveolar stop. It is realized as [t] and appears word-initially, as in (17a). The phoneme /t/ also can occur word-medially as an initial consonant of a main syllable, as in (17b).

- (17) a. /ta/ [təa] ‘use’
 b. /sato/ [sa'tou] ‘shirt’

/c/ is a voiceless palatal stop. In syllable initial position, this phoneme is realized as a voiceless alveolo-palatal affricate [tɕ]. It can appear both word-initially and word-medially as an initial consonant of a main syllable, as in (18a-b).

- (18) a. /couh/ [tɕouh] ‘fall, to drop’
 b. /ʔiciak/ [ʔi'tɕiakʔ] ‘few’

/k/ is a voiceless velar stop. It is realized as [k] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (19a-b). The phoneme /k/ also occurs in the initial position of presyllable /ka/, as in (19c).

- (19) a. /kak/ [ka:kʔ] ‘house’

- b. /sakǎt/ [sa¹kət̚] ‘pinch with finger’
 c. /kanuc/ [ka¹nuj̚ʔ] ‘heel’

/ʔ/ is a voiceless glottal stop. It is realized as [ʔ] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (20a-b). The phoneme /ʔ/ can also occupy the initial position of presyllable /ʔa/, as in (20c).

- (20) a. /ʔǎm/ [ʔam] ‘rotten’
 b. /makaʔan/ [ˌmaka¹ʔa:n] ‘hornet’
 c. /ʔajak/ [ʔa¹ja:k̚] ‘female (animal)’

Aspirated stops /ph/, /th/, /ch/, /kh/

/ph/ is a voiceless bilabial aspirated stop. It is realized as [p^h] and occurs both word-initially, as in (21a), and word-medially as an initial consonant of a main syllable, as in (21b).

- (21) a. /phiak/ [p^hiak̚] ‘wing’
 b. /m phuan/ [m¹p^huan] ‘four (4)’

/th/ is a voiceless alveolar aspirated stop. It is realized as [t^h] and occurs both word-initially, as in (22a), and word-medially as an initial consonant of a main syllable, as in (22b).

- (22) a. /thom/ [t^ho:m] ‘listen’
 b. /kathouʔ/ [ka¹t^houʔ] ‘move, wag’

/ch/ is a voiceless palatal aspirated stop. In syllable initial position, it is realized as a voiceless alveolo-palatal aspirated affricate [tʃ^h]. The phoneme /ch/ can

occur both word-initially and word-medially as an initial consonant of a main syllable, as in (23b).

- (23) a. /chiʔ/ [tɕ^hiʔ] ‘beautiful’
 b. /kachok/ [ka^htɕ^hok^ˀ] ‘bed’

/kh/ is a voiceless velar aspirated stop. It is realized as [k^h] and occurs both word-initially, as in (24a), and word-medially as an initial consonant of a main syllable, as in (24b).

- (24) a. /khun/ [k^hu:n] ‘wind’
 b. /dikhok/ [dɨ^hk^hok^ˀ] ‘thorn’

Voiced stops /b/, /d/, /j/, /g/

/b/ is a voiced bilabial stop. It is realized as [b] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (25a-b).

- (25) a. /bom/ [bo:m] ‘rice (cooked rice)’
 b. /kaba/ [ka^hbəa] ‘bunch of banana’

/d/ is a voiced alveolar stop. It is realized as [d] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (26a-b).

- (26) a. /dɔ/ [dɔ:] ‘vegetable’
 b. /sudaʔ/ [su^hda:ʔ] ‘hot (water)’

/j/ is a voiced palatal stop. In syllable initial position, it is realized as voiced alveolo-palatal affricate [dʒ]. The phoneme /j/ occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (27a-b).

- (27) a. /jit/ [dʒit^ˀ] ‘chop’

- b. /majǎʔ/ [ma¹ɗǎʔ] ‘deer’

/g/ is a voiced velar stop. It is realized as [g] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (28a-b).

- (28) a. /gaʔ/ [ga:ʔ] ‘shave’
 b. /ʔaǧǎʔ/ [ʔa¹gaʔ] ‘left side’

5.3.1.2 Nasals

In Da-ang, there are eight phonemic nasals occurring at bilabial /m̥, m/, alveolar /n̥, n/, palatal /ɲ, ɲ/, and velar /ŋ, ŋ/. In the syllable initial position, the nasals form contrasts in terms of voicing (voiced and voiceless). Both voiced and voiceless nasals are listed with examples below.

/m̥/ is a voiceless bilabial nasal. It is realized as [m̥] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (29b).

- (29) a. /man/ [ma:n] ‘ask for, beg’
 b. /ʔam̥ə/ [ʔa¹m̥əw] ‘yesterday’

/n̥/ is a voiceless alveolar nasal. It is realized as [n̥] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (30a-c).

- (30) a. /n̥ǎk/ [n̥ak^ɿ] ‘beads (used for
 woman’s head-dress)’
 b. /manaj/ [ma¹n̥a:j] ‘rat’
 c. /khanǎn/ [k^ha¹n̥an] ‘monk’

/ɲ/ is a voiceless palatal nasal. It is realized as [ɲ] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (31a-b).

- (31) a. /ɲap/ [ɲa:p̚] ‘difficult’
 b. /khaɲa/ [kʰa¹ɲəa] ‘tomorrow’

/ɲ/ is a voiceless velar nasal. It is realized as [ɲ] and occurs word-initially.

There are only two instances of the phoneme /ɲ/ found in this study, as in (32a-b).

- (32) a. /ɲaw/ [ɲaw] ‘paddy rice’
 b. /ɲun/ [ɲun] ‘fragrant’

/m/ is a voiced bilabial nasal. It is realized as [m] and occurs word-initially as an initial consonant of the main and presyllable /ma/, as in (33a-b). This phoneme /m/ also appears word-medially as an initial consonant of a main syllable, as in (33c).

- (33) a. /mɛ/ [mɛ:] ‘you (sg.)’
 b. /maglak/ [ma¹gla:k̚] ‘hawk’
 c. /kamik/ [ka¹mik̚] ‘shadow’

/n/ is a voiced alveolar nasal. It is realized as [n] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (34a-b).

- (34) a. /năp/ [nap̚] ‘know’
 b. /sanăʔ/ [sa¹naʔ] ‘tender’

/ɲ/ is a voiced palatal nasal. It is realized as [ɲ] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (35a-b).

- (35) a. /ɲouʔ/ [ɲouʔ] ‘mud’
 b. /kaɲăh/ [ka¹ɲah] ‘laugh’

/ŋ/ is a voiced velar nasal. It is realized as [ŋ] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (36a-b).

- (36) a. /ŋaj/ [ŋa:j] ‘eye’
 b. /saŋa/ [sa¹ŋəa] ‘clear’

5.3.1.3 Fricatives

In Da-ang, there are four fricatives occurring at labio-dental /f/, v/, alveolar /s/, and glottal /h/ points of articulation. Only labio-dental fricatives contrast in terms of voicing (voiceless and voiced). Apart from that, only the phoneme /h/ occurs in both initial and final positions. The fricative phonemes are shown below with examples.

/f/ is a voiceless labio-dental fricative. It is realized as [f] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (37a-b).

- (37) a. /fauʔ/ [fauʔ] ‘hang’
 b. /kafak/ [ka¹fa:k¹] ‘fireplace’

/v/ is a voiced labio-dental fricative. It is realized as [v] and occurs in free variation with [ʋ], as in (38a-c). The phoneme /v/ can occur both word-initially and word-medially as an initial consonant of a main syllable.

- (38) a. /văt/ [vat¹] ~ [ʋat¹] ‘abdomen’
 b. /vaʔ/ [va:ʔ] ~ [ʋa:ʔ] ‘warm at a fire’
 c. /kavauh/ [ka¹vauh] ~ [ka¹ʋauh] ‘wide’

/s/ is a voiceless alveolar fricative. It is realized as [s] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (39a-

b). The phoneme /s/ also appears word-initially as an initial consonant of the presyllable /sa/, as in (39c).

- | | | | | |
|------|----|---------|-------------------------|------------------|
| (39) | a. | /sen/ | [se:n] | ‘cotton, thread’ |
| | b. | /kasak/ | [ka'sa:k ^ˀ] | ‘divide’ |
| | c. | /sanəm/ | [sa'nam] | ‘medicine’ |

/h/ is a voiceless glottal fricative. It is realized as [h] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (40a-b).

- | | | | | |
|------|----|---------|------------------------|------------|
| (40) | a. | /həp/ | [hap ^ˀ] | ‘put into’ |
| | b. | /kahoc/ | [ka'hoj ^ʔ] | ‘whistle’ |

5.3.1.4 Liquids

In the Da-ang dialect of Palaung spoken at Nyaung Gone Village, there are four liquids. They occur only at the alveolar position and form contrasts in term of voicing. All liquid sounds /r̥ r ɹ l/ can occupy only the initial position of major syllables. These phonemes are listed below with examples.

/r̥/ is a voiceless alveolar trill. It is realized as [r̥] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (41a-b).

- | | | | | |
|------|----|----------|-------------------------|----------|
| (41) | a. | /r̥ək/ | [r̥ək ^ˀ] | ‘bamboo’ |
| | b. | /n̥r̥ik/ | [n̥'r̥ik ^ˀ] | ‘corn’ |

/r/ is a voiced alveolar trill. It is realized as [r] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (42a-b).

- | | | | | |
|------|----|---------|----------|----------|
| (42) | a. | /riah/ | [riah] | ‘root’ |
| | b. | /maruh/ | [ma'ruh] | ‘turtle’ |

/l̥/ is a voiceless alveolar lateral approximant. It is realized as [l̥] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (43a-b).

- (43) a. /l̥əm/ [l̥ə:m] ‘more than, exceed’
 b. /kaʎəj/ [kaʎəj] ‘roll over’

/l/ is a voiced alveolar lateral approximant. It is realized as [l] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (44a-c).

- (44) a. /lǎʔ/ [laʔ] ‘ladle’
 b. /kaloj/ [kaʎəj] ‘remaining, left over’
 c. /kalim/ [kaʎim] ‘fist’

5.3.1.5 Glides

In Da-ang, in the syllable initial position, there are only two glides /j̥ j/ occurring at a palatal point of articulation. The palatal glides are contrastive in terms of voicing (voiced and voiceless). The phoneme /j̥/ can occur only at the initial position, while /j/ can occur in both initial and final positions. The glides phonemes are listed with examples below.

/j̥/ is a voiceless palatal approximant. It is realized as [j̥] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (45a-b).

- (45) a. /j̥ap/ [j̥ap̚] ‘yawn’
 b. /ʔajak/ [ʔaʎak̚] ‘femal (animal)’

/j/ is a voiced palatal approximant. It is realized as [j] and occurs both word-initially and word-medially as an initial consonant of a main syllable, as in (46a-b).

- (46) a. /jo/ [jou] ‘fear, frighten’
 b. /majun/ [ma'jun] ‘rabbit’

5.3.2 Consonant cluster

Da-ang consonant clusters only occur at the initial position of major syllables. As shown in Table 5.3, there is a limited set of initial consonant clusters (C_1C_2). The first members of consonant cluster (C_1) are restricted to labial /p-, ph-, b-/ and velar /k-, kh-, g/ stop consonants. The second members of the consonant cluster (C_2) are sonorants: liquids /-r-, -l-/ and glide /-j-/.

Table 5.3 The co-occurrence of Da-ang consonant cluster

	-r-	-l-	-j-
p-	pr-	pl-	pj-
t-			
c-			
k-	kr-	kl-	
ph-	phr-	phl-	
th-			
ch-			
kh-	khr-		khj-
b-	br-	bl-	bj-
d-			
j-			
g-	gr-	gl-	

Therefore, there are 14 consonant clusters in Da-ang. Below, all possible consonant clusters I found in the wordlist are shown with examples, as shown in (47a-n).

(47)	a.	/pr-/	/maprun/	[ma ¹ pru:n]	‘ant’
	b.	/pl-/	/kaplan/	[ka ¹ pla:n]	‘hungry’
	c.	/pj-/	/mapuŋpjen/	[₁ mapuŋ ¹ pje:n]	‘spider’
	d.	/kr-/	/krip/	[kri ¹ p ¹]	‘worship’
	e.	/kl-/	/dikluan/	[di ¹ kluan]	‘lump’
	f.	/phr-/	/phruh/	[p ^h ruh]	‘spit out the water’
	g.	/phl-/	/phlan/	[p ^h la:n]	‘poor’
	h.	/khr-/	/khrām/	[khram]	‘rich’
	i.	/khj-/	/sakhja/	[sa ¹ k ^h jəa]	‘good’
	j.	/br-/	/briak/	[briak ¹]	‘fat’
	k.	/bl-/	/bla/	[bləa]	‘arrow’
	l.	/bj-/	/dəbja/	[də ¹ bjəa]	‘young woman’
	m.	/gr-/	/magreih/	[ma ¹ greiç]	‘bear’
	n.	/gl-/	/glai?/	[glai?]	‘bark’

5.4 Vowels

In this section, an inventory of vowel phonemes in Da-ang will be presented. The distribution and realization rules of each vowel phonemes will also be shown with examples. The Da-ang vowel system consists of 11 monophthongs: front vowels /i e ε/, central vowels /i ə ə ă a/, and back vowels /u o ɔ/ plus six diphthongs: /ia ei ai au ou ua/, which will be described as follows:

5.4.1 Monophthongs

In Da-ang, there are 11 phonemic vowels. Da-ang has three front vowels /i e ε/, three back vowels /u o ɔ/, and five central vowels /i ə ə ă a/. Except for a high

central vowel /i/, the vowel length of central vowels /ǎ ə ă a/ is phonemically distinctive (see, in details, Chapter 6). Note that, phonemically, short vowels were marked, since they occur in a more restricted environment than long vowels. The phonemic vowel sounds are shown in Table 5.4.

Table 5.4 Da-ang vowel phonemes

	Front	Central		Back
		Short	Long	
High	i	i		u
Mid	e	ǎ	ə	o
Low	ɛ	ă	a	ɔ

5.4.1.1 Front vowels

/i/ is a high front vowel. This vowel phoneme occurs both in open and closed syllables, as in (48a-b). In closed major syllables, it is realized as [i], but in open syllables, it is realized as diphthongized vowel [iɪ].

(48) /i/ → [i] / ___ C
 → [iɪ] / ___ #

- a. /kaʔih/ → [kaʔiç] ‘hate’
 b. /dini/ → [dɪniɪ] ‘here’

/e/ is a mid front vowel. This vowel phoneme occurs both in open and closed syllables, as in (49a-c). In closed major syllables it is realized as [e], but in open major syllables /e/ is realized as diphthongized vowel [ei].

(49a-b) /e/ → [e] / ___ C
 → [ei] / ___ #

- a. /ren/ → [rem] ‘red’

- b. /ble/ → [blei] ‘fruit’
 c. /mase/ → [ma¹sei] ‘what’

In the case of personal pronouns, however, the mid front vowel /e/ in an open syllable is not diphthongized, as in (49c-f)

- c. /be/ [be:] ‘you (pl.)’
 d. /ge/ [ge:] ‘they (3rd person pl.)’
 e. /ʔe/ [ʔe:] ‘we (pl. incl.)’
 f. /je/ [je:] ‘we (pl. excl.)’

/e/ is a low front vowel. It occurs both in open and closed syllables, as in (50a-b). While in closed major syllables /e/ is realized as [ɛ], in open major syllables it is realized as [e:].

(50) /e/ → [ɛ] / ___ C
 → [e:] / ___ #

- a. /saŋe/ → [sa¹ŋɛ:] ‘sun’
 b. /mek/ → [mek¹] ‘swallow’

5.4.1.2 Central vowels

/ɨ/ is a high central vowel. It occurs both in open and closed syllables, as in (33a-e). But, in open syllables, it occurs rarely and I only found three words in my wordlist, as shown in (51c-e). While in closed major syllables /ɨ/ is realized as [ɨ], in open major syllables it is realized as [i:].

(51) /ɨ/ → [ɨ] / ___ C
 → [i:] / ___ #

- a. /nik/ → [nik¹] ‘horn’

- b. /phik/ → [p^hik^ɿ] ‘group of people or animal’
 c. /di/ → [di:] ‘at’
 d. /ci/ → [tɕi:] ‘name’
 e. /ŋ si/ → [ŋ¹si:] ‘straight’

/ə/ is a short mid central vowel. It is realized as [ə] and occurs only in closed syllables, as in (52a-b). The vowel /ə/, in addition, occurs only before the final alveolar stop /-t/ and nasal /-n/ consonants.

- (52) a. /bət/ → [bət^ɿ] ‘pick by pinching’
 b. /pət/ → [pət^ɿ] ‘grass’
 c. /bən/ → [bən] ‘fly’
 d. /sapən/ → [sa¹pən] ‘lips’

/ə/ is a long mid central vowel. This phoneme occurs both in open and closed syllables, as in (53a-b). In closed major syllables /ə/ is realized as [ə:], but in open major syllables it is realized as diphthongized vowel [əu].

- (53) /ə/ → [ə:] / ___ C
 → [əu] / ___ #
 a. /rən/ → [rən] ‘silver’
 b. /jə/ → [jəu] ‘see’

/ǎ/ is a short low central vowel. It is realized as [a] and occurs only in closed syllables, as in (54a-b).

- (54) a. /hǎp/ → [hap^ɿ] ‘put into’

- b. /kǎt/ → [kat̚] ‘old-aged’
 c. /khǎt/ → [k^hat̚] ‘marry’
 d. /pǎk/ → [pak̚] ‘tie’

/a/ is a long low central vowel. This vowel phoneme occurs both in open and closed syllables, as in (55a-d). In closed major syllables, it is realized as [a:], but in open major syllables, /a/ is realized as diphthongized vowel [əa].

(55) /a/ → [a:] / ___ C
 → [əa] / ___ #

- a. /jam/ → [ja:m] ‘cry, sweep’
 b. /prak/ → [prak̚] ‘sour’
 c. /ma/ → [məa] ‘mother’
 d. /kala/ → [ka^hləa] ‘cheek’

5.4.1.3 Back vowels

/u/ is a high back vowel. It occurs both in open and closed syllables, as in (56a-b). While in closed major syllables /u/ is realized as [u], in open major syllables it is realized as [u:].

(56) /u/ → [u] / ___ C
 → [u:] / ___ #

- a. /buʔ/ → [buʔ] ‘blow’
 b. /ʔu/ → [ʔu:] ‘one (1)’

/o/ is a mid back vowel. This vowel phoneme occurs both in open and closed syllables, as in (57a-d). In closed major syllables, it is realized as [o], but in open major syllables, /o/ is realized as diphthongized vowel [ou].

(57) /o/ → [o] / ___ C

→ [ou] / ___ #

- a. /khoc/ → [khojʔ] ‘wash (dishes)’
- b. /kadam/ → [ka'do:m] ‘liver’
- c. /mo/ → [mou] ‘song’
- d. /no/ → [nou] ‘remember’

/ɔ/ is a low back vowel. It occurs both in open and closed syllables, as in (58a-b). While in closed major syllables /ɔ/ is realized as [ɔ], in open major syllables it is realized as [ɔ:].

(58) /ɔ/ → [ɔ] / ___ C

→ [ɔ:] / ___ #

- a. /hɔc/ → [hɔjʔ] ‘already, finished’
- b. /gɔ/ → [gɔ:] ‘measure’

5.4.2 Diphthongs

In Da-ang, there are two vowel sequences that would be called diphthongs. The inventory of diphthong phonemes is listed in Table 5.5.

Table 5.5 Da-ang diphthong phonemes

Diphthongs			
ia			ua
ei			ou
	ai	au	

Examples of each diphthong phonemes are listed as in (59) below:

- (59) /ia/ /siak/ [siak^ʔ] ‘ginger’
 /ei/ /leih/ [leiç] ‘go out, come out’
 /ai/ /saŋaih/ [sa^hŋaih] ‘delicious’
 /au/ /ŋauh/ [ŋauh] ‘expensive’
 /ou/ /ŋouh/ [ŋouh] ‘cut off’
 /ua/ /ŋ^hʔuan/ [ŋ^hʔuan] ‘tomb’

As stated in the previous chapter, for final consonants there are restrictions on the occurrences of diphthongs. The distributions of Da-ang diphthongs are identical to in Dara-ang. That is, the diphthongs /ia ua/ occur more widely; meanwhile the diphthongs /ei au ai ou/ occurs only before glottal consonants: glottal stop /-ʔ/ and glottal fricative /-h/, as shown in Table 5.6.

Table 5.6 The co-occurrences of Da-ang final consonants and diphthongs

	-p	-t	-c	-k	-ʔ	-m	-n	-ŋ	-ŋ	-h	-w	-j
/ia/	iap ^ʔ			iak ^ʔ	iaʔ	iam	ian			iah		
/ei/					eiʔ					eiç		
/au/					auʔ					auh		
/ai/					aiʔ					aih		
/ou/					ouʔ					ouh		
/ua/					uaʔ		uan			uah		

The diphthongization in Da-ang is due to the diachronic development of diphthong and final consonants. Diachronically, by comparing to other dialects of Palaung spoken in China (Rumai and Na-ang) and Dara-ang spoken in Thailand, we see that the original velar stop *-k debuccalized to glottal stop /-ʔ/. That is to say that

the debuccalization of Proto-Palaung final velar stops results in diphthongization (*ɔ > au, *o > ou), as shown in (60).

(60) Diachronic development of diphthongs in Da-ang

Diphthong	Rumai	Na-ang	Dara-ang	Da-ang	
/au/	tɔk	dɔʔ	dauʔ	dauʔ	‘weave’
	dɔk	tɔʔ	tauʔ	tauʔ	‘fetch water’
/ou/	hok	houʔ	houʔ	houʔ	‘ascend’
	tok	douʔ	douʔ	douʔ	‘burn’

5.5 Final consonants

The Da-ang dialect of Palaung spoken in Myanmar has 10 final consonant phonemes. There is only one series of final stops: plain voiceless /-p, -t, -c, -k, -ʔ/. Apart from final voiceless stops, there are two nasals /-m, -n/ glottal fricative /-h/, and glides /-w, -j/, as shown in Table 5.7.

Table 5.7 Da-ang final consonant phonemes

	Labial	Alveolar	Palatal	Velar	Glottal
Stops	-p	-t	-c	-k	-ʔ
Nasals	-m	-n			
Fricative					-h
Glides	-w		-j		

5.5.1 Stops

In Da-ang, there are five phonemic stops /-p, -t, -c, -k, -ʔ/ that can occur at the final position of major syllables. Apart from glottal stop /-ʔ/, the final labial

alveolar and velar stops /-p, -t, -k/ are realized as unreleased stops [-p̚, -t̚, -k̚], as in (61a-c).

(61)	a.	/dǎp/	[dap̚]	‘arm’s length’
	b.	/sǎt/	[sat̚]	‘stab’
	c.	/dǎk/	[dak̚]	‘smoke’
	d.	/pǎʔ/	[paʔ]	‘throw away’

Note that the final bilabial stop /-p/ occurring after the mid back vowel /o/ is phonetically debuccalized to /-ʔ/ and pronounced in free variation with glottal stops /-ʔ/, as shown in (62a-c).

(62) /-p/ → [-p] / elsewhere

→ [-p] ~ [-ʔ] / [o] ___ #

a.	/kadop/	[ka'dop̚] ~ [ka'doʔ]	‘with’
b.	/salop/	[sa'lop̚] ~ [sa'loʔ]	‘blouse’
c.	/makatop/	[,maka'top̚] ~ [,maka'toʔ]	‘butterfly’

As for palatal stops /c/, as described in the previous section, in the initial position it is realized as voiceless alveolo-palatal affricate [tɕ]. In the final position, /c/ is realized as a palatal glide followed by a glottal constriction [jʔ] or post-glottalized glide, as in (63a-e).

(63) /c/ → [tɕ] / # ___

→ [jʔ] / ___ #

a.	/tuc/	[tujʔ]	‘sit’
b.	/toc/	[tojʔ]	‘all gone’
c.	/rɔc/	[rɔjʔ]	‘leak’

d.	/kalac/	[ka ^l la:jʔ]	‘broken’
e.	/kapjac/	[ka ^l pja:jʔ]	‘teared’

By comparing Da-ang with the Dara-ang dialect of No-Lae, Thailand, we know that the final palatal /c/ in Da-ang, which is phonetically debuccalized to a palatal glide followed a glottal constriction [jʔ], corresponds to the final palatal /c/ in Dara-ang, which is still pronounced as [c], as shown in (64).

(64) The final palatal stop /-c/ in Dara-ang and Da-ang, dialects of Palaung

Dara-ang		Da-ang		
/lac/	[la ⁱ c ^ɿ]	/lac/	[la:jʔ]	‘melt’
/huc/	[hu ⁱ c ^ɿ]	/huc/	[hujʔ]	‘sting’
/kahoc/	[ka ^h ho ⁱ c ^ɿ]	/kahoc/	[ka ^h hojʔ]	‘whistle’
/hoc/	[ho ⁱ c ^ɿ]	/hoc/	[hojʔ]	‘already, finish’

However, it is also important to note that in Da-ang final palatal stops /-c/ occur only after back vowels /u o ə/ and long low central vowels /a/, since final palatals that occur after front vowels /i/, /e/ and short low central vowel /ǎ/ have been merged with the final alveolar stop /-t/, as shown in (65).

(65)The merger of /-c/ and /-t/ in Da-ang dialect of Palaung

	Dara-ang	Da-ang	
-t > -t	bjit	bjit	‘wake someone up’
	băť	bat	‘feel dizzy’
	băť	bət	‘pick by pinching’
-c > -t	ĵic	ĵit	‘chop’
	ĵic	ĵit	‘get up, stand up’
	brec	bret	‘side (of body)’
	malec	malet	‘pig’
	păc	pat	‘spit’
	băc	bat	‘pointed’

5.5.2 Nasals

There are two phonemic final nasals in the Da-ang dialect of Palaung spoken in Myanmar occurring at bilabial /-m/ and alveolar /-n/ points of articulation. In the final position, they are realized as [-m] and [-n] respectively. Examples of final nasals are listed in (66) below.

(66)	a.	/ʔim/	[ʔim]	‘water’
	b.	/tiam/	[tiam]	‘short (height)’
	c.	/văn/	[van]	‘cord’
	d.	/man/	[ma:n]	‘field’

It is important to note that in some cases, final labial nasal /-m/ is pronounced in free variation with alveolar nasal /-n/, as shown in (67a-b).

- (67) a. /kham/ [kham] ~ [kha:n] ‘husk’
 b. /bləm/ [blə:m] ~ [blə:n] ‘leech (land leech)’

In the initial position, Da-ang nasals have two-way contrasts in voicing: voiced and voiceless occurring at four places of articulation: labial /m m̥/ alveolar /n n̥/ palatal /ɲ ɲ̥/ and velar /ŋ ŋ̥/. However, only voiced labial /m/ and alveolar /n/ nasals occur at the final position due to the diachronic development of final nasals. By comparing with Dara-ang, we will see that the final palatal nasals /-ɲ/ in Da-ang have been merged with a final alveolar /-n/, as illustrated in (68).

(68) The merger of /-n/ and /-ɲ/ in the Da-ang dialect of Palaung

	Dara-ang	Da-ang	
-n > -n	jen	jen	‘quite’
	man	man	‘field’
	mun	mun	‘pimple’
-ɲ > -n	deɲ	n den	‘yellow’
	daɲ	dan	‘weave with grass or cane’
	guɲ	gun	‘father’

As for the final velar nasal /-ŋ/, it has been merged with final velar stops due to the processes of denasalization. That is, the Proto-Palaung final velar nasal /*-ŋ/ has been denasalized, and then become final velar stops /-k/, as shown in (69).

(69) The merger of /-ŋ/ and /-k/ in the Da-ang dialect of Palaung

	Dara-ang	Da-ang	
-k > -k	păk	păk	‘tie’
	kabik	kabik	‘bridge’
-ŋ > -k	rɛŋ	rɛk	‘wall’
	dăŋ	dăk	‘cook’
	blɔŋ	blɔk	‘thatch’

5.5.3 Fricatives

Da-ang has only one fricative, the glottal fricative /-h/, which occurs in the final position of major syllables. The phoneme /h/ has three allophones: [h], [ç], and [x] conditioned by preceding vowels, as shown in (70). Examples are listed in (70a-f).

(70) /-h/ → [h] / elsewhere

→ [ç] / [i] ___ #

→ [x] / [ə] ___ #

- | | | | |
|----|---------|----------|-----------|
| a. | /tih/ | [tiç] | ‘read’ |
| b. | /kanih/ | [ka'niç] | ‘cubit’ |
| c. | /dǎh/ | [dǎx] | ‘take’ |
| d. | /mǎh/ | [mǎx] | ‘have’ |
| e. | /tǎh/ | [tah] | ‘come’ |
| f. | /matuh/ | [ma'tuh] | ‘explode’ |

5.5.4 Glides

Da-ang has two final glides: the voiced labial-velar approximant /-w/ and voiced palatal approximant /-j/. They occur in the final position of major syllables, as in (71).

(71)	a.	/piw/	[pi:w]	‘forget’
	b.	/rew/	[re:w]	‘rattan’
	c.	/paw/	[pa:w]	‘lover’
	d.	/gaj/	[ga:j]	‘they (dual)’
	e.	/kəj/	[kə:j]	‘stay, to live’
	f.	/məj/	[mə:j]	‘axe’

However, it should be noted that there is a restriction on vowels according to the final glides. That is, as seen in Table 5.8 below, the back vowels /ɔ o u/ do not occur before the final labial-velar glide /-w/. The front vowels /i e ε/ are restricted in that they do not occur before the final palatal glide /-j/. The vowel /ǎ/ and /a/ are the most unrestricted vowels occurring before /-w, -j/.

Table 5.8 The restriction on vowels according to the final glides

	i	e	ε	ǎ	a	ɔ	o	u	ĩ	ǎ̃	ə
-w	i:w	e:w	ε:w	aw	a:w						
-j				aj	a:j	ɔ:j	o:j	u:j			ə:j

5.6 Summary

The phonological summary of the Da-ang dialect of Palaung variety spoken in Nyaung Gone Village of Kalaw city, southern Shan State, Myanmar is that words in Da-ang are either monosyllabic or polysyllabic. Polysyllabic words can be sequisyllabic words or compound words. Sequisyllabic words in Da-ang can be

preceded by either one or two presyllables (CV or CVCV), or a presyllabic nasal. As for phonemes, numbers of initial consonant phonemes of Da-ang are equal to Dara-ang. That is, there are 31 phonemic initial consonants. Da-ang has 11 phonemic vowels that have phonemic length of central mid vowels /ə̃ ə/ and low mid vowels /ã a/. As for final consonant phonemes, Da-ang has 10 phonemic consonants occupying the word-final position. Notably, there are no final palatal and velar nasals due to diachronic development of such segments, consonant merger and denasalization.

In Chapter 4 and in this chapter, I have described the sound system of Dara-ang and Da-ang dialects of Palaung spoken in Thailand and Myanmar, respectively. In the next chapter, I will turn to the issue of phonemic vowel lengths occurring in each dialect.

CHAPTER VI

VOWEL LENGTH

In Chapters 4 and 5, I described the sound systems of Palaung dialects spoken in Thailand and Myanmar. Contrary to previous descriptions (e.g., Janzen, 1978; Kasisopa, 2003), the present study found that the vowel lengths in the two Palaung dialects spoken in Thailand and Myanmar, Dara-ang and Da-ang, respectively, are phonemic only for non-high central vowels, namely /ə ə̃ ə̄ a/.

In this chapter, in addition to phonological descriptions, I will examine central vowel length contrasts in Dara-ang and Da-ang from an acoustic perspective. Although the minimal pairs of vowels found in the language have already proved that vowel length is phonemic for non-high central vowels, an acoustic study should still be conducted, as stated in Ohala (2003):

The instrumental phonetics, the discovery of the magnitude and range of lawful variation in speech must rank as one of the major findings of linguistic science, although its full significance for an understanding of sound change seems not yet to be fully appreciated (p. 670).

The goal of the acoustic analysis in this chapter is to explore the actual realizations of central vowel length contrasts in Dara-ang and Da-ang. The acoustic findings will also provide evidence to support the existence of phonological vowel length in the dialects of Palaung described in the previous chapters. Besides, a detailed phonetic study will show us that there is variation in the phonological unit.

This chapter is organized as follows: in section 6.1, vowel length in the two dialects of Palaung will be prefaced. Then, in section 6.2, I will present an acoustic analysis of central vowel lengths in the dialect spoken in Thailand. In section 6.3, I will present an acoustic analysis of central vowel lengths in the dialect spoken in

Myanmar. An acoustic comparison of vowel lengths in Dara-ang and Da-ang is provided in section 6.4, and I will then summarize the findings in section 6.5.

6.1 Vowel length in two Palaung dialects

In Chapter 4 and Chapter 5, I proposed that there are 11 vowel phonemes in the vowel systems of Dara-ang and Da-ang, the dialects of Palaung spoken in Thailand and Myanmar. Vowel length is phonemic, but only for non-high central vowels /ə ə̃ a/. In this section, I will provide details of vowel length contrasts found in Dara-ang. I will also discuss the phonological processes evolving phonemic vowel length in this dialect of Palaung.

6.1.1 Vowel length in Dara-ang

In Dara-ang, only non-high central vowels, /ə ə̃/ and /a ã/, are phonologically contrastive in terms of length. That is to say only those two pairs of short and long vowels can be found from the elicited wordlist. Examples of minimal pairs and near minimal pairs of central non-high vowels (central mid vowels /ə ə̃/ and central low vowels /a ã/) are listed in (1a-f) below.

(1) Minimal pairs and near minimal pairs of vowel length in Dara-ang

	/ə̃/		/ə/			
a	/tə̃n/	[tə̃n]	‘to lead by hand’	/tən/	[tən]	‘that’
b.	/sapə̃n/	[sa ¹ pə̃n]	‘lips’	/pən/	[pən]	‘eggs, get, be able’
c.	/bə̃n/	[bə̃n]	‘fly’	/mə̃n/	[mə̃n]	‘crawl’
	/ã/		/a/			
d.	/hə̃p/	[hə̃p ¹]	‘put into’	/hap/	[ha:p ¹]	‘curry’
e.	/jə̃m/	[jə̃m]	‘die’	/jam/	[ja:m]	‘weep, cry’

f. /rǎŋ/ [rakŋ] ‘bamboo’ /raŋ/ [rakŋ] ‘tooth’

As shown in (1), it is worthwhile to note that, according to final consonants, I found that minimal pairs of short versus long mid central vowels /ǎ ə/ are restricted to final nasals /-n/. Meanwhile, the minimal pairs showing contrastive of short versus the long low central vowel /ǎ a/ occurred before the labial stop /-p/, labial nasal /-m/, and velar nasal /-ŋ/. Apart from that, as shown in (1a-c), the final alveolar /-n/ preceded by the phonemic short mid central vowel /ǎ/ [ə] is denasalized, whereas those preceded by the phonemic long vowel are not denasalized.

6.1.2 The phonological process evolving phonemic vowel length in Dara-ang

In Dara-ang, there are three phonological processes evolving phonemic vowel lengths synchronically or diachronically. These include debuccalization, denasalization, and diphthongization, which are described as follows:

6.1.2.1 Debuccalization

As shown in Table 6.1, comparing with /ǎ ə/, the vowel length contrast of the low central vowel /ǎ a/ occurs more widely (i.e., short /ǎ/ and long /a/ vowels are contrastive before labial /-m, -p/, alveolar /-n/, palatal /-c, -ɲ/, velar /-ŋ/, glottal /-ʔ/, and glide /-w/). Predictably, there should be a length contrast before the final alveolar /-t/ and velar /-k/ stops. However, there is only a short vowel /ǎ/ that appears before the final alveolar /-t/ and velar stop /-k/ (i.e., there is no long vowel before the final alveolar /-t/ and velar /-k/ stops).

Table 6.1 The short and long vowels, /ǎ ə/ and /ǎ a/ according to final consonants

	/-p/	/-t/	/-c/	/-k/	/-ʔ/	/-m/	/-n/	/-ɲ/	/-ŋ/	/-h/	/-w/	/-j/
/ǎ/	əpᵀ	ətᵀ				əpm	ətn			əx		
/ə/	əpᵀ			əkᵀ	əʔ	əm	ən					əj
/ǎ/	apᵀ	atᵀ	aᵀcᵀ	akᵀ	aʔ	am	an	aɲ	akŋ	ah	aw	
/a/	apᵀ		aᵀcᵀ		aʔ	a:m	a:n	a:ɲ	a:kŋ		a:w	a:j

The lack of vowel length contrast occurring before the final alveolar /-t/ and velar /-k/ stops is due to the debuccalization of the original final alveolar stop /*-t, *-k/ preceded original long vowels /*a/. Diachronically, by comparing with Proto-Palaung reconstructed by Mitani (1979), we see that the original long vowel followed by a final velar stop /*-ak/ has changed to be a glottal stop preceded by the short vowel /-ǎʔ/ [aʔ]. Meanwhile, the original long vowel followed by the final alveolar stop /*-at/ has changed to be a glottal stop preceded by the long vowel /-aʔ/ [a:ʔ]. The debuccalization of such a final resulted in the emergence of a length contrast before glottal stop, as exemplified in (2) below.

(2)The emergence of length contrast of low central vowel /ǎ/ /vs. /a/ before glottal stop

	/*ak/ > /ǎʔ/ [aʔ]			/*at/ > /aʔ/ [a:ʔ]		
a.	/lǎʔ/	[laʔ]	‘ladle’	/laʔ/	[la:ʔ]	‘sharpen’
b.	/ʔǎʔ/	[ʔaʔ]	‘crossbow’	/ʔaʔ/	[ʔa:ʔ]	‘spicy’
c.	/sanǎʔ/	[sa¹naʔ]	‘tender’	/sanaʔ/	[sa¹na:ʔ]	‘gun’
d.	/sadǎʔ/	[sa¹daʔ]	‘tongue’	/sɔdaʔ/	[sɔ¹da:ʔ]	‘hot’

6.1.2.2 Denasalization

Denasalization has evolved a phonemic vowel length since the nasal preceded by the short mid central vowel /ǎ/ [ə] is denasalized as shown in (3)

and (4). That is, the final labial /-m/ and alveolar /-n/ nasals are denasalized only after the phonemic short vowel /ǝ/, but the final nasal preceded by a long vowel are not denasalized (see Chapter 7 for more details of denasalization).

(3) /-m/ → [-pm] / [ǝ] ____ #

→ [-m] / elsewhere

- | | | | |
|----|--------|------------------------|--------------|
| a. | /sǝm/ | → [səpm] | ‘plant (v.)’ |
| b. | /mǝm/ | → [mə:m] | ‘good’ |
| c. | /thom/ | → [t ^h o:m] | ‘hear’ |
| d. | /ɲiam/ | → [ɲiam] | ‘embrace’ |

(4) /-n/ → [-tn] / [ǝ] ____ #

→ [-n] / elsewhere

- | | | | |
|----|--------|------------------------|----------|
| a. | /bǝn/ | → [bət ⁿ] | ‘fly’ |
| b. | /rǝn/ | → [rən] | ‘silver’ |
| c. | /khun/ | → [k ^h u:n] | ‘wind’ |
| d. | /ɲian/ | → [ɲian] | ‘green’ |

6.1.2.3 Diphthongization

Recall from the previous chapter that the major syllables of Dara-ang can be open syllables (CV) or closed syllables (CVC). However, as seen from the examples of minimal pairs above, as in (1), vowel length in Dara-ang is contrastive only in closed syllables CVC. That is, there is no contrast of short and long vowels in open syllables CV. The reason we do not find short vowels in open syllables is due to the fact that in open syllables, vowels are always pronounced as long vowels [V:], as show in (5).

(5) /V/ → [V:] / ____ #

- | | | | |
|----|-------|-----------------------|------------------|
| a. | /phe/ | → [p ^h ɛ:] | ‘full, satiated’ |
|----|-------|-----------------------|------------------|

- b. /ma/ → [ma:] ‘mother’
 c. /ŋɔ/ → [ŋɔ:] ‘fire’
 d. /kanu/ → [ka'nu:] ‘finger’

In addition to the vowel lengthening, Dara-ang vowels tend to be diphthongized, in particular mid vowels /e/, /o/, and /ə/, as shown in (6) and the examples below.

- (6) /V/ → [VV] / ___ #
- a. /he/ → [hei] ‘tree, fire wood’
 b. /blei/ → [blei] ‘fruit’
 c. /kro/ → [krou] ‘things’
 d. /sato/ → [sa'tou] ‘shirt’
 e. /bə/ → [bəu] ‘uncle’
 f. /khemə/ → [khe'məu] ‘night’

In summary, I have proposed that vowel lengths in Dara-ang spoken in Thailand are phonemically contrastive only for non-high central vowels /ə/ and /a/. There are three phonological processes evolving phonemic vowel length diachronically or synchronically, namely debuccalization, denasalization, and diphthongization.

In the next section, vowel length in the Da-ang dialect of Palaung spoken in Myanmar will be described.

6.1.3 Vowel length in Da-ang

The phonological status of vowel length contrasts in the Da-ang dialect of Palaung is speculative, as reviewed in Chapter 2, since in this dialect that there is no phonemic vowel length (e.g., Janzen, 1978).

Contrary to previous studies, I propose in this thesis that vowel length in the Da-ang dialect of Kalaw city is indeed phonemic, but only for non-high central vowels /ə/ and /a/. My proposal is supported by minimal pairs and near-minimal

pairs listed (7a-j) below and an acoustic study of vowel length conducted in the next section, although these minimal pairs of contrastive length are overlooked by Janzen (1978).

(7) Minimal pairs and near-minimal pairs of vowel length in Da-ang

	/ǎ/		/ə/			
a.	/tǎn/	[tən]	‘to lead by hand’	/tən/	[tə:n]	‘that’
b.	/sapǎn/	[sa ¹ pən]	‘lips’	/pən/	[pən]	‘eggs, get, be able’
c.	/bǎn/	[bən]	‘fly’	/mən/	[mə:n]	‘crawl’
	/ǎ/		/a/			
d.	/hǎp/	[hap ¹]	‘put into’	/hap/	[ha:p ¹]	‘curry’
e.	/jǎm/	[jam]	‘die’	/jam/	[ja:m]	‘weep, cry’
f.	/rǎk/	[rak ¹]	‘bamboo’	/rak/	[ra:k ¹]	‘tooth’
g.	/lǎʔ/	[laʔ]	‘ladle’	/laʔ/	[la:ʔ]	‘sharpen’
h.	/ʔǎʔ/	[ʔaʔ]	‘crossbow’	/ʔaʔ/	[ʔa:ʔ]	‘spicy’
i.	/sanǎʔ/	[sa ¹ naʔ]	‘tender’	/sanaʔ/	[sa ¹ na:ʔ]	‘gun’
j.	/sadǎʔ/	[sa ¹ daʔ]	‘tongue’	/sɔdaʔ/	[sɔ ¹ da:ʔ]	‘hot’

As shown in (7a-c), it is important to point out that, in addition to the restriction of minimal pairs of short versus long mid central vowels /ǎ ə/ before final nasals /-n/, in the Da-ang dialect of Kalaw the final alveolar nasal /-n/ is not denasalized. The final alveolar is pronounced as a plain nasal (cf. (1a-c)). As pointed out in Chapter 7, in Da-ang, denasalization takes place only at the velar point of articulation. Moreover, denasalization in Da-ang is complete (i.e., velar nasal merged with velar stop as in (7f) (cf. (1f))). That is why there is no final velar nasal in the final consonant system of Da-ang.

Apart from that, as shown in (7g-j), there are minimal pairs of low central vowels /ã a/ which are restricted to the occurrence before glottal stop/-ʔ/. The emergence of vowel length contrasts before a glottal stop is due to the diachronic development of final consonants. This phonological innovation is shared among Palaung dialects: Da-ang spoken in Myanmar, Dara-ang spoken in Thailand, and Na-ang spoken in Yunnan, China (see section 6.1.2.1).

6.1.4 The phonological process evolving phonemic vowel length in Da-ang

There are two phonological processes evolving phonemic vowel length synchronically or diachronically in Da-ang: diphthongization and vowel merger, which are described as follows:

6.1.4.1 Diphthongization

It is important to note that, as listed in (7), the phonemic vowel length of Da-ang is found only in closed syllables CVC. This means that there is no short and long vowel contrast occurring in open syllables, since in major open syllables vowels are always pronounced as long vowels, as exemplified in (8).

- (8)
- | | | | |
|----|--------|------------|--------------------|
| a. | /dɛ/ | → [dɛ:] | ‘hand’ |
| b. | /katɛ/ | → [ka'tɛ:] | ‘center’ |
| c. | /sɔ/ | → [sɔ:] | ‘sick, hurt, pain’ |
| d. | /kapɔ/ | → [ka'pɔ:] | ‘bottle, gourd’ |

Mid vowels /e o ə/ in major open syllables, moreover, are phonetically diphthongized, as illustrated in (9).

- (9)
- | | | | |
|----|--------|------------|---------|
| a. | /ʔase/ | → [ʔa'sei] | ‘who’ |
| b. | /kave/ | → [ka'vei] | ‘pity’ |
| c. | /mano/ | → [ma'nou] | ‘teach’ |

- d. /kalo/ → [ka^hlou] ‘cheat, lie’
 e. /ʔatə/ → [ʔa^htəu] ‘today’
 f. /ʔamə/ → [ʔa^hməu] ‘yesterday’

Furthermore, comparing with Dara-ang of No-Lae, we see that open syllables diphthongization in Da-ang is more productive. As shown in (10) and (11), in major open syllables, the low central vowel /a/ of Da-ang is phonetically diphthongized to [əa], as in (10a-c), while the vowel /a/ of Dara-ang in major open syllables is not phonetically glided and realized as long vowel [a:], as in (11a-c).

(10) Da-ang /a/ → [əa] / ___ #

- a. /l̥a/ → [l̥əa] ‘leaf’
 b. /sada/ → [sa^hdəa] ‘tail’
 c. /mafa/ → [ma^hfəa] ‘monkey’

(11) Dara-ang /a/ → [a:] / ___ #

- a. /l̥a/ → [l̥a:] ‘leaf’
 b. /sada/ → [sa^hda:] ‘tail’
 c. /mafa/ → [ma^hfa:] ‘monkey’

6.1.4.2 Vowel merger

The vowel merger is another phonological process that evolved phonemic vowel length diachronically. As shown in Table 6.2, in the Da-ang dialect of Palaung spoken in Myanmar, the contrast of the short and long mid central vowel /ə ə/ is restricted only before the alveolar nasal /-n/. There is, however, the long vowel /ə:/ [ə:] that occurs before /-p/ and /-m/.

Table 6.2 The co-occurrence of /ə/ and /ǎ/ with final labial and alveolar stops /-p, -t/ and final labial and alveolar nasals /-m, -n/

	/-p/	/-t/	/-m/	/-n/
/ə/		ət̚		ən
/ǎ/	ǎ:p̚		ǎ:m	ǎ:n
/ǎ̃/	ǎ̃:p̚	at̚	am	an
/a/	a:p̚		a:m	a:n

Comparing with Proto-Palaung reconstructed by Mitani (1979) and the Dara-ang dialect of Palaung spoken in Thailand, we know that the process of vowel merger results in these structural gaps. That is, the short mid central vowel *ə becomes the low central vowel /ǎ/ before final labial consonants /-m, -p/. Thus, *ə and *ǎ̃ preceding labial consonants have merged (*ə̃m > ǎm) in the Da-ang dialect of Palaung, as exemplified in (12). Although short and long vowels are lost before labial consonants due to diachronic development, the phonemic vowel length of /ə ə/ before final alveolar, is preserved in Da-ang, as shown in (7).

(12) *ə̃ > ǎ / ___C [labial]

Proto-Palaung	Dara-ang	Da-ang	
*sə̃m	sə̃m	sǎm	‘plant (v.)’
*phə̃m	phə̃m	phǎm	‘breathe’
*jə̃m	jə̃m	jǎm	‘die’
*jam	jam	jam	‘weep, cry’

In summary, I have concluded that vowel length in Da-ang is phonemic, but only the non-high central vowel /ə ə/ and /ǎ a/. I have also shown that there are phonological processes (e.g., diphthongization and vowel merger) evolving phonemic vowel length diachronically and synchronically. Although vowel length is restricted to a handful of minimal pairs, contrary to Janzen (1978), I would like to propose in this

study that vowel length is phonologically contrastive. My proposal will also be supported by the measurements of acoustic realization of vowel length, namely vowel duration and the first two formant frequencies (F1 and F2) in the next section.

6.2 Acoustic analysis of vowel length in Dara-ang

In this section, in order to determine the exact nature of the realization of the phonemic vowel length, I carried out an acoustic analysis of central vowel length /ə ə ǎ a/ in the Dara-ang dialect of Palaung spoken in Thailand. After describing the method used in this acoustic study, I will then present results of the acoustic study.

6.2.1 Methods

Two male native speakers (Speaker1 and Speaker2) of Dara-ang living in No-Lae Village, Chiang Mai Province, Thailand participated in this study. The speakers ranged in age from 35 to 55 years old. They had defects in neither speaking nor hearing. Wordlist A consisted of 12 target words that were recorded. Five repetitions of target words, pronounced in isolation, were recorded (2 speakers x 24 words x 5 repetitions = 240 tokens). The speakers were asked to pronounce the target words at a normal speaking rate. Recordings were made directly onto the author's computer notebook using a microphone. Cool Edit Pro (version 2.0) was used to record all data at a sampling rate of 44.1 kHz. Based on acoustic measurement I illustrated in section 3.6.1 of Chapter 3, the vowel duration and first two formant frequencies (F1, F2) of mid and low central vowels were measured using Praat (version 5.1.02).

6.2.2 Results

The results will be divided into three sections. First, in section 6.2.2.1, I will explain the statistical design used in this study. Second, I will present the vowel duration of Da-ang central vowels in section 6.2.2.2. Third, the first two formants (F1, F2) will be discussed in section 6.2.2.3.

6.2.2.1 Statistical design

The focus of this study is on three measurements: vowel duration, first formant (F1), and second formant (F2). In order to determine whether the phonemic short and long vowels are significantly different in terms of acoustic realization, a two-tail paired t-test was performed on vowel duration, F1, and F2 between the phonemic short /ǎ ă/ and long /ə a/ vowels in Dara-ang. The t-test was run for mean values (\bar{x}) of vowel duration, F1, and F2 from 240 tokens, pooled across the two native speakers. The statistical results are presented in the following sections.

6.2.2.2 Vowel duration

Table 6.3 and Figure 6.1 show the results of the acoustic measurements of vowel durations of four central vowels, two short /ǎ, ă/ and two long /ə, a/ vowels of the speech used by two male native speakers of Dara-ang.

Table 6.3 The average duration (in ms) and the duration ratio of /ǎ/, /ə/, /ă/, and /a/ in Dara-ang (two male speakers)

Vowels	Short		Long		Mean Diff.	Short/Long Ratio
	\bar{x}	S.D.	\bar{x}	S.D.		
/ǎ/, /ə/	64.10	8.10	206.43	15.75	142.33	3.22
/ă/, /a/	96.50	18.15	200.93	20.74	104.43	2.08

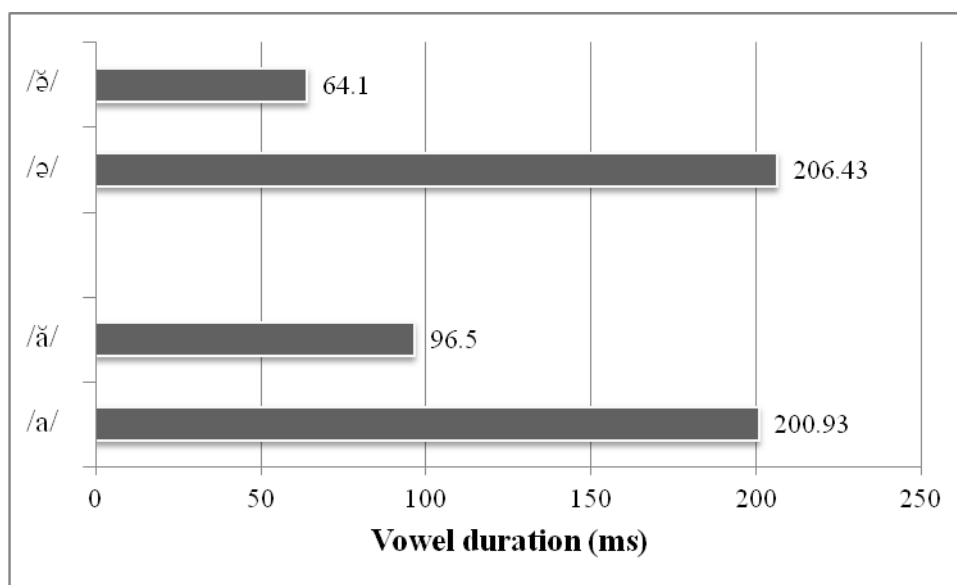


Figure 6.1 The average duration (in ms) of /ə̃/, /ə/, /ã/, and /a/ in Dara-ang (two male speakers)

In Dara-ang, as shown in Table 6.3, the acoustic measurements of vowel duration show that the duration of long vowels are longer than short vowels. As expected, a two-tail paired t-test on vowel duration between the phonemic short and long vowels showed a significant difference. That is, the vowel duration of long mid central vowels /ə/ is significantly longer than the vowel duration of short mid central vowel /ə̃/ [$t(59) = -67.408, p < 0.01$]. As shown in Figure 6.1 and Table 6.3, the average duration of /ə̃/ and /ə/, which represents mid central short and long vowels in Dara-ang, are 64.10 ms and 206.43 ms, respectively, with a ratio of 3.22.

For low central vowels, the vowel duration of the long low central vowel /a/ is also significantly greater than that of the short low central vowel /ã/ [$t(59) = -53.820, p < 0.01$]. As given in Figure 6.1 and Table 6.3, the vowels /ã/ and /a/ in Dara-ang have an average duration of 96.50 ms and 200.93 ms, respectively. The ratio of short-to-long vowels, /ã/ vs. /a/, is 2.08.

In addition to average duration, Figure 6.1 also shows the variation of vowel duration according to vowel quality in the cases of short vowel /ə̃/ and /ã/ (i.e.,

higher vowels being shorter than lower vowels). But, this is not the case in long vowels /ə/ and /a/, since high vowels tend not to have shorter durations than low vowels (i.e., long central mid vowel /ə/ is longer than long central low vowel /a/).

6.2.2.3 First and second formants (F1, F2)

First and second formants (F1, F2) are the acoustic correlates of vowel height and frontness-backness, respectively. According to Pickett (1980, p. 50-51), there are two rules correlating oral constriction and F1, F2:

- **Oral constriction/ F1 Rule:** the frequency of F1 is lowered by any constriction of the front half of the oral part of the vocal tract, and the greater the constriction, the more F1 is lowered.
- **Back Tongue Constriction/ F2 Rule:** the frequency of F2 tends to be lowered by a back tongue constriction, and the greater the constriction, the more F2 is lowered.

Table 6.4 shows average values of the first and second formants (F1, F2) of four short and long central vowels, /ɚ ə/ and /ɑ̃ a/. As shown in Table 6.4, the acoustic measurements show that the short mid central vowels /ɚ/ has average values F1 and F2 of 659.64 Hz and 1328.79 Hz, while the long mid central vowel /ə/ has average values F1 and F2 of 638.31 Hz and 1343.48 Hz. For central low vowels, the average F1 and F2 of /ɑ̃/ are 801.24 Hz and 1380.55 Hz. The average F1 and F2 of /a/ are 861.77 Hz and 1447.96 Hz.

Table 6.4 Mean F1 and F2 values (in Hz) of /ǝ/, /ə/, /ǎ/, and /a/ in Dara-ang (two male speakers)

Vowels	F1		F2	
	\bar{x}	S.D.	\bar{x}	S.D.
/ǝ/	659.64	29.01	1328.79	99.65
/ə/	638.31	34.98	1343.48	67.51
/ǎ/	801.24	54.32	1380.55	76.13
/a/	861.77	35.58	1447.96	78.83

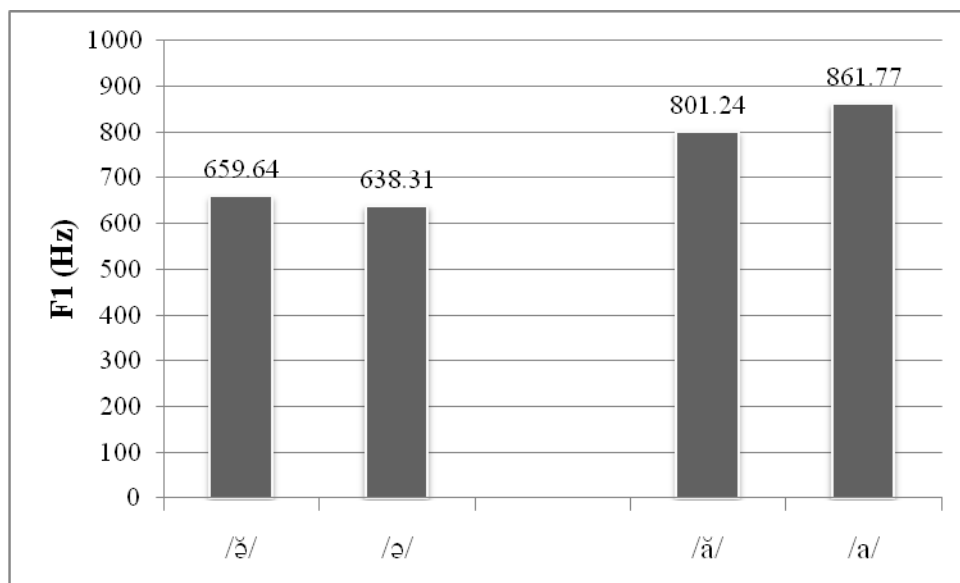


Figure 6.2 Average first formant frequency (F1) values of /ǝ/, /ə/, /ǎ/, and /a/ in Dara-ang (two male speakers)

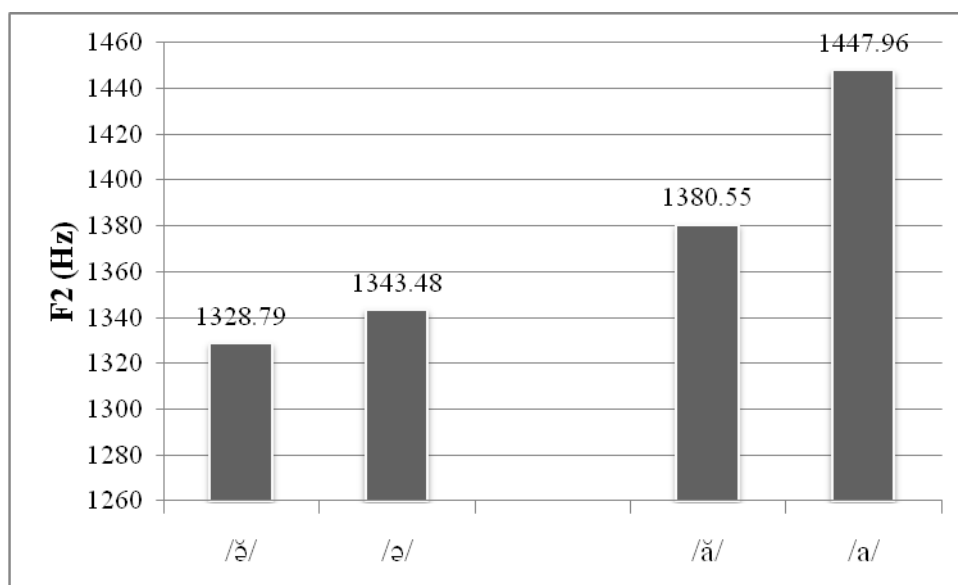


Figure 6.3 Average second formant frequency (F2) values of /ə̃/, /ə/, /ẵ/, and /a/ in Dara-ang (two male speakers)

The difference between the F1 values of short /ə̃ ə̃/, and long /ə ə/ vowels in Dara-ang is statistically significant. As seen in Figure 6.2, the F1 value of the short mid central vowel /ə̃/ is significantly higher than the F1 value of the long mid central vowel /ə/ [$t(59) = 3.616, p < 0.01$], while the F1 value of the short low central vowel /ẵ/ is significantly lower than the F1 value of the long low central vowel /a/ [$t(59) = -9.185, p < 0.01$]. According to Pickett's (1980) **Oral constriction/ F1 Rule**, it is suggested that in terms of vowel height, in the case of /ə̃ ə/, the short vowel is lower than its long counterparts. But, in the case of /ẵ a/, the short vowel is higher than the long vowel.

Regarding the second formant frequency, F2, as presented in Figure 6.3, the short central vowels /ə̃ ə̃/ have lower F2 values than long vowels /ə ə/. Surprisingly, it should also be noted that the difference of F2 values between the short vowel /ə̃/ and long vowel /ə/ is not significant. However, the difference of F2 values between short and long low central vowels (/ẵ/ vs. /a/) is statistically significant [$t(59)$

= -8.032, $p < 0.01$]. According to Pickett's (1980) **Back Tongue Constriction/ F2 Rule**, with regard to frontness and backness, it is suggested that short vowels are more back than long vowels.

In summary, F1 and F2 average values were plotted in Figure 6.4 in order to show the position of short and long vowels in Dara-ang.

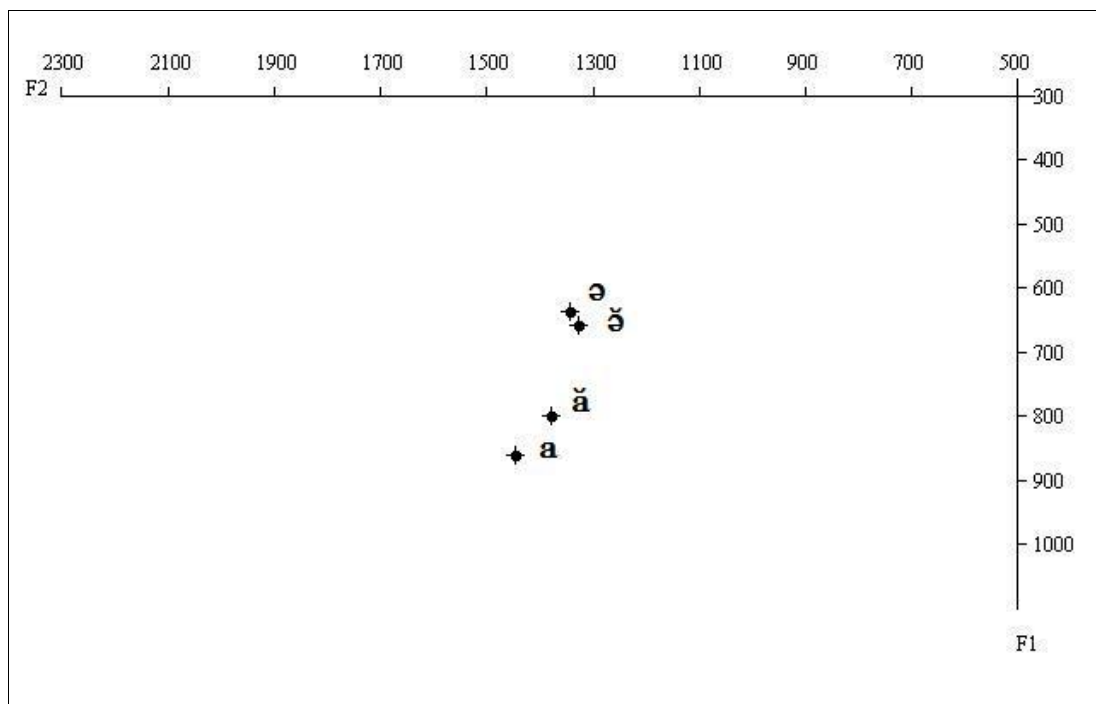


Figure 6.4 The plot of average values F1 vs. F2 of short and long vowels, /ə/, /ə̃/, /ǎ/, /ǎ̃/, and /a/ in Dara-ang (two male speakers)

6.2.3 Conclusion

In summary, the acoustic measurement found that phonological long vowels in the Dara-ang dialect of Palaung spoken in Thailand are significantly longer than phonological short vowels. Regarding vowel quality, the lower vowel /ǎ/ is longer than the higher vowel /ə/ only for phonemic short vowels. But, in the case of phonemic long vowels, the lower vowel /a/ is not longer than the higher vowel /ə̃/. Although the difference in duration is accompanied by vowel quality differences, I

concluded that the vowel duration is the main acoustic cue for distinguishing between short and long vowels in Dara-ang. Besides, the acoustic findings in this section support the phonological analysis of Dara-ang presented in Chapter 4.

6.3 Acoustic analysis of vowel length in Da-ang

In this section, an acoustic realization of phonemic vowel length in the Da-ang dialect of Palaung spoken in Myanmar will also be explored. After describing the methodology used in this acoustic analysis, the results will be presented

6.3.1 Methods

Two male native speakers (Speaker4 and Speaker5) of Da-ang living in Nyaung Gone Village of Kalaw city, Shan State of Myanmar participated in this study. At the time of recording, Speaker4 was 30 years old and Speaker5 was 53 years old. These two native speakers were born and grew up in Nyaung Gone Village. The speakers were instructed to produce the target words at a normal speaking rate. Five repetitions of 24 target words in Wordlist A, pronounced in isolation, were recorded (24 words x 2 speakers x 5 repetitions = 240 tokens). All tokens were recorded using a Sony DAT recorder and an Aiwa microphone. The recordings were digitized on Cool Edit Pro (version 2.00) at a sample rate of 44.1 kHz. According to Acoustic measurement I illustrated in Chapter 3, the vowel duration and formant frequency (F1, F2) were measured by Praat (version 5.1.02).

6.3.2 Results

The results are divided into four sections. In the first section (6.3.2.1), I will present the statistical design performed in this study. The second section (6.3.2.2) shows the results for vowel duration of Da-ang central vowels. The third section (6.3.2.3) presents the results for acoustic correlate of vowel height and backness, formant frequency (F1, F2). Finally, in the fourth section (6.3.2.4), I will discuss the short vowel preceding final labial.

6.3.2.1 Statistical design

A two-tail paired t-test was performed for vowel duration, F1 and F2 of phonemic short /ə̃ ə̃/ and long /ə̃ a/ vowels in order to investigate the difference between phonemic short and long vowels in the Da-ang dialect of Palaung spoken in Myanmar. The t-test was run for mean values (\bar{x}) of vowel duration, F1, and F2 from 240 tokens, pooled from the two native speakers. The results of the statistical analysis are discussed in the following sections.

6.3.2.2 Vowel duration

Table 6.5 and Figure 6.5 show the results of the average duration of four central vowels, two short /ə̃ ə̃/ and two long vowels /ə̃ a/ of two male native speakers. The vowel duration measurement shows that the duration of long vowels were twice longer than short vowels.

Table 6.5 The average duration (in ms) and the duration ratio of /ə̃/, /ə̃/, /ə̃/, and /a/ in Da-ang (two male speakers)

Vowels	Short		Long		Mean Diff.	Short/Long Ratio
	\bar{x}	S.D.	\bar{x}	S.D.		
/ə̃/, /ə̃/	101.07	19.82	239.00	26.83	137.93	2.36
/ə̃/, /a/	120.65	19.48	235.75	48.63	115.10	1.95

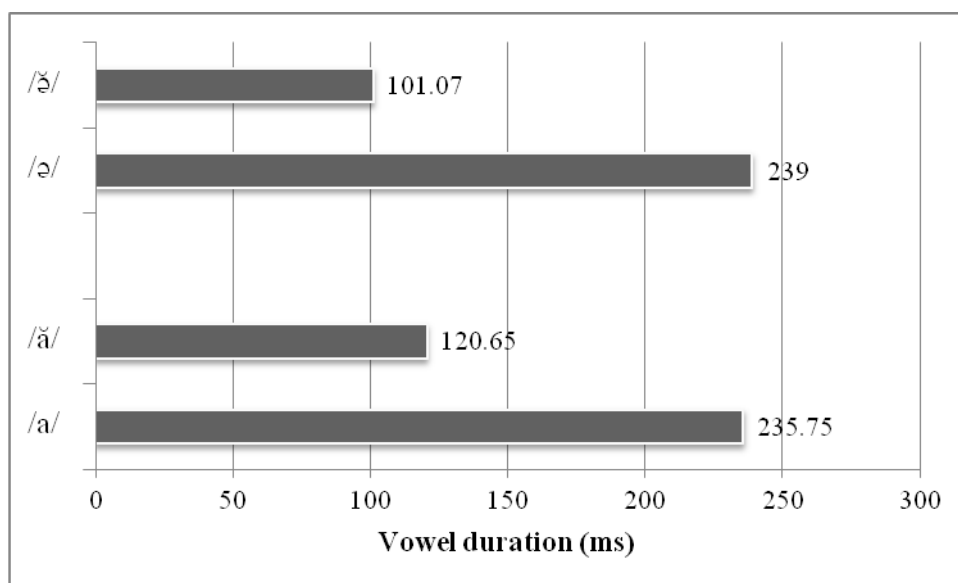


Figure 6.5 The average duration (in ms) of /ə̃/, /ə/, /ǎ/, and /a/ in Da-ang (two male speakers)

The statistical analysis (a two-tail paired t-test) also shows that the vowel duration of phonemic long vowels are significantly longer than phonemic long vowels for every pair of vowels (/ə̃ ə/ and /ǎ a/). That is, the duration of the long mid central vowel /ə/ is significantly longer than the short mid central vowel /ə̃/ [$t(29) = -28.894$, $p < 0.01$]. As shown in Table 6.5, the average duration of /ə̃/ and /ə/, which represents short and long vowels in Da-ang, is 101.07 ms and 239.00 ms, respectively, with a ratio of 2.36. Statistical results for the low central vowel /ǎ a/ are similar to those for the mid central vowels /ə̃ ə/ (i.e., the duration of the low central vowel /a/ is significantly longer than the short vowel /ǎ/ [$t(29) = -18.739$, $p < 0.01$]). As given in Table 6.5, the average duration of the Da-ang /ǎ/ is 120.65 ms and of the /a/ is 235.75 ms. The ratio of long-to-short vowels is 1.95.

In addition to average duration, regarding vowel quality, Figure 6.5 also illustrates that the short mid central vowel /ə̃/ is shorter than the short central low

vowel /a/. But, the long mid central vowel /ə/ is longer than the long low central vowel /a/. This finding is also consistent with the previous section on Dara-ang.

6.3.2.3 First and second formants (F1, F2)

Average values of the first and second formants (F1, F2) of four short and long central vowels are summarized in Table 6.6

Table 6.6 Mean F1 and F2 values (in Hz) of /ə/, /ə/, /ǎ/, and /a/ in Da-ang (two male speakers)

Vowels	F1		F2	
	\bar{x}	S.D.	\bar{x}	S.D.
/ə/	615.80	22.56	1410.58	60.86
/ə/	553.36	37.10	1294.33	123.38
/ǎ/	776.94	52.79	1365.22	82.56
/a/	926.35	100.75	1474.94	77.89

As shown in Table 6.6, the average values of F1 and F2 of the short mid central vowels /ə/ are 615.80 Hz and 1410.58 Hz, while the average values of F1 and F2 of long mid central vowels /ə/ are 553.36 Hz and 1294.33 Hz. As for central low vowels, the average F1 and F2 of /ǎ/ are 776.94 Hz and 1365.22 Hz. The average F1 and F2 of /a/ are 926.35 Hz and 1474.94 Hz.

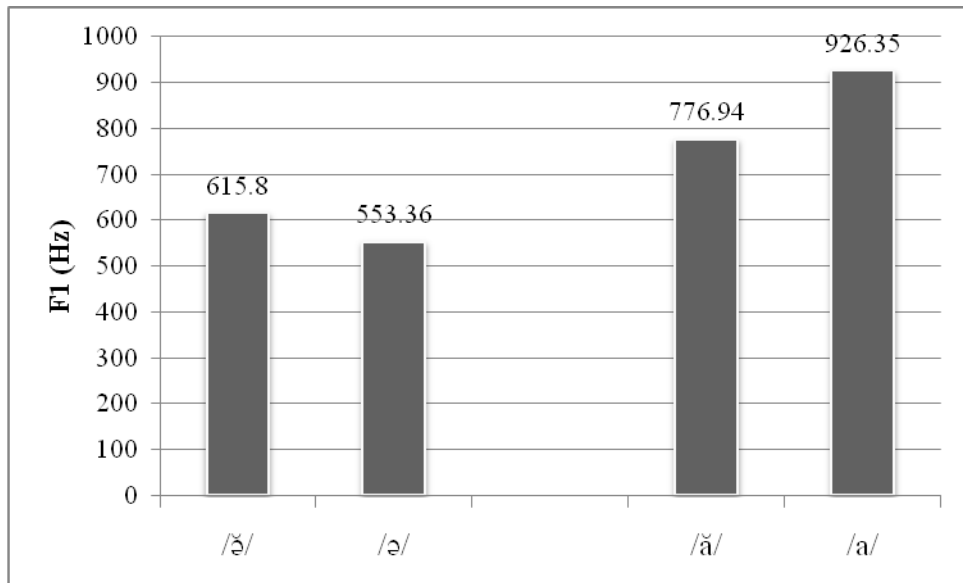


Figure 6.6 Average first formant frequency (F1) values of /ə̌/, /ə/, /ă̌/, and /a/ in Da-ang (two male speakers)

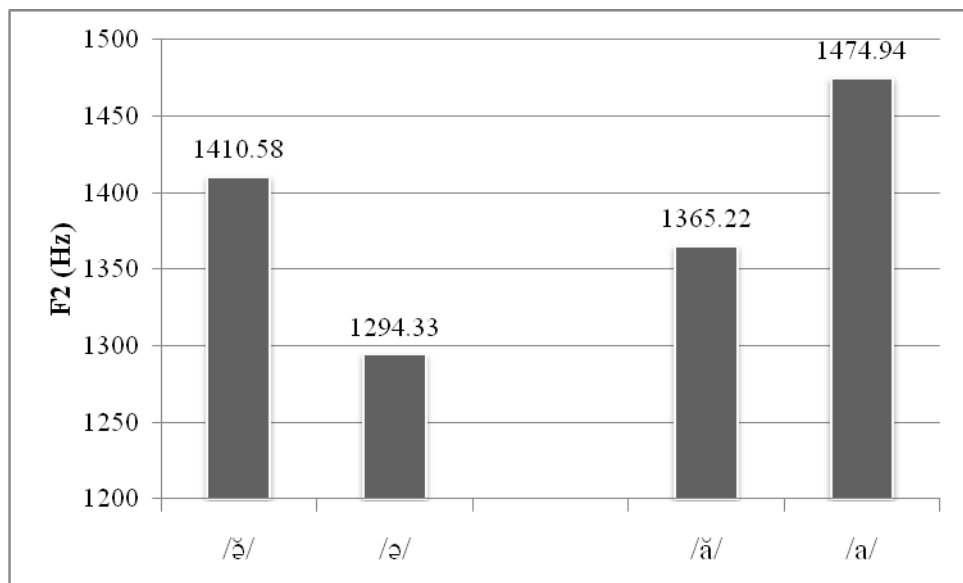


Figure 6.7 Average second formant frequency (F2) values of /ə̌/, /ə/, /ă̌/, and /a/ in Da-ang (two male speakers)

Generally, it is found that the short mid central vowel /ɘ/ has significantly higher F1 values than the long counterpart [$t(29) = -8.459, p < 0.01$]. Similar to the finding for F2 values of mid central, the short vowels /ɘ/ has significantly higher F2 values than the long vowel [$t(29) = 5.831, p < 0.01$]. The short low central vowel /ɚ/, on the other hand, has lower first two formant (F1, F2) values than the long vowel /a/. Statistical results, in addition, show the significant difference between short and long vowels (/ɚ/ and /a/) of F1 and F2 values. That is, F1 of the short vowel /ɚ/ is significantly lower than the F1 of long vowel /a/ [$t(29) = -16.210, p < 0.01$]. F2 of short vowel /ɚ/ is significantly lower than F2 of long vowel /a/ [$t(29) = -8.516, p < 0.01$].

Figure 6.6 presents the results of F1 values. According to Pickett's (1980) **Oral constriction/ F1 Rule**, F1 of the short mid central vowel /ɘ/ is higher than F1 of the long mid central vowel /ə/. This means that, as for mid central vowels /ɘ, ə/, a short vowel is lower in quality than its long counterpart. F1 of the short low central vowel /ɚ/ is lower than F1 of the long low central vowel /a/, which suggests that the short vowel /ɚ/ is higher in quality than the long vowel /a/.

F2 results are presented in Figure 6.7. According to Pickett's (1980) **Back Tongue Constriction/ F2 Rule**, F2 of the short mid central vowel /ɘ/ is higher than F2 of the long mid central vowel /ə/. F2 of the short low central vowel /ɚ/ is lower than F2 of the long low central vowel /a/. In terms of frontness and backness, as indicated by F2 values, it appears that the long mid central vowel /ə/ is more back than the short /ɘ/ counterpart. The average of F2 of the long low central vowel /a/, however, shows that it is more front than the short vowel /ɚ/. The plot of F1 and F2 of short and long vowels showing the vowel position is presented in Figure 6.8.

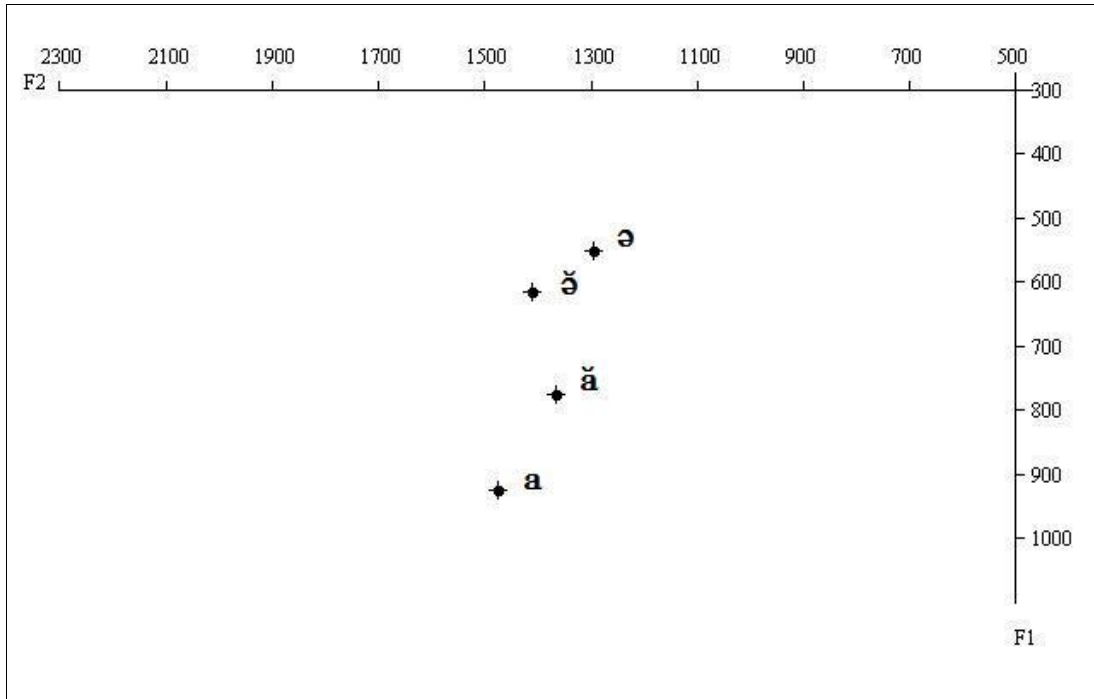


Figure 6.8 The plot of average values F1 vs. F2 of short and long vowels, /ǎ/, /ə/, /ǎ/, and /a/ in Da-ang (two male speakers)

6.3.2.4 Short vowel preceding final labial /*-ǎm/ > /-ǎm/

As discussed in the previous section (see section 6.1.2), *ǎ before the final labial nasal /-m/ have merged with /ǎ/ (*-ǎm/ > /-ǎm/). It is worthwhile to see that whether /*-ǎm/ and /-ǎm/ [-am] are completely merged. Thus, I measured the first formant (F1) value of the words that /*-ǎm/ have been merged to /-ǎm/ [-am]. Note that in Figure 6.9 /*-ǎm/ in Da-ang is symbolized as /-ǎm/*. As shown in Figure 6.7, as expected, it is found that the F1 value of /-ǎm/* is a greater difference from the F1 value of /ǎ/ and is almost identical to the F1 value of /ǎ/. It is suggested that in terms of vowel height, /*-ǎm/ completely merged to /-ǎm/ [-am].

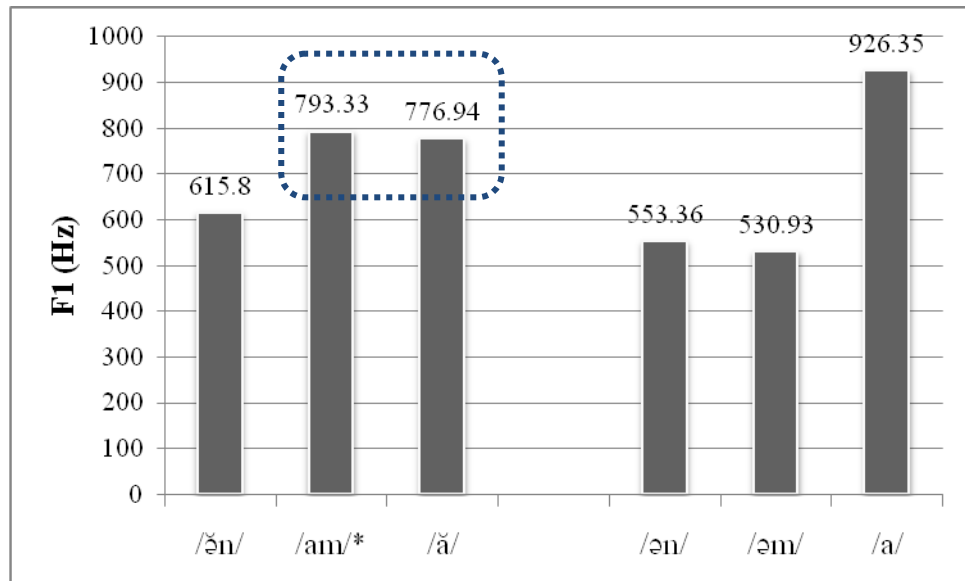


Figure 6.9 Average first formant frequency (F1) values of short vowel preceding final labial /*-ə̃m/ > /-ǎm/ [-am] (two male speakers)

6.3.3 Conclusion

In summary, the results of the acoustic study show that in Da-ang, the vowel duration of phonemic long vowels are significantly longer than short vowels. Phonemic short vowel and phonemic long vowels also differ in terms of vowel quality, however, and it is evident that vowel duration is a dominant acoustic cue to distinguish phonemic vowel length in Da-ang. As for the variation of vowel duration according to vowel quality, the lower vowel is longer than the higher vowel only for phonemic short vowels. This finding in Da-ang is consistent with Dara-ang. Diachronically, the formant structures of short vowels (F1, F2) have also provided more understanding about short mid and low vowel mergers. It can be concluded that acoustic findings confirm the phonological analysis of Da-ang presented in Chapter 5.

6.4 Acoustic comparison of vowel length in Dara-ang and Da-ang

The aim of this section is to compare the acoustic phonetic characteristic of vowel length in Dara-ang and Da-ang derived in previous sections (section 6.2 and 6.3). The average vowel duration, F1 and F2 at the acoustic vowel midpoint of Dara-

ang and Da-ang were compared. The comparison was undertaken in order to uncover similarities and differences in both dialects. For the results of this comparison, vowel duration will be presented first. The comparison of F1 and F2 will then be presented.

6.4.1 Vowel duration

By comparing vowel duration of Dara-ang (DR) and Da-ang (DA), the findings show that in every pair of vowels, /ə̃, ə/ and /ã, a/, vowel duration of Da-ang vowels are longer than Dara-ang vowels, as shown in Figure 6.10.

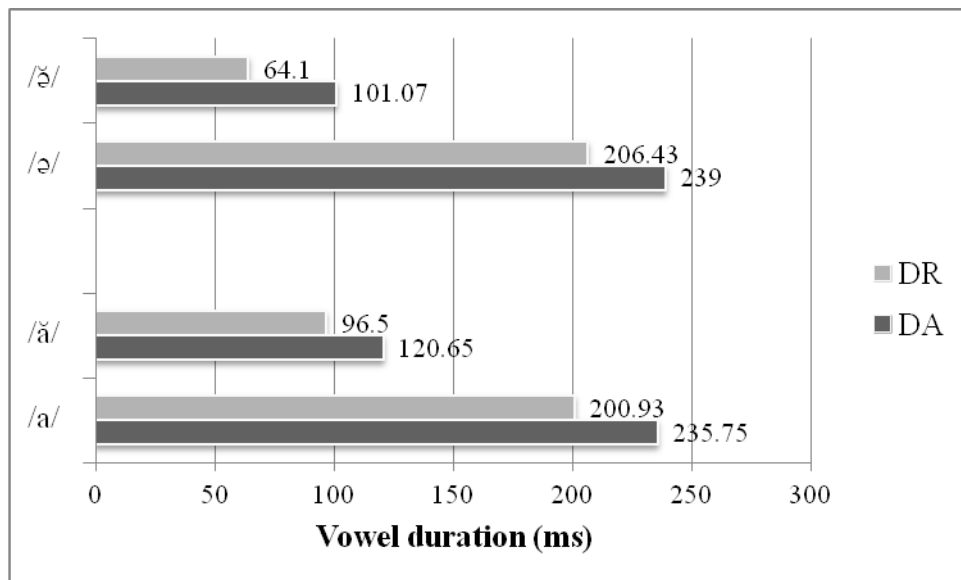


Figure 6.10 The average duration in ms of /ə̃/, /ə/, /ã/, and /a/ in two dialects of Palaung: Dara-anag and Da-ang

However, when comparing the duration ratio between short and long vowels in Dara-ang and Da-ang, as presented in Figure 6.11, I found that generally, the duration ratio of short and long vowels in Dara-ang is higher than those in Da-ang for every pair of vowels, especially the mid vowel /ə/. In addition, the duration ratio of the mid vowel /ə/ is higher than that of the low vowel /a/. Apart from that, the duration ratio of the mid vowel /ə/ in Dara-ang is much higher than those in Da-ang, while the

duration ratio of the low vowel /a/ and the average ratio in Dara-ang is a bit higher than those in Da-ang.

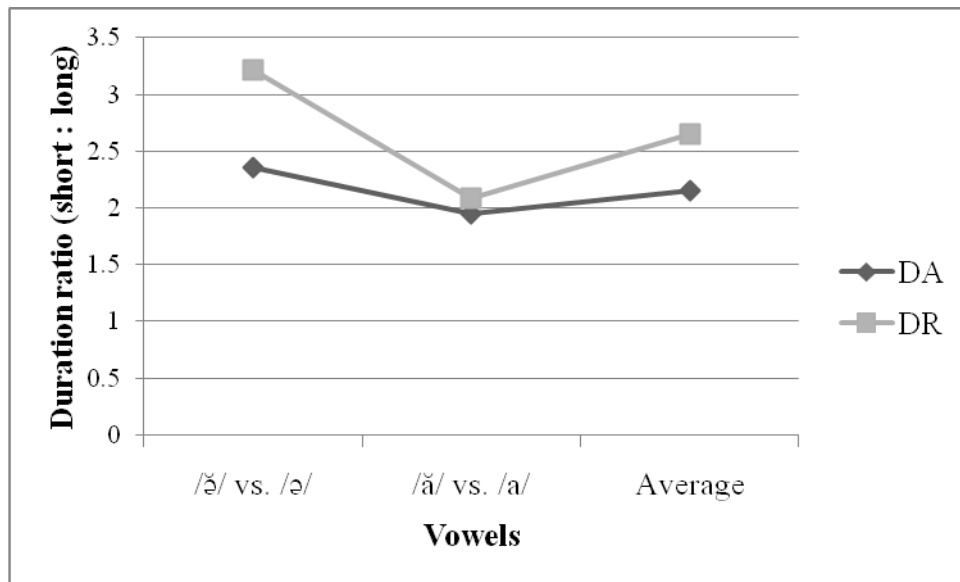


Figure 6.11 Duration ratio of short and long vowel in two dialects of Palaung: Dara-ang and Da-ang

6.4.2 First and second formants (F1, F2)

Figure 6.12 shows the average F1 in Dara-ang and Da-ang. For both /ě/ and /ə/, F1 has the higher value for Dara-ang, suggesting that the vowel /ě/ and /ə/ in Dara-ang are produced with a lower tongue position than those in Da-ang. But, for /ǎ/, F1 in Dara-ang is higher than those in Da-ang, while for the long vowel /a/, F1 is lower in Dara-ang. It suggests that in terms of tongue position, the Dara-ang short vowel /ǎ/ is pronounced with a lower tongue than the Da-ang short vowel /ǎ/, whereas the long vowel /a/ in Dara-ang is produced with a higher tongue than in the Da-ang short vowel /a/.

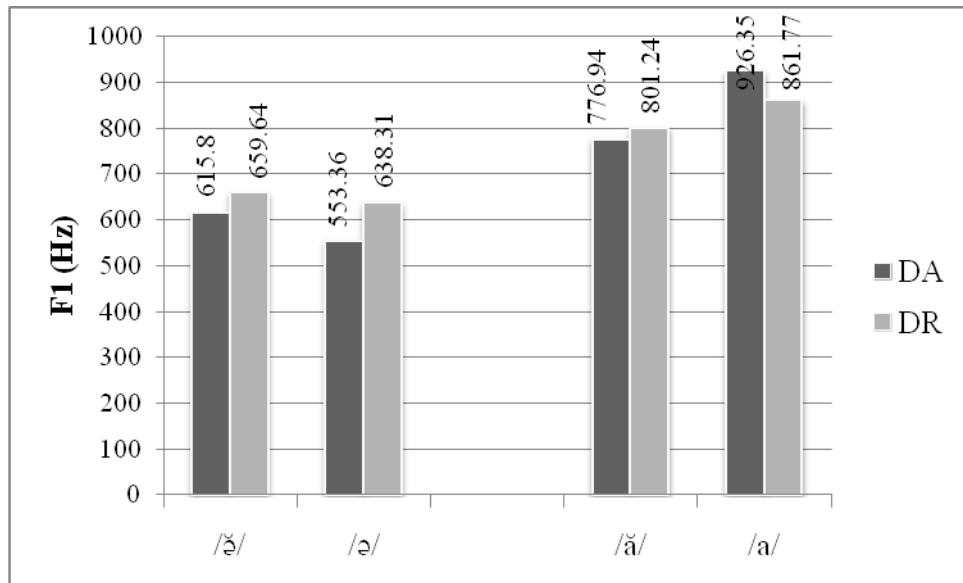


Figure 6.12 Average first formant frequency (F1) values (in Hz) of /ə/, /ɐ/, /ǎ/, and /a/ in two dialects of Palaung: Dara-anag and Da-ang

By comparing F2 between Dara-anag and Da-ang, as shown in Figure 6.13, it is found that the long mid vowel /ə/ has the lowest F2 value, which suggests that /ə/ is the most back. The highest F2 value is the short low vowel /ǎ/ of Da-ang, indicating that /ǎ/ of Da-ang is pronounced as the most front. In summary, the F1 and F2 of each vowels is plotted in order to show the position of the vowel, as illustrated in Figure 6.14.

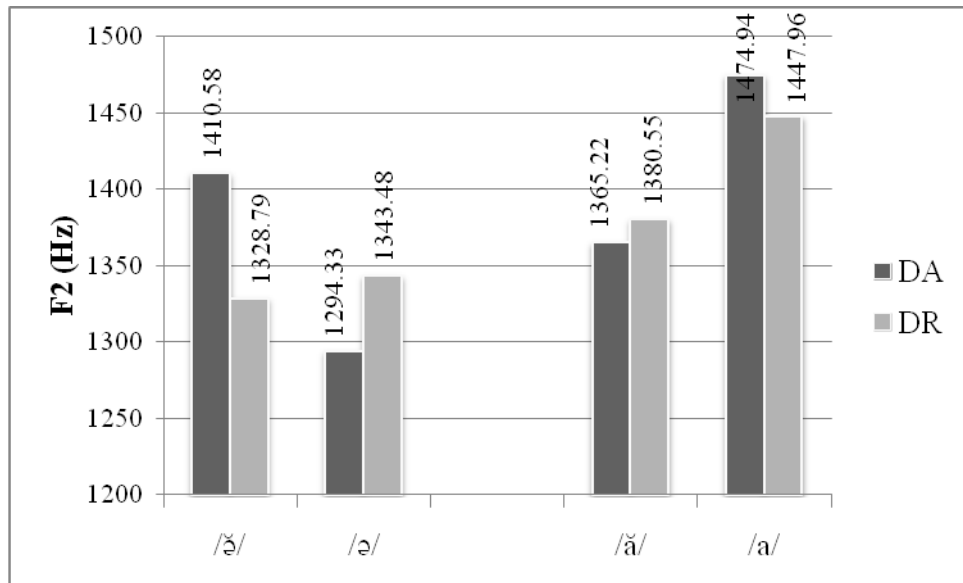


Figure 6.13 Average second formant frequency (F2) values (in Hz) of /ə/, /ə/, /ǎ/, and /a/ in two dialects of Palaung: Dara-anag and Da-ang

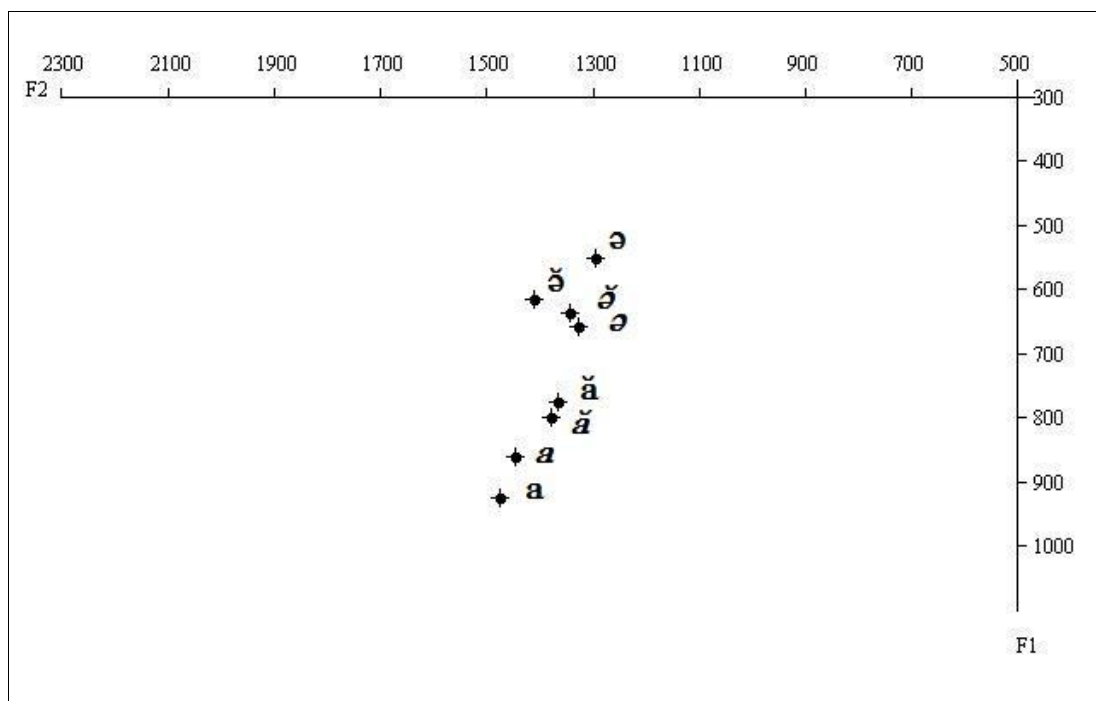


Figure 6.14 The plot of average values F1 vs. F2 of short and long vowels, /ə/, /ə/, /ǎ/, and /a/ in Da-ang (normal) in comparison with Dara-ang (*italic*)

6.4.3 Short vowel preceding final labial /*-ǎm/ > /-ǎm/ vs. /*-ǎm/ > /-ǎm/

Figure 6.15 shows first formant frequency (F1) values of short vowels preceding final labials in Da-ang in comparison with Dara-ang. Recall from the previous section, the original /*-ǎm/ has been merged with /-ǎm/ in Da-ang. However, in Dara-ang the contrast of /*ǎ/ and /*a/ before the final labial nasal is still preserved. As seen from Figure 6.15, the first formant (F1) of /-ǎm/*, an acoustic correlating to vowel height, shows the difference of values between Da-ang and Dara-ang. That is, in Dara-ang F1 of /-ǎm/* is nearly identical to /-ǎn/ [-ən]. In contrast, in Da-ang F1 of /-ǎm/* is nearly identical to /ǎ/ [a], suggesting the merger of vowels in terms of vowel height.

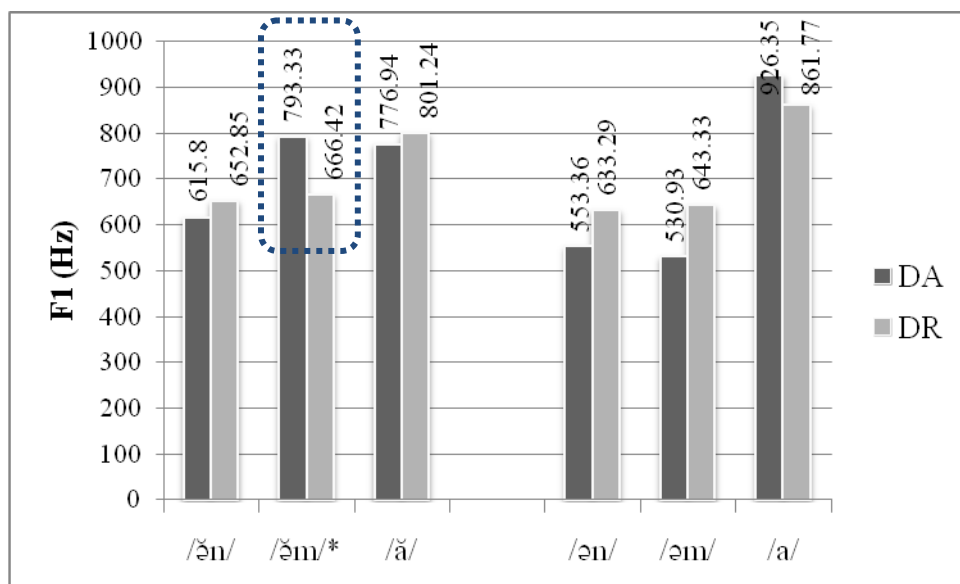


Figure 6.15 Average first formant frequency (F1) values of short vowel preceding final labial /*-ǎm/ > /-ǎm/ [-am] in Da-ang in comparison with Dara-ang (/ -ǎm/* stand for /*-ǎm/ > /-ǎm/ [-am] in Da-ang and /*-ǎm/ > /-ǎm/ [-əm] in Dara-ang)

6.5 Summary

In this chapter, I have proposed that based on minimal pairs found in my elicitation wordlist, the vowel lengths in two dialects of Palaung (Dara-ang and Da-ang) are phonemic, but only for non-high central vowels /ə ə ǎ a/. There are, additionally, phonological processes evolving phonemic vowel length diachronically and synchronically: diphthongization and vowel merger, and denasalization. Acoustic analysis of phonological vowel lengths in Dara-ang and Da-ang has shown that the duration of phonemic long vowels is twice longer than phonemic short vowels. Phonemic short and long vowels, in addition, also differ in terms of vowel quality (height and backness). However, vowel duration is a dominant acoustic cue to distinguish phonemic vowel length in Dara-ang and Da-ang. According to intrinsic lengths – the lower the vowels, the longer the duration – I found that it is true only in the case of short vowels.

In the next chapter, I will describe the word-final denasalization occurring in the Dara-ang and Da-ang dialects of Palaung spoken in Thailand and Myanmar. The phonetic realization and temporal characteristic of denasalized nasals will also be explored.

CHAPTER VII

WORD-FINAL DENASALIZATION

In this chapter, I will first describe the denasalization of word-final nasals that occur in two Palaung dialects: Dara-ang, which is spoken in Thailand, and Da-ang, which is spoken in Myanmar (section 7.1). Then, I will present two acoustic studies that examine the phonetic realization (section 7.2) and temporal characteristic (section 7.3) of the targeted word-final nasals that have been denasalized in Dara-ang, a dialect of Palaung spoken in Thailand. Finally, I summarize the findings presented in this chapter (section 7.4).

7.1 Denasalization in two Palaung dialects

The denasalization that occurs in the Palaung dialects spoken in Thailand and Myanmar can be categorized into two types: (1) partial denasalization and (2) complete denasalization. The phonological factors associated with the word-final denasalization in the Palaung dialects are nasal place of articulation, vowel height, and phonemic vowel length. These will be described as follows.

7.1.1 Word-final denasalization in Dara-ang

The denasalization occurring in Dara-ang (spoken in Thailand) is partial denasalization in certain environments. That is to say that in the word-final position, the final nasal consonants /-m, -n, -ŋ, -ŋ/ are partially denasalized to homorganic oral stops + nasals [-pm, -tn, -cŋ, -kŋ], as shown in the following examples.

Examples:

/?im/	→ [ʔipm]	‘water’
/təŋ/	→ [tətŋ]	‘lead by hand’

/dep/	→ [de: ⁱ cɲ]	‘far, long’
/phiakɲ/	→ [p ^h iakɲ]	‘wings’

However, in the word-final position, the entire final nasal is not always denasalized (i.e., word-final denasalization is conditioned by preceding vowels). That is, only the final velar nasal /-ŋ/ is always denasalized to [-kɲ] in all cases (i.e., /-ŋ/ preceded by any vowels is always surfaced as [-kɲ]). The rest of the final nasals – labial, alveolar, and palatal in word-final position – are surfaced as two allophones, plain nasals [-m, -n, -ɲ] and denasalized nasals [-pm, -tn, -cɲ], conditioned by preceding vowels.

Recall from Chapter 4 that, regarding the phonemic status of denasalized nasals, these denasalized nasal consonants in Dara-ang are considered as allophones of the plain nasals, based on the five reasons stated in Chapter 4 (see section 4.5.2.2).

7.1.2 Phonological contexts triggered denasalized nasals in Dara-ang

In Dara-ang, three phonological contexts triggered denasalized nasals in word-final position: (1) nasal place of articulation, (2) vowel height, and (3) phonemic vowel length.

As shown in Table 7.1, I hypothesize that denasalization in Dara-ang has historical consequences, namely, if it occurs, that the denasalization of word-final nasals originated at the velar point of articulation. This process will be followed by the denasalization of final nasals preceded by a high central vowel. Then, nasals preceding phonemic short vowels will change to denasalized nasals. This hypothesis will be supported by data of Da-ang, a closely related dialect of Palaung spoken in Kalaw city, Myanmar, which will be discussed in the next section (section 7.1.3).

Table 7.1 Dara-ang denasalization according to nasal place of articulation, vowel height and phonemic vowel length

	/-m/	/-n/	/-ɲ/	/-ŋ/
/i/	i:m	i:n	icɲ	< ikɲ < *-iŋ
/e/		e:n	e:cɲ	< ekɲ < *-eŋ
/ɛ/		ɛ:n		ɛ:kɲ
/i/	ipm			ikɲ
/ǎ/	ǎpm	ǎtn		
/ə/	ə:m	ə:n		
/ǎ/	am	an	aɲ	akɲ
/a/	a:m	a:n	a:ɲ	a:kɲ
/u/		u:n	u:ɲ	ukɲ
/o/	o:m			okɲ
/ɔ/		ɔ:n		ɔkɲ
/ia/	iam	ian		iakɲ

7.1.2.1 Nasal place of articulation

The first phonological context correlating to denasalization in Dara-ang is nasal place of articulation. As seen in Table 7.2, the velar nasal /-ŋ/ in a final position is always denasalized to [-kɲ] (i.e., the final velar nasal preceded by all vowels is denasalized). By this, I mean that the denasalized velar nasal [-kɲ] in a word-final position is not triggered by preceding vowel height or preceding phonemic vowel length, but it is triggered by the velar nasal place of articulation. Meanwhile, the denasalized labial nasal [-pm] is triggered by the preceding vowel height and preceding phonemic vowel length. The denasalized alveolar nasal [-tn] is only triggered by the preceding phonemic vowel length (for more details, see next section).

Table 7.2 Dara-ang denasalization according to palatal and velar places of articulation of final nasals

	/-ɲ/	/-ŋ/
/i/	icɲ	< ikŋ < *-iŋ
/e/	e:cɲ	< ekŋ < *-eŋ
/ɛ/		ɛ:kŋ
/i/		ikŋ
/ə̃/ ¹		
/ə/		
/ǎ/	aɲ	akŋ
/a/	a:ɲ	a:kŋ
/u/	u:ɲ	ukŋ
/o/		okŋ
/ɔ/		ɔkŋ
/ia/		iakŋ

Notes

1. In Dara-ang, there are no native words ending with the final velar /-ŋ/ or palatal /-ɲ/ nasal preceded by /ə̃ ə/.

As for the final palatal /-ɲ/ that have been denasalized to [-cɲ], in fact, it is triggered by the nasal velar place of articulation, not by preceding vowels. Diachronically, it is important to note that, the word-final palatal nasals /-ɲ/ preceded by the front vowels /i/ and /e/ are historically developed from the original final velar nasals /*-ŋ/ reflected in other Mon-Khmer languages. The final velar nasal has palatalized *-ŋ to -ɲ after *i and *e (/i-ɲ/ < *-iŋ; /e-ɲ/ < *-eŋ) (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 denasalization process is more likely to happen before the palatalization process. The process of denasalization precedes palatalization, since the velar nasal /-ŋ/ preceded by

all vowels tend towards denasalization, but the words ending with original final palatals /-ɲ/, for example /bǎɲ/ [baɲ], are not denasalized, as shown in Table 7.2. That is why there is a denasalized nasal at the palatal place of articulation.

However, recall from Chapter 4 (see section 4.5.2.2), it also should be noted that, synchronically, the denasalized palatal nasal [-çɲ] is analyzed as an allophone of the final palatal nasal /-ɲ/, which is conditioned by the preceding front vowels /i/ and /e/.

7.1.2.2 Vowel height

Vowel height, additionally, seems to be a factor correlated to the denasalization of word-final nasals. As illustrated in Table 7.3, it reveals the inverse relation between vowel height and denasalized nasals. That is, the final labial nasal /-m/ preceded by high central vowel /ɨ/ [ɨ] is denasalized to [-pm], whereas those that are preceded by low central vowels /ǎ/ [a] and /a/ [a:] are not denasalized.

Table 7.3 Denasalization of final labial nasal /-m/ according to central vowel height

	/-m/	/-n/	/-ɲ/	/-ŋ/
/ɨ/	ɨpm			ikɲ ²
/ə/	əpm	ətn		
/ə/	ə:m	ə:n		
/ǎ/	am	an	aɲ	akɲ
/a/	a:m	a:n	a:ɲ	a:kɲ

Notes

2. The words ending with final velar /-ŋ/ nasal preceded by /ɨ/ is already denasalized due to nasal place of articulation (see section 7.1.2.1)

7.1.2.3 Phonemic vowel length

In addition to the nasal place of articulation and central vowel height, phonemic vowel length is a phonological factor correlated with the partial denasalization in Dara-ang. However, as shown in Table 7.4, it is true only in the case

of the central mid vowels /ə ə/. That is, the final labial /-m/ and alveolar /-n/ nasals preceded by short mid central vowel /ə/ [ə] have denasalized to [-pm, -tn], while the final labial /-m/ and alveolar /-n/ nasals preceded by long mid central vowel /ə/ [ə:] have not participated in the partial denasalization. Diachronically, it can be said that the partial denasalization has taken place in order to prevent the merger of short and long vowels /ə ə/.

Table 7.4 Denasalization of final labial /-m/ and /-n/ nasals according to phonemic vowel length

	/ə/	/ə/	/ä/	/a/
/-m/	əpm	ə:m	am	a:m
/-n/	ətn	ə:n	an	a:n
/-ŋ/			aŋ	a:ŋ
/-ŋ/			akŋ	a:kŋ

In summary, in Dara-ang spoken in Thailand, there are three phonological contexts that trigger denasalized nasals in the word-final position. They are nasal place of articulation, vowel height, and phonemic vowel length. In the next section, I will further discuss final denasalization in Da-ang spoken in Myanmar.

7.1.3 Denasalization in Da-ang

The denasalization occurring in Da-ang, as well as the other Palaungic languages (e.g., Hu, U), belongs to the category of complete denasalization. That is, word-final nasals have been completely denasalized to final oral stops. However, this process occurs only at velar point of articulation.

Diachronically, as illustrated in Table 7.5, the original final velar nasal *-ŋ preceded by all vowels have become a final velar oral stop /-k/. Then, the denasalized final further merged with the original final velar oral stop (*-ŋ > k). This means that complete overlapping occurred. Nowadays, we do not know which final velar stops

are preserved from original velar stops (/k/ < *-k), or which ones are diachronically developed from velar nasals (/k/ < *-ŋ).

Regarding the phonemic status of denasalized nasals in Da-ang, since velar nasal is completely denasalized to plain stops, there is no final velar nasal phoneme in the final consonant system of Da-ang (for more details, see section 5.5 of Chapter 5). Meanwhile, the word-final denasalization in Dara-ang spoken in Thailand is conditioned by three phonological contexts. Denasalized nasals [-pm, -tn, -cɲ, -kɲ], thus, are considered as allophones of plain nasals.

Table 7.5 Complete denasalization in Da-ang according to nasal place of articulation

	/-m/	/-n/	-n < *-ɲ	-k < *-ŋ
/i/	i:m	i:n	in	< -iɲ < *-iŋ
/e/		e:n	e:n	< -eɲ < *-eŋ
/ɛ/		ɛ:n		ɛ:k
/i/	im			ik
/ə/		ən		
/ə/	ə:m	ə:n		
/ǎ/	am	an	an	ak
/a/	a:m	a:n	a:n	a:k
/u/		u:n	u:n	uk
/o/	o:m			ok
/ɔ/		ɔ:n		ɔk
/ia/	iam	ian		iak

In Dara-ang, as mentioned in the previous section, the word-final palatal nasal /-ɲ/ preceded by the front vowel /i e/ is diachronically developed from the final velar nasal /-ŋ/. Such a process also occurred in Da-ang. That is, Da-ang must have first palatalized *-ŋ to -ɲ, then final palatal -ɲ > -n. Furthermore, as shown in Table 7.5, the original final palatal nasal *-ɲ preceded by other vowels has changed to the

final alveolar nasal /-n/. The result is that there are no palatal /-ɲ/ and velar /-ŋ/ nasals occurring in the final position in Da-ang.

As for factors correlating denasalization in the Da-ang dialect of Palaung, the data reveal that place of articulation is the only factor. Since Da-ang and Dara-ang are genetically related dialects, it is possible that the denasalization in both dialects originated from a final velar point of articulation at the stage before splitting into Da-ang and Dara-ang. However, after the splitting of the two dialects, the denasalization in Da-ang has not spread to other places of articulation, namely labial, alveolar, and palatal. The blocking of the spreading of denasalization may be due to two reasons:

- First, the changing of the original final velar nasal (*-ŋ > -ɲ > -n).
- Second, the merger of the central short vowel before final labial nasal (*ə̃m > ə̃m).

In summary, I have shown that diachronically, the word-final velar nasal /*-ŋ/ in Da-ang has completely merged with the final oral stop /-k/. The factor involving denasalization in Da-ang is place of articulation. This supports the hypothesis that denasalization in Palaung dialects originated from a velar point of articulation. However, the process of spreading to other places of articulation is dialect-specific. In other words, it is phonetically motivated for each dialect.

In the next section, since word-final nasals in the Da-ang dialect of Palaung spoken in Myanmar have completely denasalized, only target denasalized final nasals in Dara-ang will be investigated.

7.2 Phonetic realization of the target denasalized nasals in Dara-ang

In this section, denasalized nasals are the target segments for acoustic study. In Dara-ang, we do not have a very clear idea of what word-final nasals that have been denasalized were realized and whether the denasalized target segments are realized as voiced or voiceless stops. The past studies, in addition, are mostly impressionistic descriptive works, and acoustic studies have not been carried out.

Therefore, by examining spectrograms of target words, I will explore the actual realization of a set of word-final nasal consonants that have been denasalized in Dara-ang. After describing the methods used in this acoustic study (section 7.2.1), I will illustrate the realization of the various target denasalized final nasals with selected spectrograms and waveforms.

7.2.1 Methods

The data presented in this section come from Speaker 1, my principal informant, a native speaker of Palaung who lives in No-Lae village in Chiang Mai Province. Three repetitions of 39 target words in Wordlist B1 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. Data were digitally recorded at a sampling rate of 44.1 kHz and saved as a .wav file using Cool Edit Pro (version 1.0). Spectrograms and waveforms were performed using Praat (version 5.1.02). The visual and auditory inspection was carried out for all tokens of each target word.

7.2.2 Results

Spectrographic analysis confirmed that the segments were “denasalized.” Tokens of word-final denasalized nasals in Dara-ang give a uniform picture of oral closure with nasal release and they also indicate that there is a variation in duration during oral stops production, as shown in the waveforms in the following sections. Since Dara-ang has denasalized final nasals in four places of articulation which co-occur with preceding vowels, the qualitative analysis of denasalized nasals is given by places of the consonant, as follows.

7.2.2.1 Realization of final /-m/

The word-final labial nasal /-m/ becomes the denasalized [-pm] due to two phonological contexts: vowel height and phonemic vowel length. That is, as for vowel height, the final labial /-m/ preceded by the high central vowel /ɨ/ [ɨ] is

denasalized. For phonemic vowel length, the final labial /-m/ preceded by the short mid central vowel /ǝ/ [ə] is denasalized, as shown in the following examples.

Examples:

/-im/ → [-pm]	/gim/	→ [gipm]	‘thigh’
	/ʔim/	→ [ʔipm]	‘water’
/-ǝm/ → [əpm]	/sǝm/	→ [səpm]	‘to plant’
	/ʔǝm/	→ [ʔəpm]	‘rotten’
	/sanǝm/	→ [sa'nəpm]	‘medicine’
	/kanǝm/	→ [ka'nəpm]	‘thunder’

This means that, apart from /i/ and /ǝ/, final labial /-m/ nasal preceded by other vowels do not become stops in the word-final position. Final /-m/ is realized as a voiceless labial stop with voiced homorganic nasal release [-pm]. Sample spectrogram and waveform of final stop with nasal release in the word /ʔim/ [ʔipm] ‘water’ and /sǝm/ [səpm] ‘to plant’ are given in Figure 7.1 and Figure 7.2.

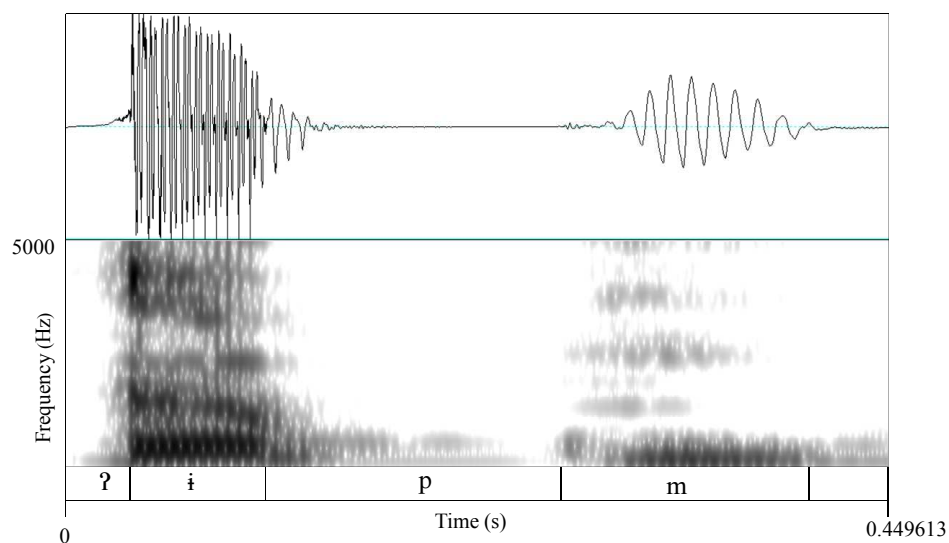


Figure 7.1 Waveform and spectrogram of /ʔim/ ‘water’

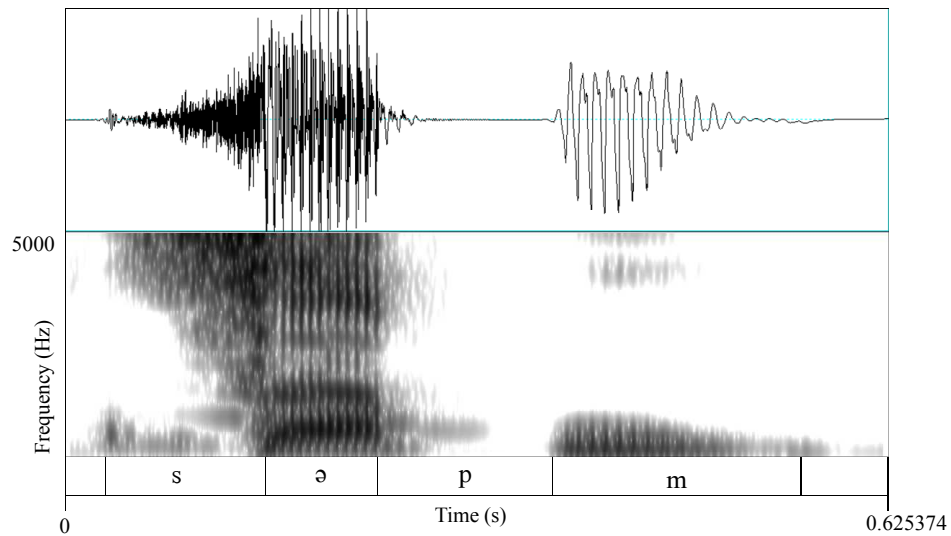


Figure 7.2 Waveform and spectrogram of /səm/ ‘to plant’

As shown in both figures (7.1 and 7.2) there is still some 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 samples of the word-final denasalized labial nasal [-pm], the spectrograms also showed that before the velic is lowered, the nasal release, there is a period of complete silence during the closure, indicating no vocal fold pulsing.

7.2.2.2 Realization of final /-n/

The alveolar final nasal /-n/ becomes an oral alveolar stop plus nasal [-tn] only after the short mid central vowel /ə/ [ə], as shown in examples. This means that phonemic vowel length is the only factor evolving the denasalization of word-final alveolar nasals

Examples:

- | | | |
|-------|-----------|-------------------|
| /bǎn/ | → [bət̚n] | ‘to fly’ |
| /tǎn/ | → [tət̚n] | ‘to lead by hand’ |

As illustrated by the word /bǎn/ [bət̚n] ‘to fry’ and /tǎn/ [tət̚n] ‘to lead by hand’ in Figure 7.3 and Figure 7.4, the final /-n/ is realized as a full stop indicating partial voicing at the moment of oral closure before releasing nasal.

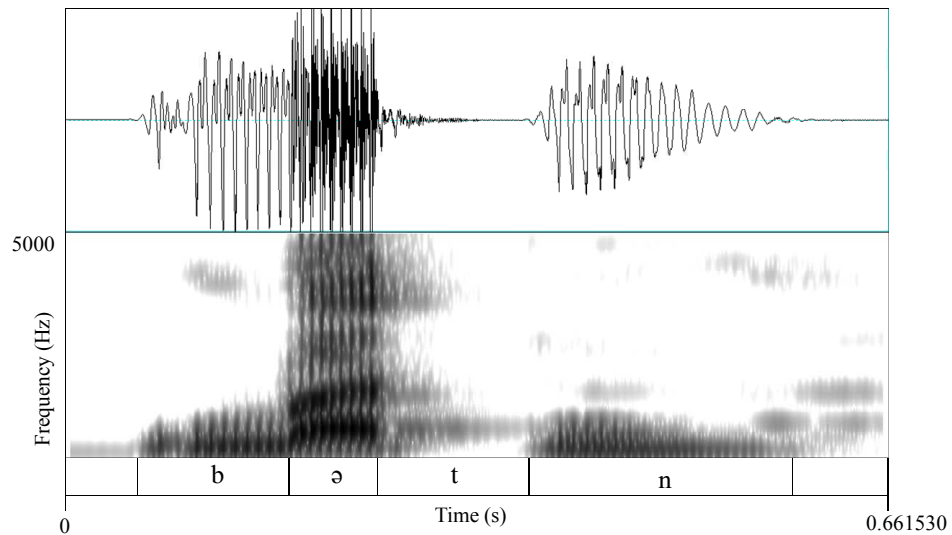


Figure 7.3 Waveform and spectrogram of /bǎn/ ‘to fry’

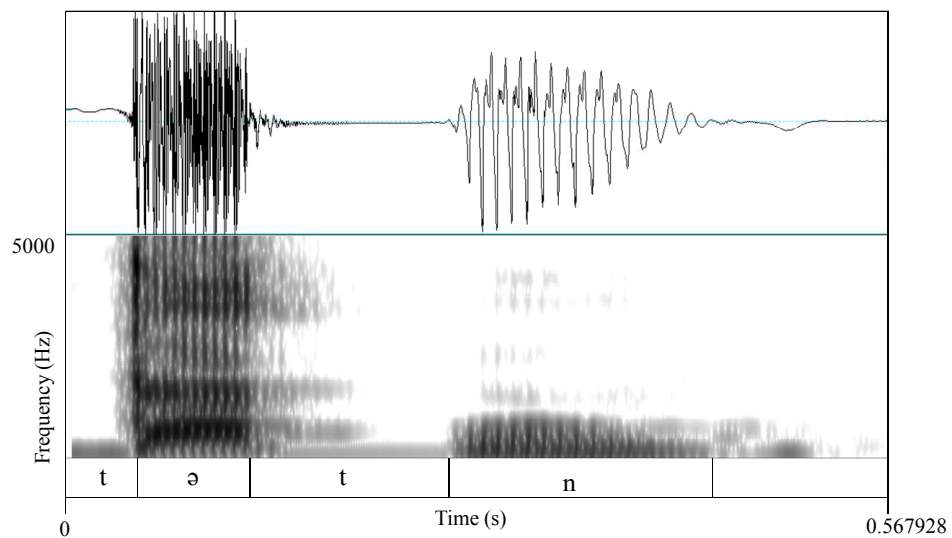


Figure 7.4 Waveform and spectrogram of /tǎn/ ‘to lead by hand’

7.2.2.3 Realization of final /-ɲ/

The final palatal nasal /-ɲ/ is quite rare in the Dara-ang dialect of Palaung spoken in Thailand. It mostly occurs with the vowels /i e u ə a/. However, only final palatal nasals preceded by front vowels /i e/ are realized as oral stops with nasal [-cɲ], as shown in the examples. Diachronically, as mentioned in the previous section, the word-final palatal nasals /-ɲ/ that have been denasalized [-cɲ] are historically developed from original final velar nasals /*-ŋ/ (*-iŋ > /-iɲ/; *-eŋ > /-eɲ/) reflected in other Mon-Khmer languages (Diffloth, 1991, p. 22-24).

Examples:

/gɲ/	→ [gicɲ]	‘head’
/cɲ/	→ [tɕicɲ]	‘to sew’
/deɲ/	→ [de: ⁱ cɲ]	‘yellow’
/bleɲ/	→ [ble: ⁱ cɲ]	‘sky’
/reɲ/	→ [re: ⁱ cɲ]	‘red’
/nteɲ/	→ [n ⁱ te: ⁱ cɲ]	‘road, path’

Figures 7.5 and 7.6 illustrate instances of the word ending with the palatal nasal /-ɲ/ that becomes a stop with a nasal release [-cɲ]. As shown in figure 7.5, the final palatal /-ɲ/ preceded by the high front vowel /i/ is realized as a voiceless palatal stop followed by a nasal release [-cɲ]. Meanwhile, Figures 7.6 shows spectrogram and waveform of the word final palatal /-ɲ/ [-cɲ] preceded by the mid front vowel /e/ in the words /n teɲ/ [nⁱte:ⁱcɲ] ‘road, path’.

Notably, as seen in Figure 7.6, the duration of oral closure of the palatal /-ɲ/ preceded by the vowel /e/ is visually shorter than the oral portion of the final palatal preceded by high front vowel /i/ in Figure 7.5. Comparatively, the oral closure portion

of the final palatal /-ɲ/ is also shorter than the labial place of articulation. Non-significant diphthongization, additionally, has been observed in vowel before palatal consonant /-ɲ/ as indicated by the increase of the second formant frequency (F2).

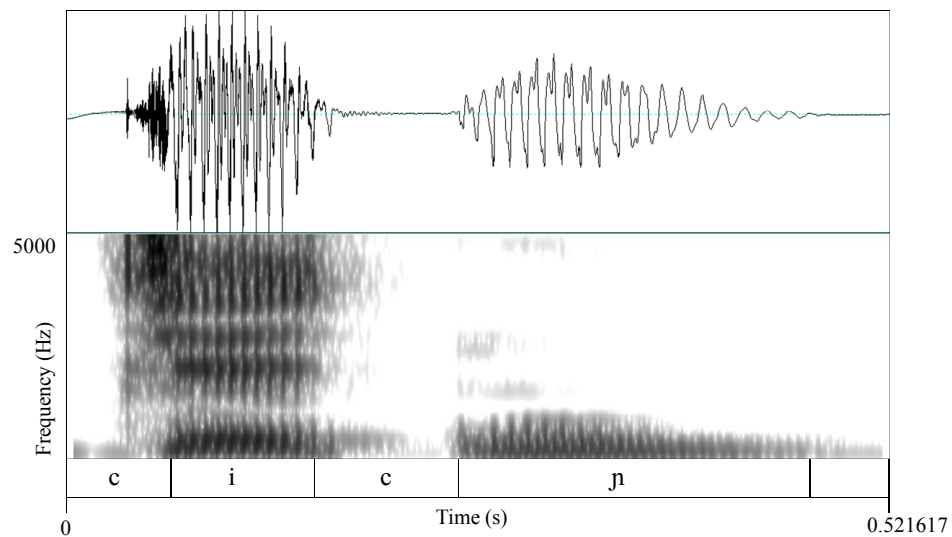


Figure 7.5 Waveform and spectrogram of /cijɲ/ ‘to sew’

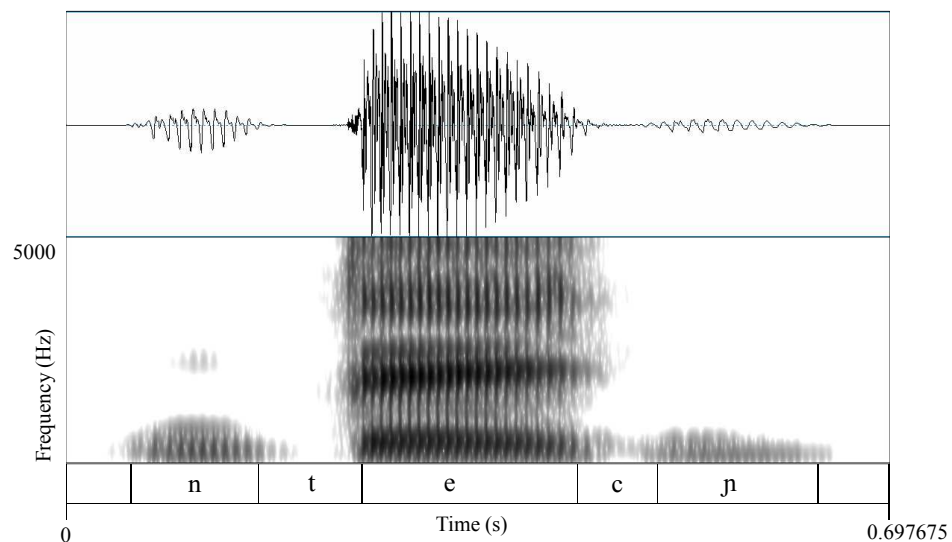


Figure 7.6 Waveform and spectrogram of /n teɲ/ ‘road, path’

7.2.2.4 Realization of final /-ŋ/

The final velar nasal /-ŋ/ is realized as a voiceless oral stop with the voiced nasal release [-kŋ] in almost every context of preceding vowels: single vowels /ε ɨ ə ɔ/ and diphthong /ia/, as shown in examples.

Examples:

/bleŋ/	→ [ble:kŋ]	‘river’
/dǎŋ/	→ [dakŋ]	‘to cook’
/glaŋ/	→ [gla:kŋ]	‘skirt’
/ʔuŋ/	→ [ʔukŋ]	‘sawing place’
/boŋ/	→ [bokŋ]	‘piece (cls.)’
/sɔŋ/	→ [sɔkŋ]	‘bitter’
/ʔiaŋ/	→ [ʔiakŋ]	‘excrement’

An example of the realization of the final velar nasal /-ŋ/ in the word /phiaŋ/ [p^hiakŋ] ‘wing’ is given in Figure 7.7.

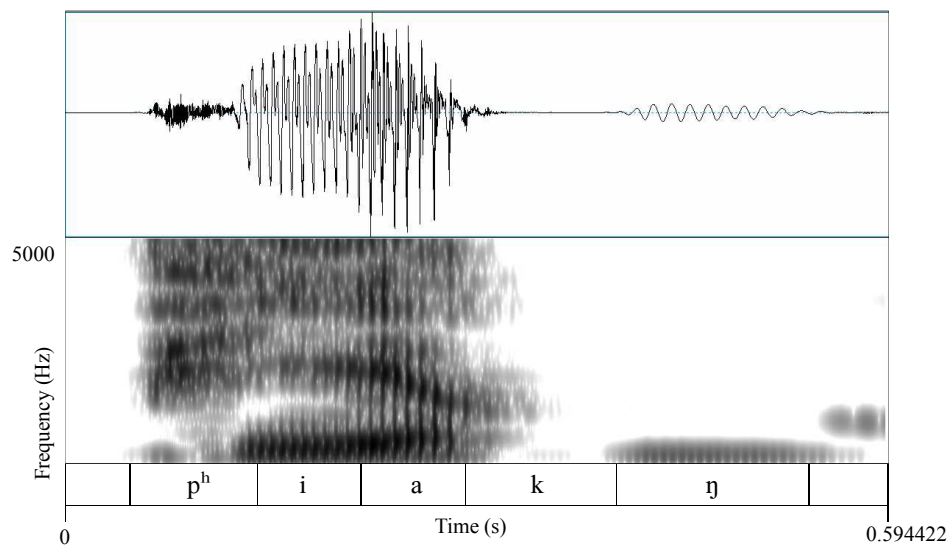


Figure 7.7 Waveform and spectrogram of /phiaŋ/ ‘wing’

The final velar nasal /-ŋ/ is realized as either a short or long oral stop portion which is always followed by voiced homorganic nasal release, as illustrated by the words /rɔŋ/ [rɔkŋ], ‘post, pole’ and /puŋ/ [pu:kŋ] ‘water container’, in Figure 7.8 and Figure 7.9 respectively.

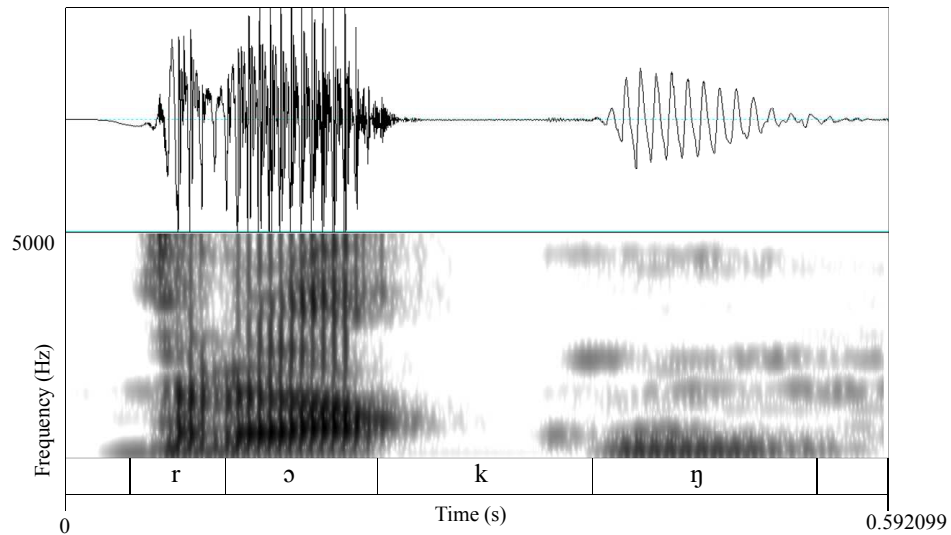


Figure 7.8 Waveform and spectrogram of /rɔŋ/ ‘post, pole’

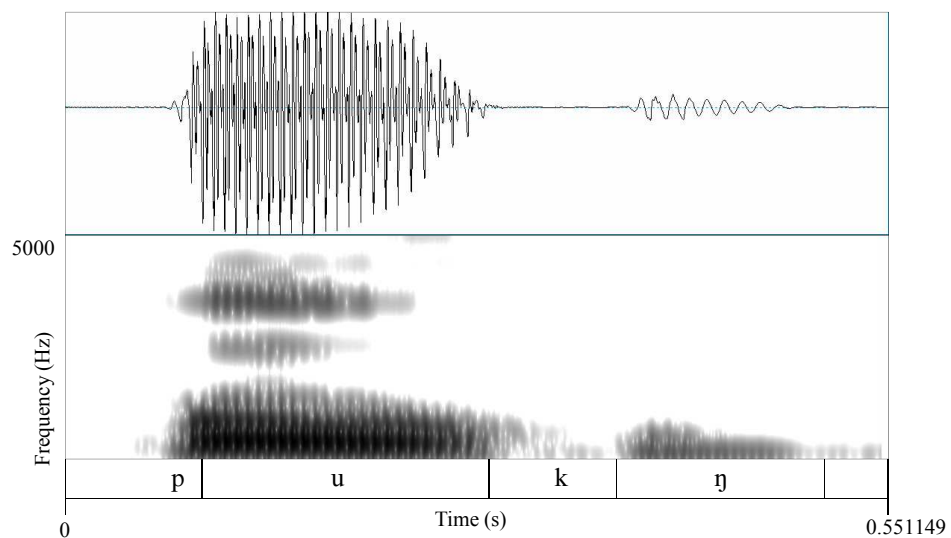


Figure 7.9 Waveform and spectrogram of /puŋ/ ‘water container’

By comparing Figures 7.8 and 7.9, the oral stop closure of final velar nasal that has been denasalized is visually not equal in terms of duration. That is, the duration of oral closure portion of the velar nasal /-ŋ/, preceded by the phonetically short vowel [ɔ] in the word /rɔŋ/, is longer. Meanwhile, the duration of the oral closure portion of the velar nasal /-ŋ/ preceded by the phonetically long vowel [u:] in the word /puŋ/ [pu:kŋ] is shorter.

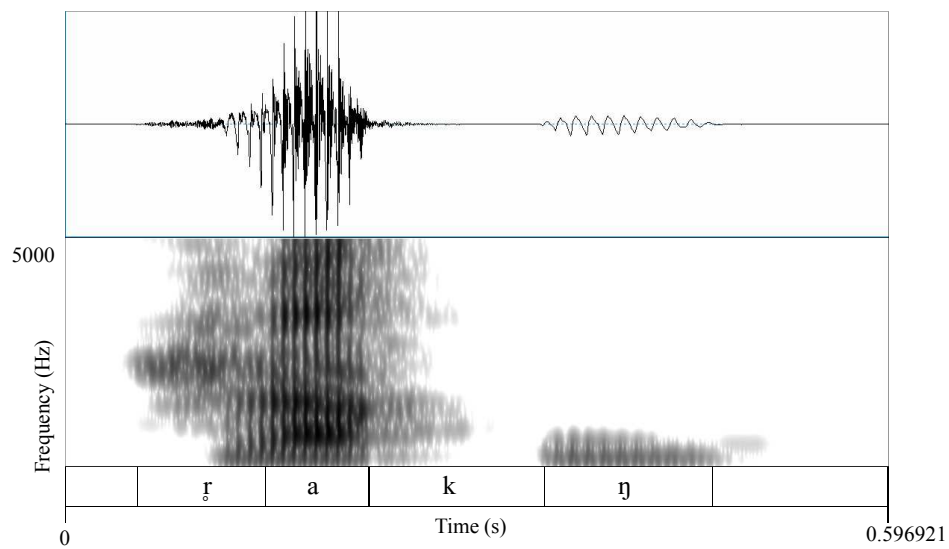


Figure 7.10 Waveform and spectrogram of /rǎŋ/ ‘bamboo’

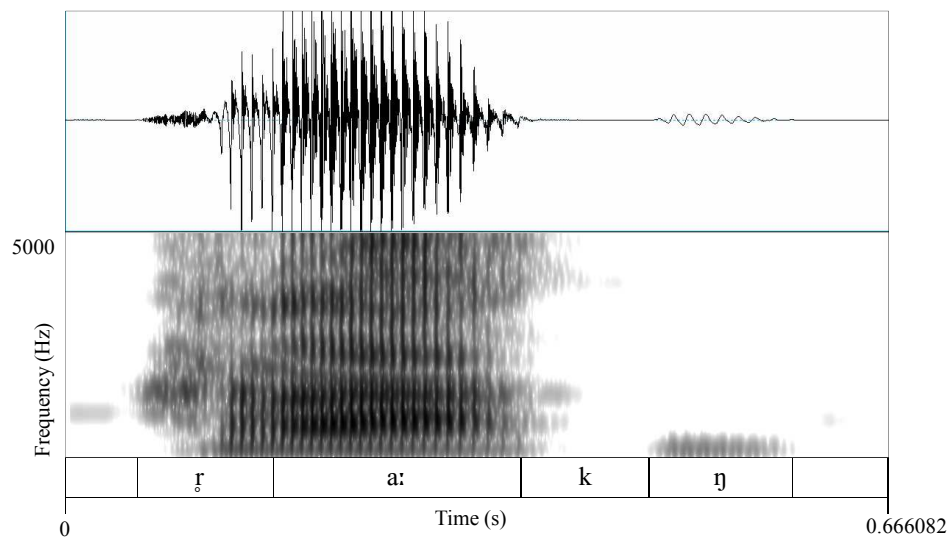


Figure 7.11 Waveform and spectrogram of /rǎŋ/ ‘tooth’

When Figure 7.10 was compared with Figure 7.11, we see that the correlation between oral closure duration and preceding vowel duration is also probably true for velar nasals preceded by low central vowels /ǎ a/, which has contrastive length. That is, the oral closure duration of final denasalized velar nasals preceded by short vowels is shorter than those preceded by long vowels (for more details, see section 7.3.2.3).

7.2.3 Conclusion

In summary, we have seen that in the Dara-ang dialect of Palaung the final nasal consonants which are partially denasalized /-m, -n, -ɲ, -ŋ/ are realized as voiceless oral stops followed by homorganic voiced nasal releases [-pm, -tn, -cɲ, -kŋ]. Spectrographic analysis has confirmed that denasalized nasals are different from plain nasals. The duration of the oral closure portion in the target word-final denasalized nasals, however, is variable. Therefore, in the next section, the temporal characteristic of target denasalized final nasals will be examined.

7.3 Temporal characteristics of denasalized final nasals in Dara-ang

In the last section, the target denasalized nasals were examined qualitatively. Since the duration of the oral closure portion in denasalized nasals varied, in this section the temporal characteristics of word-final nasal consonants that have been denasalized in Dara-ang will be explored in order to see whether there is a phonetic pattern of desynchronizations of the velic lowering and oral closure.

After describing the methodology (section 7.3.1), the result of temporal characteristics of the target denasalized final nasals will be presented.

7.3.1 Methods

Three speakers: Speaker 1, Speaker 2, and Speaker 3 living at No-Lae Village of Chiang Mai Province, Thailand were recruited for the investigation. They were between the ages of 35 – 60 years old. All speakers were fluent native speakers of the Dara-ang dialect of Palaung. Wordlist B2 consisted of 13 target words were

recorded. The recordings took place in a quiet room in the house of the speakers in No-Lae Village, Chiang Mai Province, Thailand. All speakers were asked to pronounce the target words in isolation five times (13 words x 3 speakers x 5 repetitions = 195 tokens). Recordings were made directly onto the author's computer notebook using a microphone. Cool Edit Pro (version 1.0) was used to record all data at a sampling rate of 44.1 kHz. The acoustic measurements were taken using Praat (version 5.1.02). The duration of the target segments were measured in accordance with the acoustic measurement II illustrated in section 3.6.3 of Chapter 3.

7.3.2 Results

The result of spectrographic studies from the previous section (section 7.2) shows that the oral closure portion of denasalized nasals varied. The question here, however, is whether or not oral closure portion and nasal release varied according to either nasal places of articulation or the length of a preceding vowel. After describing the statistical design performed in this study, I will discuss results of the analysis.

7.3.2.1 Statistical design

To examine which temporal measures varied according to nasal place of articulation and preceding vowel duration, a statistical analysis was conducted by performing 2-way ANOVA. The focus in this study is on three temporal measures: vowel duration, oral closure duration, and nasal release duration (each pooled across three Dara-ang speakers). The factors included in each two-way ANOVA were:

- 1) Vowel duration (two levels: short, long)
- 2) Nasal place of articulation (four levels: bilabial /m/, alveolar /n/, palatal /ɲ/, velar /ŋ/)

The statistical interaction in the ANOVA was explored through least significant difference (LSD). A discussion of the results from all statistical analyses appears in the following sections.

7.3.2.2 The duration of the oral closure portion and nasal release according to nasal places of articulation

The two-way ANOVA results showed that nasal place of articulation has no effect on the duration of the oral closure portion of denasalized nasals, while a significant was found for duration of nasal release (i.e., nasal place of articulation has an effect on the duration of nasal release [$F(3, 189) = 3.512, p < 0.05$]).

Moreover, further investigation of the interaction showed that the duration of nasal release between final labial /-m/ and final velar /-ŋ/ is significantly different. Also, the different nasal release duration between the final palatal /-ɲ/ and final velar /-ŋ/ is significant. As shown in Figure 7.12, the duration of nasal release of the final palatal /-ɲ/ is the longest, while the shortest is that of final velar /-ŋ/. Apart from that, the duration of nasal release of the final bilabial /-m/ is in the second, while that of the final alveolar /-n/ is in the third.

Although the statistical findings suggest that the duration of nasal release varied according to nasal place of articulation rather than the duration of oral closure, as given in Figure 7.12, according to place of articulation, it can also be seen that word-final denasalized alveolar nasal tends to have greater duration of the oral closure portion than other denasalized nasals. That is, the duration of the oral closure portion of the final alveolar /-n/ [-tn] is the longest. The duration of the oral closure of the final velar /-ŋ/ [-kŋ] preceded by phonetic long vowels is the shortest. Figure 7.12 also shows that the final velar /-ŋ/ can be divided into two groups, the one preceded by phonetic short vowels and the other preceded by phonetic long vowels. The duration of the oral closure of the denasalized velar /-ŋ/ preceded by phonetic short vowels is longer than those preceded by phonetic long vowels. Meanwhile, the duration of oral closure portion of the final palatal /-ɲ/ preceded by the high front vowel /i/ is longer than by preceded by the mid front vowel /e/.

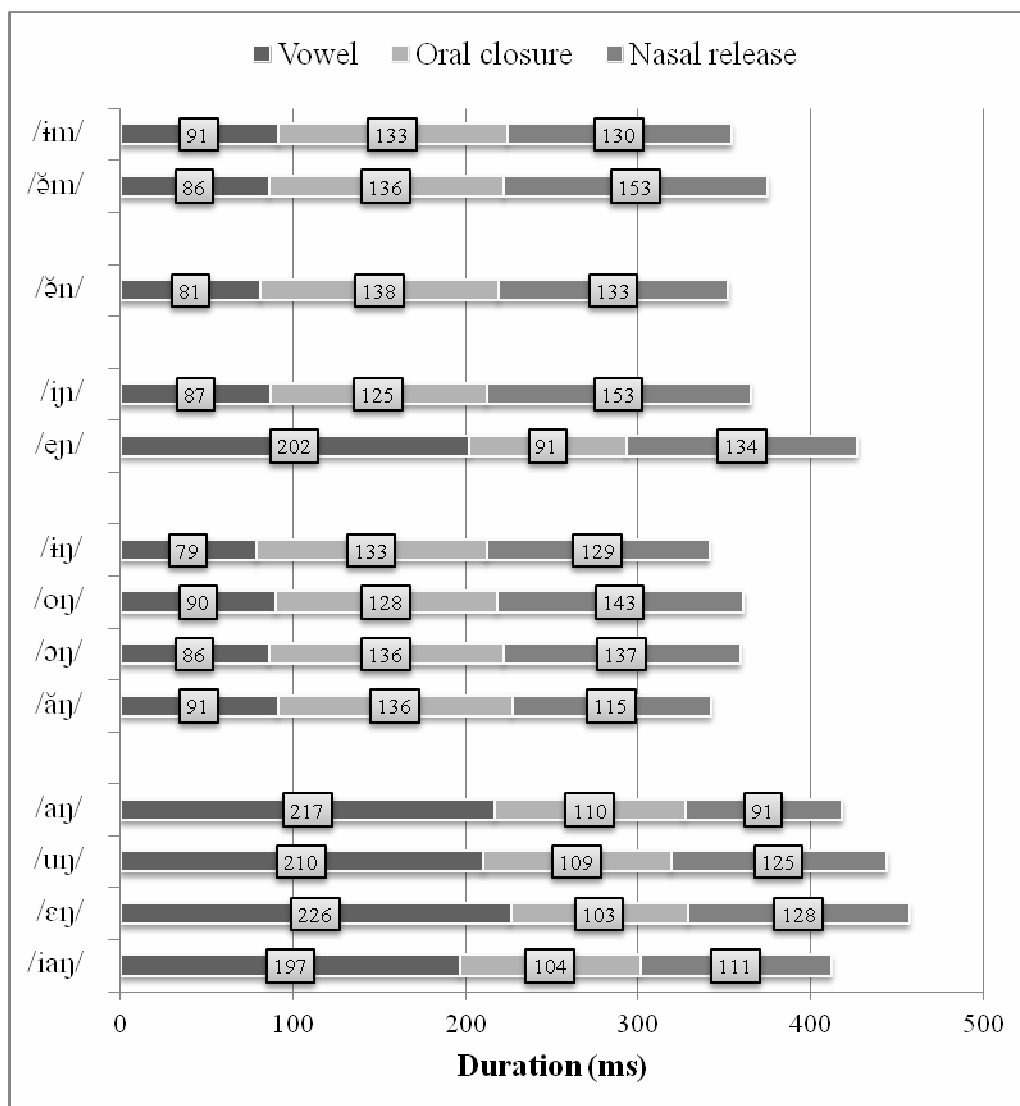


Figure 7.12 Average durations in millisecond of vowels, oral closure portion, and nasal release, according to places of articulation

7.3.2.3 The duration of the oral closure portion according to preceding vowel duration

Although the findings from acoustic measurement showed that the duration of oral closure does not vary by nasal place of articulation, it is possible that the duration of oral closure might be related to the length of the preceding vowel.

The two-way ANOVA results confirmed that the duration of preceding vowels has a significant effect on oral closure duration [$F(1, 189) = 47.184, p < 0.01$]. Figure 7.13 shows the correlation between preceding vowel durations and closure

durations of denasalized nasals. It can be seen from the figure that the duration of oral closure preceded by a phonetic short vowel is longer than preceded by a phonetic long vowel. In the other words, the phonetic short vowels are followed by longer oral closure duration. On the contrary, the phonetic long vowels are followed by shorter oral closure duration.

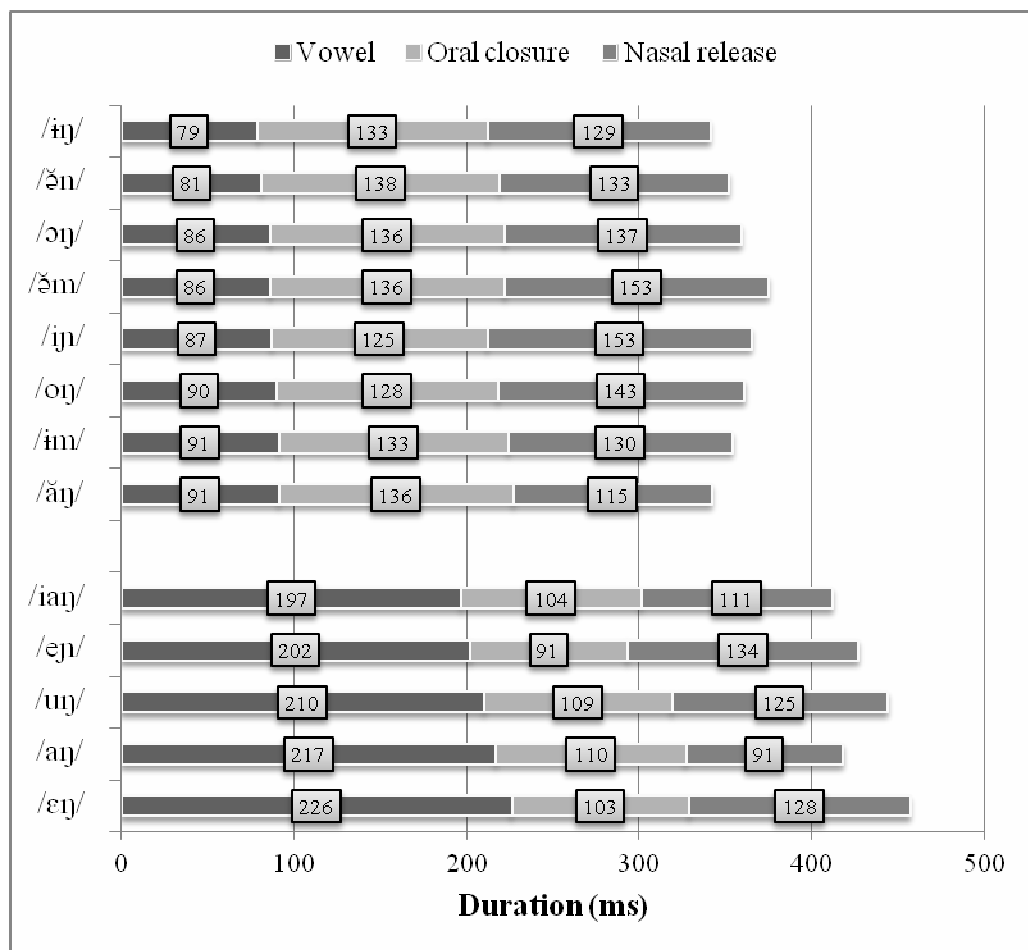


Figure 7.13 Average durations (in ms) of vowel, oral closure portion, and nasal release, according to phonetic short and long vowels, showing the relation between preceding vowel duration and oral closure duration

Surprisingly, statistical results showed that duration of preceding vowel also had a significant effect on the duration of nasal release [$F(1, 189) = 10.287$, $p < 0.01$]. As seen in Figure 7.13, in terms of nasal release duration, we will also see

that phonetic short vowels are followed by longer nasal release duration. The phonetic long vowels, in contrast, are followed by shorter nasal release duration. In sum, it can be concluded that the phonetic length of a preceding vowel has an effect on both the duration of the oral closure and nasal release of the denasalized nasals.

7.3.3 Conclusion

In summary, results from the acoustic study showed that nasal place of articulation has an effect on the duration of nasal release of denasalized nasals, while no significance was found for duration of the oral closure portion. But, statistical results confirmed that the duration of preceding vowels have a significant effect on the oral closure portion of the denasalized nasals. Apart from that, the preceding vowel duration also has an effect on the duration of nasal release. This acoustic finding suggested that the duration of oral closure and nasal release of denasalized nasal preceded by phonetic short vowels tends to have greater duration than those preceded by phonetic long vowels.

7.4 Summary

In this chapter, I have described word-final denasalization in Dara-ang and Da-ang, two dialects of Palaung. I proposed that three phonological contexts trigger denasalized nasals: nasal place of articulation, vowel height, vowel length. In both dialects the denasalization diachronically originated at velar point of articulation. Then, the denasalization spread to other nasal place of articulation. However, in the Da-ang dialect of Kalaw, denasalization is blocked from the diachronic consonant and vowel merger. The findings of the acoustic study revealed that the final denasalized nasal is realized as a voiceless oral stop followed by nasal release. Additionally, the duration of preceding vowels had a significant effect on oral closure durations of denasalized nasals.

In the next chapter, I will summarize the findings from previous chapters. Findings in this thesis will be discussed and recommendations for future research will be provided.

CHAPTER VIII

CONCLUSION

This thesis describes the phonology of the Dara-ang and Da-ang dialects of Palaung spoken in Thailand and Myanmar, and addresses issues concerning vowel length and word-final denasalization in both dialects. In this chapter, I will summarize my findings from previous chapters. I will then discuss the findings according to the research questions. Finally, I will provide recommendations for other interesting issues that might be worth exploring in future research.

8.1 Summary of findings

The first aim of this thesis was to describe the phonology of Dara-ang and Da-ang, the Palaung dialects spoken in Thailand and Myanmar, respectively. The phonological study of those two dialects showed that words in both Dara-ang and Da-ang are either monosyllabic or polysyllabic words. The polysyllabic words include sequisyllabic and compound words. The Dara-ang and Da-ang sequisyllabic words, in addition, can be preceded by either one or two presyllable or presyllabic nasals, whereas compound words consist of a compounding (1) between two monosyllabic words, (2) between a monosyllabic word and a sequisyllabic word, and (3) between a sequisyllabic word and a sequisyllabic word. There are two types of syllables in Dara-ang and Da-ang: major and minor syllables. Based on forms, the minor syllables can be categorized into two types: presyllables and presyllabic nasals, whereas according to function there are two classes of minor syllables: a grammatical function and a non-specified use. Major syllables can be open (CV) or closed syllables (CVC). The major syllable can begin with a single initial (C) or a consonant cluster (C₁C₂). It is found that in both Dara-ang and Da-ang, the first member of the consonant cluster is restricted only to the labial /p-, ph-, b-/ and the velar /k-, kh-, g/ stop consonants. The

second members of the consonant cluster are liquids /-r-, -l/ and glide /-j-/. As for phonemic sounds inventory, while there are differences in terms of the phonetic realization of the phonemes and the phonological processes evolving synchronically and diachronically, the phonological system of Da-ang is quite similar to Dara-ang, as summarized in Table 8.1. Dara-ang and Da-ang inventories of initial consonants are identical. There are 31 initial consonant phonemes: voiceless stops /p t c k ʔ/, voiceless aspirated stops /ph th ch kh/, voiced stops /b d ɟ g/, voiceless nasals /m̥ n̥ ɲ̥ ɳ̥/, voiced nasals /m n ɲ ɳ/, fricatives /f v s h/, and liquids /r̥ r̥ l̥ l̥ j̥ j̥/.

Table 8.1 Comparison of phonemic sound inventory between Dara-ang spoken in Thailand and Da-ang spoken in Myanmar

	Dara-ang (Thailand)	Da-ang (Myanmar)
Initial consonants	p ph b t th d c ch ʔ k kh g ʔ	p ph b t th d c ch ʔ k kh g ʔ
	m̥ m̥ n̥ n̥ ɲ̥ ɳ̥ ɲ̥ ɳ̥	m̥ m̥ n̥ n̥ ɲ̥ ɳ̥ ɲ̥ ɳ̥
	f v s h	f v s h
	r̥ r̥ l̥ l̥	r̥ r̥ l̥ l̥
	j̥ j̥	j̥ j̥
Vowels	i e ε i̇ ə ǎ a u o ɔ	i e ε i̇ ə ǎ a u o ɔ
	ia ei ai au ua ou	ia ei ai au ua ou
Final consonants	p t c k ʔ	p t c k ʔ
	m n ɲ ɳ	m n
	h	h
	w j	w j

As shown in Table 8.1, the Dara-ang and Da-ang inventories of vowels are identical. The vowel system consists of 11 monophthongs: front vowels /i e ε/, central vowels /i̇ ə ǎ a/, and back vowels /u o ɔ/, plus six diphthongs: /ia ei ai au ou ua/. Phonemically, short vowels were marked since they occur in more restricted environments than long vowels. In regards to the final consonant systems, the Dara-

ang inventory of final consonants differs from Da-ang due to the diachronic merger of the finals. Dara-ang has 12 final consonant phonemes: stops /p t c k ʔ/, nasals /m n ɲ ŋ/, fricative /h/, and glides /w j/, while Da-ang lacks the final palatal /ɲ/ and velar /ŋ/ nasals. In Da-ang, *-ɲ has merged with -n, while *-ŋ is completely denasalized and then merged with -k.

The second aim of this thesis was to explore vowel length and word-final denasalization and to conduct an acoustic analysis in order to investigate the phonetic realization of phonemic vowel length and denasalized nasals in Dara-ang and Da-ang. Based on minimal pairs found in an elicited wordlist from both dialects, I propose that vowel length is phonemically contrastive only for the non-high central vowels /ə ə̃ ə̄ a/, and the contrast of short and long vowels is restricted only in closed syllables. Diphthongization is a phonological process evolving vowel length synchronically since in Dara-ang and Da-ang phonemic long vowels, especially mid vowels in major open syllables, are always pronounced as long and further diphthongized. Diachronically, in Da-ang I have found that *-ə̃m has merged with -ə̄m resulting in the loss of phonemic vowel length contrast before the final labial nasal /-m/. In Chapter 6, I also demonstrated through an acoustic study based on a recorded wordlist that phonemic short and long vowels also significantly differ in terms of acoustic properties, vowel duration and the first two formant frequencies (F1, F2). Though acoustic findings of F1 and F2, an acoustic correlates of vowel quality (vowel height and vowel backness), show a difference between phonemic short and long vowels, the dominant acoustic cue to distinguish vowel length in Dara-ang and Da-ang is vowel duration, since long vowels are 2.64 times longer than short vowels.

In Chapter 7, I focused on word-final denasalization occurring in Dara-ang and Da-ang. I argue that there are two categories of denasalization found in Palaung dialects: partial and complete denasalization. The denasalization that occurs in Da-ang is complete (i.e., nasal is completely denasalized to stops). In other words, there is no final velar nasal phoneme in the final consonant system of Da-ang, since final velar nasal already merged with the final velar stop (*-ŋ > -k). Denasalization in Dara-ang

is partial. I further propose that denasalization occurring in Dara-ang, which is spoken in Thailand, is a sound change in progress. Phonologically, a denasalized nasal in Dara-ang is analyzed as an allophone of a final plain nasal. In regard to the triggers of the denasalized nasal, there are three phonological contexts: nasal place of articulation, vowel height, and vowel length. In both dialects, the denasalization diachronically originated at a velar nasal point of articulation. This innovation is shared in both dialects. Then, in Dara-ang the denasalization spread to another nasal place of articulation. Meanwhile, after the denasalization took place at a velar nasal point of articulation, Da-ang denasalization was blocked due to the diachronic merger of final consonants and vowels, i.e., $*-ŋ > -n$ and, $*-əm > -əm$. Therefore, there is no phonetic factor to motivate the spreading of denasalization to other nasal places of articulation. In Dara-ang (spoken in Thailand), I further investigate the phonetic realization of the denasalized nasals. Spectrographic analysis revealed that final denasalized nasal is realized as a voiceless oral stop followed by a voiced nasal release. Due to the variation of the duration of the oral closure portion in the target word-final denasalized nasals, the temporal characteristics of denasalized nasals were measured. Acoustic measurements of the duration of the oral closure portion of denasalized nasals showed that the duration of oral closure of the denasalized nasals did not vary according to the nasal place of articulation. An acoustic finding, however, suggests that the duration of the preceding vowel had a significant effect on the duration of the oral closure portion of the denasalized nasals.

8.2 Discussion

In this section, I will summarize the results and compare them to previous descriptions, and then discuss the findings according to the research questions.

8.2.1 The phonemic sound inventory of Palaung dialects

Overall, consistent with previous descriptions of Palaung (Janzen, 1978; Gwaw Too, 1982; Kasisopa, 2003), there are 31 initial consonant phonemes in Dara-ang and Da-ang. It should be noted that, contrary to Kasisopa (2003), the finding of

initial consonants supports Janzen (1978) that the labio-dental fricative phonemes /f v/ are contrastive in terms of voicing and there is no labio-velar approximant /w/ occurring in the initial position. Contrary to previous studies (Janzen, 1978; Gwaw Too, 1982; Kasisopa, 2003; Chaichompoo, 2010), this study proposes the 11 vowel system is comprised of three front vowels, three back vowels, and five central vowels. Vowel length of non-high central vowel is phonemic. The vowel system with central vowel length distinction confirms the Proto-Palaung vowel system reconstructed by Mitani (1977, 1979) and Diffloth (1991). As for the final consonant system, there are 12 final consonants in Dara-ang. The number of finals in Dara-ang is less than those found in Kasisopa (2003) due to the phonemic status of a denasalized nasal (i.e., in this study, a denasalized nasal is analyzed as an allophone of plain nasal). More importantly, due to the diachronic development of final nasals, this study found that there are only 10 final consonants in Da-ang spoken in Kalaw city, Myanmar.

8.2.2 Is vowel length in Dara-ang preserved or is vowel length in Da-ang lost?

Referring to the Da-ang dialect of Palaung spoken in Myanmar, Janzen (1978) describes the vowel system as having no phonemic vowel length, suggesting that vowel length from Proto Palaung has been lost in this dialect. Meanwhile, in Dara-ang, which spoken in Thailand, Kasisopa (2003) proposed a vowel system with phonemic short and long vowels, which implies that vowel length from Proto-Palaung is preserved in Dara-ang. Contrary to previous descriptions, in this study, the vowel lengths of the Palaung dialects spoken in Thailand and Myanmar (Dara-ang and Da-ang) are phonemic only for non-high central vowels, namely /ǎ ə ă a/. That is, central vowel length in Da-ang did not lost, while vowel length in Dara-ang is preserved only for central vowels. This result confirms the Proto-Palaung vowel system reconstructed by Mitani (1977, 1979) and Diffloth (1991), which showed the 10 vowel system has three front vowels: /*i *e *ɛ/, three back vowels: /*u *o *ɔ/, and four central vowels: /*ǎ *ə *ă *a /. From doing fieldwork on the Palaung dialects spoken in Thailand and Myanmar, and five dialects of Palaung spoken in Dehong Dai-Jingpho

Autonomous Prefecture, Yunnan Province, China¹, I agree with Diffloth (1991) that vowel length in Palaung dialects is still operating, but with a small function load. Note that, the emergence of the high central vowel /i/ in the vowel system of Dara-ang and Da-ang is due to the diachronic development of the high back vowel /u/. As suggested in Ostapirat (2009), *-um and *-uŋ were delabialized to /-im/ and /-iŋ/, respectively. I also found that a set of words having the high central vowel /i/ in open syllable were Tai loanwords.

In considering why vowels in Dara-ang and Da-ang lost vowel length (except for non-high central vowels), I believe that the reason is probably due to intrinsic vowel duration. As mentioned in Maddieson (1997), other things being equal, higher vowels are shorter than lower vowels. However, as demonstrated in Teeranon (2007), the intrinsic length is a tendency. It is not universal as an intrinsic pitch and it should be a language-specific phenomenon rather than phonetic universal. Consistent partly with the results found in Mon-Khmer languages by Teeranon (2007), acoustic measurements of vowel duration of phonemic long and short vowels in this study showed that low vowels are not always longer than high vowels (i.e., in Dara-ang and Da-ang low vowels are longer than high vowels only in the case of short vowels but not long vowels).

The phonological structure of the language may have influence on phonetic variation as hypothesized by Gordon (2002), who suggested that languages without phonemic length have greater durational differences between different vowel qualities than languages with phonemic vowel length. By investigating the duration differences between low and high vowels in languages with and without phonemic vowel length, Gordon (2002, p. 72) concluded that a language without phonemic vowel length displays greater durational differences between vowels of different qualities. He further suggests that “in languages with phonemic length contrast there is

¹ I am a research assistant of the on-going project entitled “A preliminary ethnolinguistic study of the Palaung people in Kengtung, Myanmar and in Yunnan, China” granted to Assoc. Prof. Sujaritlak Deepadung, the project leader and my thesis advisor, by Thailand Research Fund and Mahidol University (BRG-5380001).

less room for the intrinsically longer low vowels to enhance their inherent length by undergoing additional lengthening (p. 73).” Since Dara-ang and Da-ang have a mixed vowel system (i.e., some vowels have phonemic length whereas others do not as noted in Diffloth (1991, p. 25)) the Palaung vowel system appears to be half-way between a full vowel system and a language in which a vowel has been lost. Diffloth, moreover, suggests that “this vowel-system contraction seems typical of the Burma-Yunnan linguistic sub-area.” Thus, perhaps the vowel system of Dara-ang and Da-ang may influence the phonetic variation of vowels.

A rather surprising finding is that, regarding the duration ratio between short and long vowels, this study found that the duration ratio of the mid vowel /ǝ/ vs. /ə/ in Dara-ang is greater than those in Da-ang, due to the denasalization of final nasals. Recall that, as shown in (1), final nasals /-m, -n/ preceded by mid short vowel /ǝ/ in Dara-ang are partially denasalized to [-pm, -tn] and the phonemic vowel length of /ǝ/ vs. /ə/ is restricted before final nasals.

(1) Denasalization of final nasal preceded by short mid central vowel /ǝ/

Dara-ang			Da-ang		
/-m/	/ʔǝm/	→ [ʔəpm]	/ʔǝm/	→ [ʔəm]	‘rotten’
/-n/	/tǝn/	→ [tətn]	/tǝn/	→ [tən]	‘lead by hand’

The phonetic realization of denasalized nasals which is composed partly of a stop has shortened the preceding vowel duration, with the result being that the distinction between short and long vowels /ǝ/ vs. /ə/ was enhanced. This finding confirms my hypothesis that the final nasal in Dara-ang is denasalized in order to prevent the merger between short and long vowels.

8.2.3 What are the triggers of denasalized nasals in Palaung dialects?

Kasisopa (2003) reports that in Dara-ang, preceding phonemic vowel length triggered denasalized nasals diachronically. In addition to phonemic vowel

length, this study has found that nasal place of articulation and vowel height are also triggers of denasalized nasal in the Dara-ang dialects of Palaung. However, the denasalization occurring in the word-final position of Dara-ang is a sound change in progress. That is, the denasalized nasals are triggered synchronically in a phonological context. They have not yet been phonologized as the phonemes as Kasisopa (2003).

That vowel height is a trigger of denasalized nasals is not surprising. As mentioned in Bell-Berti (1993), the relationship between velic position and vowel height has been observed a century ago and has been confirmed by a number of recent studies. An experiment of denasalization in Korean (Chen & Clumeck, 1975, pp. 125-127) indicates that there is a close relation between vowel height and the nasality of the prevocalic consonant (i.e., “the more open (low) the vowel, the greater the frequency with which the consonant were perceived as nasal.”). Furthermore, there is evidence from the experiments (Ohala, 1975, Clumeck, 1976) that indicate that nasalization of vowels is heavier among low vowels than mid or high vowels. Besides, the velum is higher for high vowels and lower for low vowels. Acoustically, Ohala and Ohala (1993, p. 230) also state that “vowel with low F1/or F2 or those that are distinctively oral may also engender intrusive stops in adjacent nasals (assimilation of velic closure).” Predictably, if a language undergoes a process of word-denasalization, the final nasal preceded by a high vowel would be denasalized. As found in Dara-ang (spoken in Thailand), the nasal preceded by a high vowel is partially denasalized.

8.2.4 What denasalized nasal is phonetically realized?

The denasalized nasal in Da-ang has been described as “preglottalized nasals” in Janzen (1978), while in Dara-ang it is called “voiced plosive with homorganic nasal release” by Kasisopa (2003). The phonetic explanation of denasalized nasals given by Janzen (1978, p. 14) is that:

Phonetically there seems to be tenseness of the whole pharynx with closure at the velar sail, the glottis and in case of η a closure of the tongue at the velum, being pronounced with a quick released, which gives a plosive and sound preceding the outflow of the air

through the nasal cavity. It may also occur that the glottis remains closed and an unvoiced nasalized sound is produced.

Unfortunately, in this study, when I was doing fieldwork in Myanmar in February 2010, I found that the segment so-called preglottalized nasals had been completely denasalized and then merged to a final velar stop /-k/. I would hypothesize that, when Janzen was describing the Da-ang dialect of Kalaw, final velar nasal was partially denasalized as now occurs in the Dara-ang dialect of No-Lae. Furthermore, I would suggest that the process of denasalization in the Palaung dialects, perhaps in the Palaungic languages (e.g., Hu, U), has passed the stage of partial denasalization. By comparing with other Palaung dialects, Janzen noted that this feature does not occur in Gold Palaung and Rumai. Apart from Dara-ang and Da-ang, I also found this feature in Na-ang, a dialect of Palaung spoken in Dehong, Yunnan Province, China. I would suggest that the denasalized nasal is a feature shared in the so-called Darang group of dialects by Ostapirat (2009).

As for the partially denasalized nasals in Dara-ang, contrary to Kasisopa (2003), acoustic results found that they are realized as voiceless stops followed by voiced homorganic nasal release. The voiced nasal release found in Dara-ang is not an uncommon finding, as discussed by Harris (2006), who said that there are two types of nasal release in Southeast Asian languages. The first type is voiceless homorganic nasal release found in Tai languages and Vietnamese dialects. The second type is voiced nasal release, which occurs in Bruu, a Mon-Khmer language. Dara-ang belongs to this second type.

According to the oral closure of the voiceless stops preceding nasal release, acoustic measurements found that the duration of preceding vowels had a significant effect on the oral closure duration of the target word-final denasalized nasals. Generally, a nasal consonant is formed with complete closure in the oral tract simultaneously with the lowering of the velum, allowing air into the nasal cavity. For denasalized nasals, following the Articulatory Phonology (AP) as proposed by Browman and Goldstein (1992), the representation is presented as in Figure 8.1.

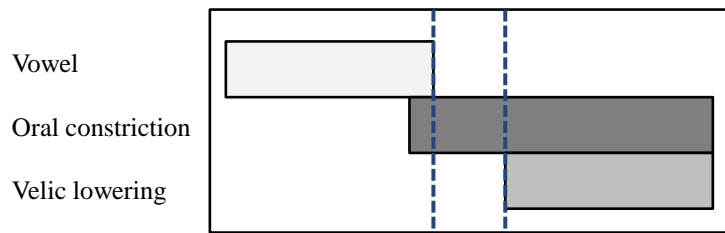


Figure 8.1 The representation of velic and oral gestures in denasalized nasals of Daaang dialect of Palaung

In the model of AP, articulatory events are gestures described in terms of tract variables. Each tract variable is correlated with a particular articulator. The articulation of a nasal consonant comprises two gestures: velic lowering and oral constriction. In word-final nasals, for example in English, velic lowering precedes oral constriction. Such production is perceived as nasalization of a preceding vowel. Meanwhile, for the production of a denasalized nasal, the velic lowering gesture is delayed as shown by an oral closure portion before releasing nasal. As stated in Ohala and Ohala (1993 p. 230), “If in the transition between a nasal consonant and a segment requiring orality, the velic closure become desynchronized with respect to this oral segment and is made during the nasal, a stop necessarily homorganic with the nasal will appear.”

8.3 Recommendations

In this thesis, I provided a phonological description of the Palaung dialects spoken in Thailand and Myanmar, with a focus on the issue of vowel length contrasts and word-final denasalization. The following topics are suggested for future research.

8.3.1 The sound system of other Palaung dialects spoken in China, in particular those spoken in northern Shan State, should be described in order to compare with the results of this study and provide more lexicons to reconstruct the Proto-Palaung language.

8.3.2 Since my findings of vowel length and word-final denasalization in this study are based solely on acoustic analysis, the perceptual experiment of vowel lengths and aerodynamics and laryngoscopic studies of denasalized nasals could be conducted.

8.3.3 In this study, only the temporal characteristics of denasalized nasals were measured. Therefore, measurements of normal nasals (CVN) also need to be carried out to confirm the findings of this thesis.

8.3.4 Apart from phonetics and phonology, a compilation of a Palaung dictionary should be compiled. Besides, a Palaung grammar reference would also be worthwhile for future research.

BIBLIOGRAPHY

- Bell-Berti, F. (1993). Understanding velic motor control: Studies of segmental context. In M.K. Huffman & R.A. Krakow (Eds.), *Phonetics and phonology Volume 5: Nasals, nasalization, and the velum* (pp. 63-85). New York: Academic Press.
- Billerey-Mosier, R. (2001). *JPlotFormants v1.4: Formant-plotting software* [Computer software]. Retrieved September 21, 2011, from <http://www.linguistics.ucla.edu/people/grads/billerey/PlotFrog.htm>
- Blevins, J., & Garrett, A. (2004). The evolution of metathesis. In B. Hayes, R. Kirchner, & D. Steriade (Eds.), *Phonetically driven phonology* (pp. 117-156). Cambridge: Cambridge University Press.
- Boersma, P., & Weenink, D. (2009). *Praat: Doing phonetics by computer (version 5.1.02)* [Computer software]. Retrieved February 27, 2009, from <http://www.praat.org/>
- Browman, C.P. & Goldstein, L. (1992). Articulatory phonology: An overview. *Phonetica*, 49, 155-180.
- Chaichompoo, C. (2010). *Palaung phonology revisited*. Chiang Mai Rajabhat University. [Research Report]
- Chen, M. & Clumeck, H. (1975). Denasalization in Korean: A search for universal. In C.A. Ferguson, L.M. Hyman, & J.J. Ohala (Eds.), *Nasálfest: Paper from a Symposium on Nasal and Nasalization* (pp.125-131). Stanford, CA: Stanford University, Linguistics Department.
- Clumeck, H. (1976). Patterns of soft palate movements in six languages. *Journal of Phonetics*, 4, 337-351.
- Dai Qingxia & Liu Yan. (1997). Analysis of the tones in the Guangka subdialect of De'ang. *Mon-Khmer Studies*, 27, 91-108.
- Deepadung, S. (2009). Ethnicity and the Dara-ang (Palaung) in Thailand. *Journal of Language and Culture*, 28 (1), 7-29.

- Deepadung, S., & Thongkumchum, P. (2005). *Encyclopedia of ethnic groups in Thailand: Dara-ang (Palaung)*. Institute of Language and Culture for Rural Development, Mahidol University. [In Thai]
- Diffloth, G. (1974). Austroasiatic languages. *Encyclopedia Britannica* 2. (15th ed.). 480-484.
- Diffloth, G. (1980). The Wa languages. *Linguistics of the Tibeto-Burman Area*, 5 (2).
- Diffloth, G. (1982). Subclassification of Palaungic and notes on 'P'uman'. *Paper presented at the 15th Sino-Tibetan Conference*, August 1982. Beijing, China.
- Diffloth, G. (1991). Palaungic vowels in Mon-Khmer perspective. In J. H. C. S. Davidson (Ed.), *Austroasiatic languages: Essays in honour of H. L. Shorto* (pp.13-27). School of Oriental and African Studies, University of London.
- Diffloth, G. (2005). The contribution of linguistic palaeontology to the homeland of Austro-Asiatic. In L. Sagart, R. Blench, & A. Sanchez-Mazas (Eds.), *The peopling of East Asia*, (pp. 77-80). London: RoutledgeCurzon.
- Diffloth, G. & Zide, N. (2003). Austroasiatic languages. In *International encyclopedia of linguistics (Vol. 1)*. Oxford: Oxford University Press.
- Gordon, M. (2002). A phonetically driven account of syllable weight. *Language*, 78 (1), 51-80.
- Gordon, Raymond G., Jr. (Ed.). (2005). *Ethnologue: Languages of the world* (15th ed.). Dallas, Tex.: SIL International.
- Grimes, B. (2003). Northern Mon-Khmer languages. In *International encyclopedia of linguistics (Vol. 3)*. Oxford: Oxford University Press.
- Gwaw Too. (1982). *The phonology of Palaung*. [Monograph]
- Harris, J. G. (2006). Notes on Thai final unreleased plosive. In J. E. Harris (Ed.), *Readings in articulatory phonetics: Volume 1 consonants & phonation types* (pp. 153-160). Bangkok: Ek Phim Thai.
- Howard, M. C. & Wattanapun, W. (2001). *The Palaung in northern Thailand*. Chiang Mai: Silkworm Books.
- Hayes, B. (2009). *Introductory phonology*. Malden, MA: Wiley-Blackwell.

- Janzen, H. (1976a). The system of verb-aspect words in Pale. In P. N. Jenner, L. C. Thompson, & S. Starosta (Eds.), *Austroasiatic studies Part I* (pp. 659-668). Honolulu: University of Hawaii Press.
- Janzen, H. (1976b). Structure and function of clauses and phrases in Pale. In P. N. Jenner, L. C. Thompson, & S. Starosta (Eds.), *Austroasiatic studies Part I* (pp. 669-691). Honolulu: University of Hawaii Press.
- Janzen, H. (1978). A phonological description of Pale in comparison with Gold-and Rumai-Palaung. *Paper presented at 2nd International Conference on Austroasiatic Linguistics*, December 19-21, 1978. Mysore, India.
- Janzen, M. (1991). *English-Pale dictionary*. Unpublished.
- Janzen, M. (1991). *Pale-English-Burmese dictionary*. Unpublished.
- Kasisopa, B. (2003). *Phonological study and genetic classification of Dara-ang (Palaung) spoken at Nawlae village, Fang district, Chiang Mai province*. Unpublished master's thesis, Chulalongkorn University. [In Thai]
- Ladefoged, P. (2003). *Phonetic data analysis: An introduction to fieldwork and instrumental techniques*. Oxford: Blackwell.
- Luce, G. H. (1965). Danaw, a dying Austroasiatic language. *Lingua*, 14, 98-129.
- Maddieson, I. (1997). Phonetic universals. In W.J. Hardcastle & J. Laver (Eds.), *The handbook of phonetic sciences* (pp. 619-639). Oxford: Blackwell.
- Matisoff, J. (1973). Tonogenesis in Southeast Asia. In L. M. Hyman (Ed.), *Consonant types and tone* (pp. 71-95). Los Angeles: University of Southern California.
- Milne, L. (1910). *Shans at home*. London: John Murray, Albemarle Street; Reprinted 2001, White Lotus, Bangkok, Thailand.
- Milne, L. (1921). *An elementary Palaung grammar*. Oxford: Clarendon Press.
- Milne, L. (1924). *The home of an eastern clan: A study of the Palaungs of the Shan States*. Oxford: Clarendon Press.
- Milne, L. (1931). *A dictionary of English-Palaung and Palaung-English*. Rangoon: Superintendent of Government Printing and Stationery.
- Mitani, Y. (1977). Palaung dialects: A preliminary comparison. *South East Asian Studies*, 15 (2), 193-212.

- Mitani, Y (1978). Problems in the classification of Palaungic. *Paper presented at 2nd International Conference on Austroasiatic Linguistics*, December 19-21, 1978. Mysore, India.
- Mitani, Y. (1979). Vowel correspondences between Riang and Palaung. In T. L. Thongkum, et al. (Eds.), *Studies in Tai and Mon-Khmer phonetics and phonology in honour of Eugenie J.A. Henderson* (pp. 142-150). Bangkok: Chulalongkorn University Press.
- Ohala, J.J. (1975). Phonetic explanations for nasal sound patterns. In C.A. Ferguson, L.M. Hyman, & J.J. Ohala (Eds.), *Nasálfest: Paper from a Symposium on Nasal and Nasalization* (pp. 289-316). Stanford, CA: Stanford University, Linguistics Department.
- Ohala, J. J. (2003). Phonetics and historical phonology. In B.D. Joseph & R.D. Janda (Eds.), *The handbook of historical linguistics* (pp. 669-686). Oxford: Blackwell.
- Ohala, J.J. & Ohala, M. (1993). The phonetics of nasal phonology: Theorems and data. In M.K. Huffman & R.A. Krakow (Eds.), *Phonetics and phonology Volume 5: Nasals, nasalization, and the velum* (pp. 225-249). New York: Academic Press.
- Ostapirat, W. (2009). Some phonological criteria for Palaung subgrouping. *Journal of Language and Culture*, 28 (1), 63-76.
- Pickett, J. M. (1980). *The sound of speech communication: A primer of acoustic phonetics and speech perception*. Texas: PRO-ED.
- Samarin, (1967). *Field linguistics: A guide to linguistic field work*. New York: Holt, Rinehart and Winston.
- Schmidt, P.W. (1906). Die Mon-Khmer Völker, ein Bindeglied zwischen Völkern Zentralasiens and Austronesiens. *Braunschweig: Archiv für Anthropologie*, 5, 59-109.
- Scott, J.G. & Hardiman, J. P. (1900). *Gazetteer of Upper Burma and the Shan States, Part I, Volume 1*. Rangoon: Superintendent of Government Printing and Stationary.
- Sebeok, T.A. (1942). An examination of the Austroasiatic language family. *Language*, 18, 206-17.

- Shafer, R. (1952). Études sur l'austroasien. *Bulletin de la Société de Linguistique de Paris*, 48, 111-58.
- Shorto, H. L. (1960). Word and syllable patterns in Palaung. *Bulletin of the School of Oriental and African Studies*, 23 (3), 544-57.
- Shorto, H. L. (1963). The structural patterns of northern Mon-Khmer languages. In H.L. Shorto (Ed.), *Linguistic comparison in South East Asia and the Pacific*, (pp. 45-61). London: School of Oriental and African Studies.
- Sidwell, P. (2008). Palaungic. Retrieved April 14, 2009, from <http://people.anu.edu.au/~a108009/languages/Palaungic.html>
- Svantesson, Jan-Olof. (1988). U. *Linguistics of the Tibeto-Burman Area*, 11 (1), 64-133.
- Svantesson, Jan-Olof. (1991). Hu: A language with unorthodox tonogenesis. In J.H.C.S. Davidson (Ed.), *Austroasiatic languages: Essays in honour of H.L. Shorto* (pp. 67-79). School of Oriental and African Studies, University of London.
- Symes, M. (1800). *An account of an Embassy to the Kingdom of Ava sent by Governor-General of India in the year 1795*. London: Nicol and Wright.
- Theeranon, P. (2007). The intrinsic pitch and intrinsic length of high and low vowels in Mon-Khmer language. *Mon-Khmer Studies*, 37, 41-52.
- Thomas, D. D. & Robert K. H. (1970). More on Mon-Khmer subgroupings. *Lingua*, 25, 398-418.
- Yule, H. (1858). *A narrative of the mission sent by the Governor-General of India to the Court of Ava in 1855, with notices of the country, government, and people*. London: Smith, Eider & Co.

APPENDIX

DA-ANG AND DARA-ANG WORDLIST

The following Da-ang and Dara-ang wordlist consists of 923 vocabulary items which are arranged according to semantic areas into twenty sections. Within each section, words are then listed by the alphabetical order of the English glosses, except numerals which are listed from low to high numbers.

Sections	Vocabulary Items
1. Nature	1-32
2. Religion and belief	33-40
3. Plants	41-93
4. Space/Time	94-123
5. Food	124-133
6. Animals	134-204
7. Body parts	205-279
8. Verbs	280-594
9. Human	595-625
10. Pronouns	626-636
11. Material culture	637-727
12. Place/House	728-754
13. Deictics/Grammatical words	755-771
14. Adjectives	772-875
15. Colors	876-881
16. Numbers	882-894
17. Quantifiers	895-903
18. Question words	904-909
19. Classifiers	910-920
20. Unit of measurement	921-923

No.	English	Thai	Da-ang	Dara-ang
1. Nature				
1.	ashes	ขี้เถ้า	brɔ ɲɔ	brɔ ɲɔ
2.	cliff	หน้าผา	daʔak	dəʔaɲ
3.	cloud	เมฆ	ɲ ʔuʔ	ɲ ʔu
4.	dust	ฝุ่น	kapuh	kapuh
5.	earth, soil	ดิน	kadaj	kadaj
6.	fire	ไฟ	ɲɔ	ɲɔ
7.	flood	น้ำท่วม	ʔim pun	ʔim pun
8.	fog	หมอก	ɲ ʔuʔ	ɲ ʔu
9.	forest, jungle	ป่า	pre	pre
10.	gold	ทอง	khriw	khriw
11.	hail	ลูกเห็บ	bria	bria
12.	iron	เหล็ก	hin	hin
13.	lightning	ฟ้าแลบ	plaʔ m plet	paɲprec
14.	mist	ไอน้ำ	ɲ ʔuʔ	ɲ ʔu
15.	moon	ดวงจันทร์	magian	magian
16.	moon (full moon)	พระจันทร์เต็มดวง	magian kalāk	lən mon
17.	moon (waning moon)	พระจันทร์เสี้ยว	lɔk	ลɔɲ, lən lap
18.	mountain	ภูเขา	nɔn	nɔn
19.	mud	โคลน	ɲouʔ	ɲo
20.	rain	ฝน	glaj	glaj
21.	rainbow	รุ้ง	cen saɲɛ, lən saɲɛ	ceɲ saɲɛ
22.	river	แม่น้ำ	blek	bleɲ
23.	sand	ทราย	kahaiʔ	kahaiʔ
24.	shadow	เงา	kamɨk	kamɨk
25.	silver	เงิน	rən	rən
26.	sky	ท้องฟ้า	blen	bleɲ

No.	English	Thai	Da-ang	Dara-ang
27.	smoke	ควัน	dăk	dăk
28.	star	ดาว	samăn	samăṅ
29.	stone	หิน	maw	maw
30.	sun	ดวงอาทิตย์	saŋe	saŋe
31.	water	น้ำ	ʔim	ʔim
32.	wind	ลม	khun	khun
2. Religion and belief				
33.	dream	ฝัน	m baw	m baw
34.	ghost	ผี	kanăm, kaprɔ	kanăm
35.	guardian spirit	ศาลเจ้าเมือง		saməŋ
36.	hell	นรก	naraj	naraj
37.	language	ภาษา	grouh	grouh
38.	sin	บาป	məp	məp
39.	soul	วิญญาณ	kaprɔ	kaprɔ
40.	work	งาน	gan	gan
3. Plants				
41.	bamboo	ไม้ไผ่	ɽăk	ɽăŋ
42.	bamboo shoot	หน่อไม้	pɔk	pɔŋ
43.	banana	กล้วย	glɔj	glɔj
44.	bark	เปลือกไม้	glaiʔ	glaiʔ
45.	bean	ถั่ว	ble lom	ble lom
46.	bean (hyacinth bean)	ถั่วแปบ	ble dipaj	ble dipaj
47.	betel chew	หมาก	mamo	mamo
48.	cabbage	กะหล่ำ		kalampli
49.	chilly	พริก	maphrit	maphric
50.	coconut	มะพร้าว	ble ʔun	mapaw
51.	corn	ข้าวโพด	n ɽik	ʔaɽik
52.	cotton, thread	ฝ้าย	sen	seŋ

No.	English	Thai	Da-ang	Dara-ang
53.	cucumber	แตงกวา	dɨgia	dəgia
54.	eggplant	มะเขือ	makhə	makhə
55.	flower	ดอกไม้	bouh	bouh
56.	fruit	ผลไม้	ble	ble
57.	garlic	กระเทียม	mapo luj	mapo luj
58.	ginger	ขิง	siak	siaŋ
59.	gourd	น้ำเต้า		kapə
60.	grass	หญ้า	pət	pət
61.	husk	แกลบ	kham	kham
62.	leaf	ใบไม้	lə	lə
63.	lemongrass	ตะไคร้	kahom	kahom
64.	lime	ป้อน	thun	thun
65.	mango	มะม่วง	ble mok	ble moŋ
66.	mushroom	เห็ด	dih	dih
67.	mustard leaves	ผักกาด	də siam	də siam
68.	onion	หัวหอม	mapo	mapo
69.	opium	ฝิ่น	phin	phin
70.	orange	ส้ม	ble maʔək	maʔək
71.	paddy rice	ข้าวเปลือก	h̄aw	h̄aw
72.	papaya	มะละกอ	ble saŋpho	ble saŋpho
73.	pea (cow pea)	ถั่วฝักยาว	ble lum dɨtok	ble lom thu
74.	pea (green pea)	ถั่วเขียว	ble vək	ble vək
75.	pine tree	ต้นสน	he ŋ ke	he ŋ ke
76.	potato	มันฝรั่ง	kukhe	tukhe
77.	pumpkin	ฟักทอง	ble gluan	ble gluan
78.	rattan	หวาย	rew	rew
79.	resin	ยางไม้	briak he	ŋaʔ
80.	root	รากไม้	riah	riah
81.	seed	เมล็ด	kaʔak	kaʔək

No.	English	Thai	Da-ang	Dara-ang
82.	sesame	งา	dɨŋa	dɨŋa
83.	solanum	มะเขือพวง	saŋkran sɔk	sakram sɔŋ
84.	sugarcane	อ้อย	dɨmaj	dɨmaj
85.	stick	กิ่งไม้	ra	ra
86.	taro	เผือก	touh	touh
87.	tea leave	ใบชา	lə	lə ʔaŋə
88.	thatch	หญ้าคา	blɔk	blɔŋ
89.	thorn	หนาม	dɨkhɔk	dəkhɔŋ
90.	tomato	มะเขือเทศ	makasom	makhəsom
91.	tree	ต้นไม้	he	he
92.	trunk	(ลำ) ต้น	dāk	dāŋ
93.	vegetable	ผัก	dɔ	dɔ
4. Space / Time				
94.	above	บน	ʔidek	dɛŋ
95.	at	ที่		dɨ
96.	before, ahead	ก่อน ข้างหน้า	naʔac	naʔac
97.	behind, in the back	ข้างหลัง	napǎn	napǎn
98.	below	ล่าง	khɾim	khɾim
99.	day	วัน	saŋɛ	saŋɛ
100.	day after tomorrow	มะรืน	taʔŋa	taŋa
101.	east	ตะวันออก	naleih saŋɛ	naleih saŋɛ
102.	evening	ตอนเย็น	baraʔap, paŋə	baraʔap
103.	here	ที่นี่	dɨni	dɨni
104.	in	ใน	khɛk	khɛŋ
105.	inside	ข้างใน	nakhek	nakheŋ
106.	left side	ข้างซ้าย	ʔagǎʔ	ʔagǎʔ
107.	morning	ตอนเช้า	savǎh	sivǎh

No.	English	Thai	Da-ang	Dara-ang
108.	night	กลางคืน	pamə	khemə
109.	noon	ตอนเที่ยง	kate saŋɛ	kate saŋɛ
110.	north	ทิศเหนือ	buhək	nabuhəŋ
111.	now	ตอนนี้	dutuni	dəkani
112.	on	บน	ʔidek	deŋ
113.	outside	ข้างนอก	ʔiret, naret	narec
114.	right side	ข้างขวา	ʔaʔăh	ʔaʔăh
115.	south	ทิศใต้	bujan	nabujan
116.	that	นั่น	də	dəj
117.	this	นี่	ni	ni
118.	today	วันนี้	ʔatə	ʔatə
119.	tomorrow	พรุ่งนี้	khəŋa	kəŋa
120.	under	ใต้	khrim	khrim
121.	west	ทิศตะวันตก	nagət saŋɛ	nagət saŋɛ
122.	year	ปี	sanəm	sanəm
123.	yesterday	เมื่อวาน	ʔamə	ʔamə
5. Food				
124.	breakfast	อาหารเช้า	bom ŋa	bom ŋa
125.	curry	กับข้าว	hap	hap (things to eat with rice, dishes)
126.	dinner	อาหารเย็น	bom mə	bom mə
127.	liquor, alcohol	เหล้า	pauh	pauh
128.	lunch	อาหารกลางวัน	bom saŋɛ	bom saŋɛ
129.	pickled and dried soybean	ถั่วเน่า	ʔarim	ʔarim, ʔirim
130.	rice (cooked rice)	ข้าวสวย	bom	bom
131.	rice (pounded rice)	ข้าวสาร	digaw	digaw
132.	snack	ขนม	khamun	khamun

No.	English	Thai	Da-ang	Dara-ang
133.	tea	ชา	ʔaŋə	ʔaŋə
6. Animals				
134.	ant	มด	maprun	maprun
135.	bat	ค้างคาว	makalǎʔ	makalǎʔ
136.	bear	หมี	magreih	magreih
137.	bee	ผึ้ง	maphian, phian	maphian
138.	bird	นก	masim	masim
139.	buffalo	ควาย	magrǎʔ	magrǎʔ
140.	butterfly	ผีเสื้อ	makatop	makatop
141.	cat	แมว	ʔaŋew	maŋew
142.	caterpillar	ด้กด้ก หนอน	varaiʔ	maprac
143.	centipede	ตะขาบ	masarak	macaraŋ, meŋcaraŋ
144.	chameleon	กิ้งก่า	magoj	magoc
145.	chicken	ไก่	maʔian	maʔian
146.	cobra	งูเห่า	han krə	haŋ ŋ krə, haŋ krə
147.	cock	ไก่ตัวผู้	ʔagok	ʔagon
148.	cock's comb	หงอนไก่	nǎh	nǎh
149.	cock's spur	เดือยไก่	tə	tə
150.	cockroach	แมลงสาบ	makhǎk	maphian
151.	cow	วัว	mǎk	mamǎk
152.	crab	ปู	madigriah	madigriah
153.	cricket	จิ้งหรีด	maton	maton
154.	crocodile	จระเข้		ŋək (crocodile)
155.	crow	กา	makaʔǎʔ	makaʔǎʔ
156.	deer	กวาง	majǎʔ	majǎʔ
157.	deer (barking deer)	ฟาน	mabuah	mabuah

No.	English	Thai	Da-ang	Dara-ang
158.	dog	หมา	maso	maso
159.	duck	เป็ด	mabeʔ, beʔ	mabeʔ
160.	egg	ไข่	pən ʔian	pən ʔian, piʔian
161.	elephant	ช้าง	masaŋ	masaŋ
162.	feather	ขน	hik	hik
163.	fish	ปลา	maga	maga
164.	fish scales	เกล็ดปลา	khap maga, hun maga	geʔ
165.	fly	แมลงวัน	marɔj	marɔj
166.	fox	หมาป่า	maso pre, so pre	maso pre
167.	frog	กบ	marouʔ	marouʔ
168.	grasshopper	ตั๊กแตน	majok	majon
169.	hawk	เหยี่ยว	maglak	maglaŋ
170.	hoof	กีบ		gip
171.	horn	เขา	nik	niŋ
172.	hornet	ตัวต่อ	makaʔan	makaʔaŋ
173.	horse	ม้า	maŋprək	maŋprɔŋ
174.	leech (land leech)	ทาก	bləm	mabləm
175.	leech (water leech)	ปลิง	mablin	mabliŋ
176.	louse	เหา	mase	mase
177.	millipede	กิ้งกือ	varaiʔ	varaiʔ
178.	monkey	ลิง	mafa	mafa
179.	mosquito	ยุง	makamuʔ	makamu
180.	neighing sound (of horse)	เสียงม้า		kahe
181.	otter	นาก	mapun	makraj
182.	owl	นกฮูก	marabouʔ	nok kawmew

No.	English	Thai	Da-ang	Dara-ang
183.	peacock	นกยูง	mapra?	nok jun
184.	pig	หมู	malet	malec
185.	pigeon	นกพิราบ (ป่า)	mabluj	mabloj
186.	porcupine	เม่น	maŋ gǎh	ma ŋ giah
187.	rabbit	กระต่าย	majun	majun
188.	rat	หนู	maŋaj	maŋaj
189.	scorpion	แมงป่อง	mameŋŋw?	mameŋŋw
190.	shell	กระดอง	kou?	kou?
191.	shellfish	หอย	høj, makrah	mahøj
192.	snake	งู	han	mahaŋ
193.	spider	แมงมุม	mapuŋpjen	mapuŋpjen
194.	spider web	ใยแมงมุม	makampjen	kaŋpuŋpjen
195.	squirrel	กระรอก	mabrai?	mabrai?
196.	tail	หาง	sada	sada
197.	termite	ปลวก	mapron	maproŋ
198.	tiger	เสือ	madivaj	maravaj
199.	toad	คางคก	marou? prăt	marou? prăt
200.	trunk	งวงช้าง	ŋok	ŋwŋ
201.	turtle	เต่า	maruh	maruh
202.	tusk	งา	plai? saŋ	plaj saŋ
203.	wing	ปีก	phiak	phiaŋ
204.	worm	หนอน	mava?, valua laj	valua
7. Body parts				
205.	abdomen	ท้อง	văt	văc
206.	ankle bone	ตาตุ่ม	ŋaj plo, pi?ian plo	pi?ian plo
207.	arm (lower part)	แขน	kaha	kaha

No.	English	Thai	Da-ang	Dara-ang
208.	arm (upper part)	กล้ามเนื้อ	plom	plom
209.	armpit	รักแร้	kalew	kalew
210.	back	หลัง	katu?	katu?
211.	beard	หนวด	hik dimuh	dimouh
212.	blood	เลือด	nam	nam
213.	body	ร่างกาย	do	do
214.	boil	ฝี	bim	jaw
215.	bone	กระดูก	ka?ak	ka?aŋ
216.	brain	สมอง	hai?	hai?
217.	breast, udder	นม	pu	pu
218.	butt	ก้น	sapok	sapoŋ
219.	calf	น่อง	gəh plə	bagəh
220.	cheek	แก้ม	kala	kala
221.	chest	หน้าอก	manauh	baŋnauh
222.	chin	คาง		kuŋ kap
223.	ear	หู	ʔou?	ʔajou?
224.	elbow	ข้อศอก	guŋgəh	guŋgəh
225.	eye	ตา	ŋaj	ŋaj
226.	eye lid	หนังตา	hun ŋaj	hun ŋaj
227.	eyebrow	คิ้ว	hik ŋaj	hik ŋaj
228.	face	หน้า	na	na
229.	fat	ไขมัน	briak	briaŋ
230.	feces	ขี้	ʔiak	ʔiaŋ
231.	finger	นิ้ว	kanu	kanu
232.	finger (index)	นิ้วชี้	kanu puc	kanu saku
233.	finger (middle)	นิ้วกลาง	kanu kate	kanu kate
234.	finger (ring)	นิ้วนาง	kanu vāh	kanu ʔava
235.	finger (small)	นิ้วก้อย	kanu ve?	kanu ve?

No.	English	Thai	Da-ang	Dara-ang
236.	fist	กำปั้น	kalim	kalim
237.	flesh, meat	เนื้อ	jàk	jàŋ
238.	foot	เท้า	plɔ	ceŋ, plɔ
239.	forehead	หน้าผาก	katauh	katauh
240.	gall bladder	ดี	sɔk	sɔŋ
241.	gums	เหงือก	dɨŋǎn	ŋǎn
242.	hair	ผม	hik ɡin	hik ɡiŋ
243.	hand	มือ	dɛ	dɛ
244.	head	หัว	ɡin	ɡiŋ
245.	heart	หัวใจ		baraw
246.	heel	ส้นเท้า	kanuc	kanuc
247.	hollow of the knee	ข้อพับ	dɨɡaiʔ	dɨɡaiʔ
248.	intestines	ลำไส้	ŋɔŋ vat	ŋɔŋ vac
249.	jaw	กราม	kuŋkap	kaʔaŋ kala, kaʔaŋkuŋkap
250.	joint	ข้อ	kasɔk	kasɔŋ
251.	knee	เข่า	ɡuŋ krok, dɨɡaiʔ	ɡiŋ kroŋ
252.	knuckle	มะเขงก	saprit, kalim	sapric
253.	leg	ขา (ส่วนบน)	plɔ	plɔ
254.	lips	ริมฝีปาก	sapǎn	sapǎn
255.	liver	ตับ	kadom	kadom
256.	lung	ปอด	phuphəp	phuphəp
257.	mouth	ปาก	moc	moc
258.	nail	เล็บ	ŋ him	ŋ him
259.	neck	คอ	mek	mɛŋ
260.	nose	จมูก	ɡumuh	ɡoŋmuh
261.	palm	ฝ่ามือ	kaba dɛ	kaba dɛ
262.	pimple	สิ่ว	mun	mun

No.	English	Thai	Da-ang	Dara-ang
263.	rib	กระดูกซี่โครง	bret	kaʔaŋ brec
264.	saliva	น้ำลาย	ʔim păt	ʔim pác
265.	scar	แผลเป็น	pla	pla
266.	shoulder	ไหล่	jǎʔ	jǎʔ
267.	side (of body)	ซี่ข้าง	bret	blec
268.	skin	หนัง	hun	hun
269.	spiral	สันหลัง	san katuʔ	kaʔaŋ katuʔ
270.	stomach	กระเพาะ	bim	bim
271.	sweat	เหงื่อ	ʔim diṃuh	diṃuh
272.	tender	เสี้ยนเอ็น	sanǎʔ	sanǎʔ
273.	thigh	ต้นขา	gim ho	gim
274.	thumb	นิ้วหัวแม่มือ	kanu ma	kanu ma
275.	tongue	ลิ้น	sadǎʔ	sadǎʔ
276.	tooth	ฟัน	ɾak	ɾaŋ
277.	waist	เอว	ɲoj	ɲoj
278.	wound	แผล	dim	dim
279.	wrist	ข้อมือ	kasok de	kasɔŋ de
8. Verbs				
280.	ach, stiff	เมื่อย	ɲam, mablun	ɲam
281.	afraid	กลัว	kacua	kacua
282.	angry	โกรธ	ru	ru
283.	answer	ตอบ	viaʔ	viaʔ
284.	arrive	มาถึง	jǎm	jǎm
285.	ascend	ขึ้น	houʔ	houʔ
286.	ask	ถาม	diṃɔʔ	diṃɔʔ
287.	ask for, beg	ขอ	ɲan	ɲaŋ
288.	bark (dog)	เห่า	prouh	prouh
289.	bathe	อาบน้ำ	ta ʔim	ta ʔim

No.	English	Thai	Da-ang	Dara-ang
290.	be	เป็น	muh	muh
291.	begin	เริ่ม	cuh	cuh
292.	believe	เชื่อ	ɲim	ɲim
293.	bend down, bow	ก้ม	mu?	mu?
294.	bite	กัด	kau?	kau?
295.	blink (eyes)	กระพริบตา	kajap	kajəp ɲaj
296.	blow	เป่า	bu?	bu?
297.	boast	โอ้อวด	pikhik	pikhik
298.	boil	ต้ม	kək	kəŋ
299.	bow (in reverence, honor)	โค้งคำนับ	gip	gip
300.	born	เกิด	gə?	gə?
301.	borrow	ยืม	vaj	vaj
302.	break	หัก	kabək	kabək
303.	breathe	หายใจ	phəm	hək phəm
304.	bring food to old people (who stay at the temple)	ถวายข้าววัด	lu	lu
305.	build, do, make	ทำ	bok	boŋ
306.	bump against	ชน	katuh, kadə?, də?, kabuj	katuh
307.	burn	เผา	dou?	dou?
308.	burp	เรอ	ʔəʔəm	ʔəʔəm
309.	burry	ฝัง	dip, di?	dip
310.	burst into flames	ไฟลุก	kuh	kuh
311.	buy	ซื้อ	cəh	cəh
312.	call	เรียก	dai?	dai?
313.	carry from one place to another	ย้าย	to	to
314.	carry in the arms	อุ้ม	ɲia?	ɲia?

No.	English	Thai	Da-ang	Dara-ang
315.	carry on one's head	เทิน	giŋ gua, guŋ gua	khliɸ
316.	carry, strapped to one's forehead (using bag, basket)	พาดหน้าผาก	păh	păh
317.	carry on the shoulder	แบก	งว?	งว?
318.	carry over the shoulder	สะพาย	ŋai?	ŋai?
319.	catch	จับ (ปลา)	mət	mət
320.	chase out	ไล่	กวน	กวน
321.	cheat, lie	โกหก	kalo	kalo
322.	chew	เคี้ยว	saglan	saklap
323.	choose	เลือก	rauh	rauh
324.	chop	สับ	jit	jic
325.	clap	ปรบมือ	katha?, katha? de	katha?
326.	clench (hand)	บีบมือ	kaniem	kaniem
327.	close	ปิด	kabi?	kabi?
328.	collapse	ถล่ม	diɣlauh	diɣlauh
329.	comb	หวี	căh	căh
330.	combine	รวม	kaju?	kaju
331.	come	มา	tăh	tăh
332.	compete	แข่ง	kakhen	kakheɸ
333.	connect	ต่อ เชื่อม	kadu?	kadu?
334.	cook ¹	หุง	jun	jun
335.	cook ²	หุง	dăk	dăŋ
336.	cook in the ashes	หมก	gim	gim
337.	cough	ไอ	ka?ou?	ka?ou?
338.	count	นับ	tih	tih

No.	English	Thai	Da-ang	Dara-ang
339.	cover body	ห่ม	plik, m pou?	sablik
340.	cover up	คลุม		pun
341.	crawl	คลาน	mən	mən
342.	crouch	หมอบ	katăp	katăp
343.	crow,coo	ขัน	katuan	katuan
344.	curse	สาบแช่ง		dəŋ
345.	cut	ตัด	kăp	kăp
346.	cut apart	ฟัน	dəp	dəp
347.	cut grass	ตัดหญ้า	douh	douh
348.	cut off	ตัดกิ่งไม้	ŋouh	ŋouh
349.	dance	เต้น	ga	ga
350.	descend	ลง	lok	loŋ
351.	die	ตาย	jăm	jăm
352.	dig	ขุด	găh	găh
353.	dip into hot water	ลวก	bluh	bluh
354.	disappear	หาย	raj	raj
355.	dive	ดำน้ำ		lam ?im
356.	divide	แบ่ง	kasak	kasəŋ
357.	doubt, suspect	สงสัย	thak	thaŋ
358.	drink	ดื่ม	diak	dian
359.	drip	หยด	cə?	cə?
360.	drop	หล่น	răh	răh
361.	dry	ตากแห้ง	raj	raj
362.	dye	ย้อม	phauh	phauh
363.	eat	กิน (ข้าว)	hom, hom bom, hap maga	hom
364.	embrace	กอด	ŋiam	ŋiam

No.	English	Thai	Da-ang	Dara-ang
365.	enter	เข้า	lip	lip
366.	escape	หนี	to	to
367.	exchange	แลกเปลี่ยน	kaplut	kaplu?
368.	explode	ระเบิด	matuh	matuh
369.	extinguish	ดับไฟ	jät, bjät	jät
370.	fall, to drop	ตก	couh	coh
371.	fall down	หกล้ม	keih	keih
372.	fall out (hair, feather)	(ผม) ร่วง	n douh	n douh
373.	fan, beckon	พัด, โบก	jăp	jăp
374.	fart	ตด	phăm	phăm
375.	fear, frightened	กลัว		jo
376.	feed	เลี้ยง	hiak	hian
377.	feel dizzy	เวียนหัว	băt	băt
378.	fetch water	ตักน้ำ	tau?	tau?
379.	fight	ต่อสู้	kaluc, kagouh	lajdih
380.	find, seek	หา	răt	rec
381.	fix	ซ่อม	m praj	m praj
382.	float	ลอย		bre
383.	flow	ไหล	?im l̥e	l̥e
384.	fly	บิน	băn	băn
385.	fold in half	พับ	diğăp	diğăp
386.	forget	ลืม	piw	piw
387.	fry	ทอด, ผัด	kho	kho
388.	get, be able	ได้	pən	pən
389.	get up, stand up	ลุกขึ้น	jit	jic

No.	English	Thai	Da-ang	Dara-ang
390.	give	ให้	dua, taih	dua, taih
391.	give discount	ลดราคา	jom	jom
392.	give up	ยอมแพ้	gom, tɕhim	gom
393.	go, walk	ไป เดิน	haw	haw
394.	go about	เที่ยว	le	le
395.	go out, come out	ออก	leih	leih
396.	grind	บด	blac	blac
397.	grip	คืบ	kakiap	kakiap
398.	guess	เดา	lam	lam
399.	hack off at an angle (not straight through)	ถาก	dauh	dauh
400.	hack with a hoe	ขุดด้วยจอบ	lou?	lou?
401.	hang	แขวน	fau?, hɔj	fau?, hɔj
402.	hatch	ปักไข่	kăh	kăh
403.	hate	เกลียด	ka?ih	ka?ih
404.	have	มี	măh	măh
405.	have intercourse	ร่วมเพศ	lakaci?, kapit	lakaci?
406.	hear	ได้ยิน	jə	thom
407.	help	ช่วย	cɔj, ginɲu	cɔj
408.	hide	ซ่อน	khriak	khriaŋ
409.	hit	ตี	măh	măh
410.	hold in hand	ถือ	gok	goŋ
411.	hold (in the teeth or beak)	คาบ	kap	kap

No.	English	Thai	Da-ang	Dara-ang
412.	hunt	ล่า	le khe pre, lip pre	le pre
413.	hurry	รีบ	kato	kato, kare?
414.	invite	เชิญชวน นิมนต์	bak, dai?	baŋ, dai?
415.	jump, hop	กระโดด	giŋkrăp	cakrăp
416.	jump down, jump into	กระโดดลง	buŋ bluh, bjuah	pluŋpluŋ
417.	jump up	กระโดดขึ้น	dăn	den
418.	kick	เตะ	bauh	bauh
419.	kill	ฆ่า	ŋauh	ŋauh
420.	kiss	จูบ	ʔuh	ʔuh
421.	kneel	คุกเข่า		khruŋ khro
422.	knock or strike with knuckle	เขก	saprit	sapric
423.	know	รู้	năp	năp
424.	laugh	หัวเราะ	kaŋăh	kaŋăh
425.	launder	ซักผ้า	lăh	lăh
426.	lay brick	ก่ออิฐ	katai?	kataj
427.	lay eggs	ออกไข่	pən	pən
428.	lead by hand	จูง	tăn	tăn
429.	lean against	พิง	ne	ne
430.	lean to	อิง	kiak	kiaŋ
431.	lick	เลีย	lia?	lia?
432.	light (fire)	เป่าไฟ	bu? ŋo	bu?
433.	like	ชอบ	vo	vo
434.	listen to	ฟัง	thom	thom
435.	look	ดู		ŋo?
436.	look after	เลี้ยงดู	jo?	jo?

No.	English	Thai	Da-ang	Dara-ang
437.	look at	มอง	joʔ	joʔ
438.	look up	เงย	sakǎh	sakǎh
439.	loosen, untie	แก้ (เชือก)	gauh	gauh
440.	loosen the ground	พรวน (ดิน)	glouʔ, rih	glouʔ
441.	love	รัก	ʔik	ʔiŋ, rɔk
442.	marry	แต่งงาน	khăt	khăt
443.	make sound, growl	ฮัม	hăm	hăm
444.	measure	วัด	gɔ	gɔ
445.	meet	พบ	katun, jə	katun, lajjə
446.	melt	ละลาย	lac	lac
447.	miss	คิดถึง	diken	diken
448.	mixed	ผสม	kavə	kasu, kavə (to stir well), kasu kavə (to mix)
449.	move, wag	เคลื่อนย้าย	kathouʔ	kathouʔ
450.	open	เปิด	vǎh	vǎh
451.	order	สั่ง	dăm	dăm
452.	pass	ผ่าน	kalouh	kalauh
453.	pass by, overtake	เลย	puan	puan
454.	peel (with hand)	ปอกด้วยมือ	liaʔ	liəʔ
455.	peel (with knife)	ปอกด้วยมีด	hǎʔ	hǎʔ
456.	pen up, confine a cage	ขัง	khroʔk	khroŋ
457.	persuade	ชวน	daiʔ	daiʔ
458.	pick by pinching	เด็ด	băt	băt

No.	English	Thai	Da-ang	Dara-ang
459.	pick fruit	เก็บผลไม้	băt, thon	băt
460.	pick up	รับ	cauh	cauh
461.	pierce	แทง	bluh	sat
462.	pinch with finger	หยิก	sakăt	sakăt
463.	pity	สงสาร	kave	kave
464.	place	วาง	?un	?un, bleih (to leave sth. behind)
465.	plant	ปลูก	săm	săm
466.	play ¹	เล่น	dilaw	dilaw
467.	play ²	เล่น		brac
468.	plough	ไถ	the na	the
469.	point at	ชี้	saku	saku
470.	pound	ตำ	duh	duh
471.	pray	สวดมนต์	sakhə	tauh tham
472.	press on	กด	nia?, thi?	nia?
473.	pull	ดึง	di?, kadï?	di?
474.	pump air	สูบลม	phruh, pruh	phruh
475.	punch a hole	เจาะ	bluh	bluh
476.	push	ผลัก	jun	jun
477.	put down	วาง	bleih	?un
478.	put into	ใส่	hăp	hăp
479.	put on, wear (cloth)	สวม (เสื้อผ้า)	chip	chip
480.	put out (a fire)	ดับไฟ	bjăt	bjăt
481.	raise	ยก	cou?	cou?
482.	reach into (pocket, bag)	ล้วง		cok

No.	English	Thai	Da-ang	Dara-ang
483.	read	อ่าน	tih	tih
484.	redeem, pay a ransom	ไถ่	thu?	thuk, thu?
485.	remain	เหลือ	kaloj	kaloj
486.	remember	จำ	no	no
487.	rest	พักผ่อน	diəw	diəw
488.	return	กลับ	vǎn, viw	veŋ
489.	ride	ขี่	pau?	pau?
490.	roast over the fire	เผา	dək	dəŋ
491.	roll	พลิก	kablia?	kabria?
492.	roll over	ม้วน	kaɔj	kaɔj
493.	roll up	มวน		saləj
494.	roof	มุง (หลังคา)	tǎp	tǎp
495.	rub hard with both hands	บีบมือ	sabw?	sabw
496.	rub with a finger	ถูนิ้ว	thuthit	thuthic
497.	run	วิ่ง	kablet	tə (to escape)
498.	saw	เลื่อย	kri?, lələ	lə
499.	scatter	กระจาย	brăt	brăc
500.	scold	ด่า	?eih	?eih
501.	scoop up with two hands	กอบ	katom	katom
502.	scrape	เกา		gua?
503.	scrape (fishscale)	ขูด (เกล็ด)	ga?	ga?
504.	scratch	เกา	bou?	bou?
505.	scratch up	แคะ, แคะ	jǎh	jǎh
506.	scratch with craws	ข่วน	bou?	bou?
507.	search	ค้น (หา)	rǎh	rǎh
508.	see	เห็น	jə	jə

No.	English	Thai	Da-ang	Dara-ang
509.	sell	ขาย	jək	jəŋ
510.	send	ส่ง	təj	təj
511.	sew	เย็บ	cin, cin	ciŋ
512.	shake	สั่น	mavăt	mavăt
513.	shake, rock	เขย่า	kukhruh, dijuh	rə
514.	share (things)	แบ่ง	kasak	kaŋəŋ
515.	sharpen	ลับ	laʔ	laʔ
516.	shave	โกน	gaʔ	gaʔ
517.	shine on	ส่อง (แสง)	thək	thəŋ
518.	shoot	ยิง	băn	băŋ
519.	shout	ตะโกน	dăt	dăt
520.	sing	ร้องเพลง	păt məw	tauħ məw
521.	sit	นั่ง	tuc	tuc
522.	sit with legs crossed	นั่งขัดสมาธิ	kaviak, kaviaʔ η krok, khrɪp khro, dijom	kavianəŋ
523.	skin (with knife)	ถลก (หนัง)	liaʔ hun, liaʔ kouʔ	liaʔ hun
524.	sleep	นอน	ʔiʔ	ʔiʔ
525.	slice	หั่น, ปาด	suaʔ	suaʔ
526.	slice into small strips	ซอย	pəʔ	pəʔ
527.	slip	ลื่น	gliaʔ	gliaʔ
528.	smell	ดม	ŋəʔ	ŋəʔ
529.	smile	ยิ้ม	ʔew	ʔew
530.	speak	พูด	kalak, tauħ, grouh	kaŋəŋ, grouh

No.	English	Thai	Da-ang	Dara-ang
531.	spit	ถ่ม (น้ำลาย)	păt	păc
532.	splash	น้ำกระจ่าย	kachăt	kachăc
533.	split with a knife	ผ่าด้วยมีด	kaplauh, kapla?	kaplauh, kapla?
534.	split with an axe	ผ่าด้วยขวาน	dăh	dăh
535.	spread apart	กางขา	katăh	katăh
536.	spread out	บาน	blăh	blăh
537.	sprinkle (water)	รดน้ำ/พรมน้ำ	khrauh	khrauh
538.	squat on the floor	หมอบ		khukhraw
539.	squeeze	บีด	nia?, thi?	nia?
540.	stab	แทง	săt	săt
541.	stand	ยืน	cok	cøj
542.	starve	(หิว) อด	kaplan, ?ăt	kaplan
543.	stay, to live	อยู่	køj	køj
544.	steal	ขโมย	pra	pra
545.	sting	ผึ้งต่อย	huc	huc
546.	stop, quit	หยุด	cu	cu
547.	stretch	ยืด	kaŋa?	kajɨ?
548.	strike downwards, stuff	ทุบ	katih	katih
549.	stuck in the throat	ติดคอ	hau?	hau?
550.	suck	ดูด	ŋu?	ŋu?
551.	swallow	กลืน	mek	meŋ
552.	swarm around	ดอม	kadim, bip	kadim
553.	sweep	กวาด	bih	bih
554.	swim	ว่ายน้ำ	vih ?im	lam ?im
555.	swing	แกว่ง (ชิงช้า)	buŋbuk	buŋbuŋ, m buŋ

No.	English	Thai	Da-ang	Dara-ang
556.	take	เอา	dǎh	dǎh
557.	take off (cloth)	ถอด (เสื้อผ้า)	buc	buc
558.	talk together	คุยกัน	lamuan, muan	kamuan
559.	teach	สอน	mano	mano
560.	tear	ฉีก	jac	kajac
561.	tie	ผูก	pǎk	pǎk
562.	tie the hair up, make the hair into a knot	มวยผม	sagloc	sagloc
563.	think	คิด (นึก)	jin ja	sapha
564.	throw	ขว้าง	vin	vǎn
565.	throw away	โยนทิ้ง	pǎʔ	pǎʔ, paʔven
566.	throw water	รดน้ำ	rik	rik
567.	touch	แตะ	də	də
568.	trap	ดัก	karǎp	karǎp
569.	turn inside out, turn over	กลับด้าน พลิก	kabliaʔ	kabliaʔ
570.	twist	พันเชือก	gian	gian
571.	urinate	ฉี่	chi	chi
572.	use	ใช้	ta	ta
573.	vomit	อ้วก	hə	hə
574.	wait	รอ	bə	bə
575.	wake up	ตื่น	ŋ səh	ŋ səh
576.	wake someone up	ปลุก	bjit	kic
577.	want	อยาก	si	si
578.	warm at a fire	ผิง	vaʔ	vaʔ
579.	wash	ล้าง	baj	baj
580.	wash (dishes)	ล้างจาน	khoc	khoc
581.	wash (face)	ล้างหน้า	dɨləuh	dɨləuh

No.	English	Thai	Da-ang	Dara-ang
582.	wear	ใส่ (ชุด)	ta	ta
583.	weave	ทอผ้า	dau?	dau?
584.	weave with grass or cane	สาน	dan	dan
585.	weep, cry	ร้องไห้	jam	jam
586.	whisper	กระซิบ	kalaŋ dɪtɛ?	puphap
587.	whistle	พิวปาก	kahoc	kahoc
588.	wipe	เช็ด	khu?	khu?
589.	wither	เหี่ยว	hia?	hia?
590.	work	ทำงาน	ran	raŋ
591.	worship	ไหว้	krip	krip
592.	wrap around	ห่อ	kabǎn	kabǎn
593.	write, draw	เขียน, วาด	dɛm	dɛm
594.	yawn	หาว	ɟap	ɟap
9. Human				
595.	aunt, younger sister of mother or father	พี่สาวและน้องสาว ของพ่อ	gǎn,	gǎn
596.	Burmese	คนพม่า	m pran	danpran, m pran
597.	child	เด็ก	gɔn	gɔn
598.	Chinese	คนจีน	dakhe	dakhe
599.	father	พ่อ	gun	gun
600.	friend	เพื่อน		gik
601.	grandchild	หลาน	lan	lan
602.	grandfather, older man	ปู่ ตา	da	da
603.	grandmother, older female	ย่า ยาย	ja	ja
604.	guest	แขก		khec
605.	headman	ผู้ใหญ่บ้าน	datak	dataŋ

No.	English	Thai	Da-ang	Dara-ang
606.	husband, man, male	สามี	ʔimaj	ʔimaj
607.	killer	ฆาตกร	ʔiŋauh	ʔiŋauh
608.	lover	คนรัก	paw	paw
609.	monk	พระ	khaŋǎn	kaŋǎn
610.	mother	แม่	ma	ma
611.	name	ชื่อ	ci	ci
612.	older brother or older sister	พี่	ʔikăt	ʔikăt
613.	orphaned	ลูกกำพร้า	gɔn saprăh	gɔn saprăh
614.	Palaung	ปะหล่อง	daʔak	daraʔaŋ
615.	person, human	คน	ʔi, duʔi	duʔi
616.	relatives	ญาติ	mave, benok	binɔŋ vave
617.	slave	ทาส	mɔj	dabe
618.	Thai	ไทย	dasiam	dathe
619.	thief	ขโมย	dapra	dapra
620.	twins	ฝาแฝด	gɔn rap	gɔn rap
621.	uncle, father-in- law	พี่ชายและน้องชาย ของแม่	bə	bə
622.	widow	แม่หม้าย	ja saprăh	ja saprăh
623.	young women	หญิงสาว	dəbja	dəbja
624.	wife, woman	ภรรยา	ʔibǎn	ʔibǎn
625.	younger sibling	น้อง	va	va
10. Pronouns				
626.	he (3 rd person sg.)	เขา	ʔǎn	ʔǎn
627.	I	ฉัน	ʔo	ʔo
628.	they (dual)	พวกเขา 2 คน	gaj	gaj
629.	they (3 rd person pl.)	พวกเขาหลายคน	ge	ge

No.	English	Thai	Da-ang	Dara-ang
630.	we (dual incl.)	เรา 2 คน รวมคนฟัง	ʔaj	ʔaj
631.	we (dual excl.)	เรา 2 คน ไม่รวมคนฟัง	jaj	jaj
632.	we (pl. incl.)	เราหลายคน รวมคนฟัง	ʔe	ʔe
633.	we (pl. excl.)	เราหลายคน ไม่รวมคนฟัง	je	je
634.	you (sg.)	เธอ	me	mɛ
635.	you (dual)	เธอ 2 คน	baj	baj
636.	you (pl.)	เธอหลายคน	be	be
11. Material culture (things/ tools/ clothes)				
637.	arrow	ลูกศร	bla	bla
638.	axe	ขวาน	məj	məj
639.	bag ¹	ย่าม	hu	hu
640.	bag ²	ย่าม	kabjaw	kabjaw
641.	bamboo flute (palaung music instrument)	ปี่น้ำเต้า	vɔ	vɔ
642.	basket ¹	ตระกร้า	krik	krik
643.	basket ² (small basket)	ตระกร้า	sablouh	sablouh
644.	beads (used for woman's head-dress)	ลูกปัด	ɳak	ɳaŋ
645.	bed	เตียง	kachok	kachon
646.	belt	เข็มขัด	sɛʔ, seʔ	sɛʔ
647.	blanket	ผ้าห่ม	hip	hip
648.	blouse	เสื้อผู้หญิง	salop, saloʔ	salop

No.	English	Thai	Da-ang	Dara-ang
649.	boat	เรือ	rə	rə
650.	book	หนังสือ	băp	băp, pai?
651.	bottle	ขวด	kapɔ	kapɔ
652.	bowl	ถ้วย	salai? hap	salaj
653.	box	กล่อง	cadək	cadək
654.	bracelet	กำไล	kan de	kan de
655.	broom	ไม้กวาด	m bih	m bih
656.	bullet	ลูกปืน	ble sana?	ble sana?
657.	button	กระดุม	ble pe	ble pe
658.	cage	หีบ	sablouh	sablouh (basket)
659.	camera	กล้องถ่ายรูป	majăt	maŋ pɔpuŋ
660.	candle	เทียน	den	den
661.	cards	ไพ่	phaj	phaj
662.	chisel	สิ่ว	m blouh	m blouh
663.	chopping board	เขียง	ŋ gouh	ŋ gouh
664.	cigarette	บุหรี่		salik
665.	clock	นาฬิกา	nari	nari
666.	cloth (piece of cloth)	ผ้า	bek	bik
667.	cloths	เสื้อผ้า	khrik	khriŋ
668.	coal	ถ่าน	kasauh	kasauh
669.	comb (n.)	หวี	ŋ cǎh	ŋ cǎh
670.	container	ถังใส่น้ำ	puk	puŋ (water container)
671.	cord/rope	เชือก	vǎn	vǎn
672.	crossbow	หน้าไม้	?ǎ?	?ǎ?
673.	cymbal	ฉาบ	chen	cheŋ
674.	drum	กลอง	grik	griŋ
675.	earring	ต่างหู	bijou?	bejou?

No.	English	Thai	Da-ang	Dara-ang
676.	firewood	ฟืน	he	he
677.	flash light	ไฟฉาย	masania?	phaj tha?
678.	flat bamboo tray	กระด้ง	mana	mana
679.	flat gong	กั๋งสาด	mavew	mavew
680.	glass	แก้วน้ำ	salai?	van mu
681.	gong	ฆ้อง	gumok	gunṭmoṅ
682.	guitar (palaung music instrument)	พิณ	dik	diṅ
683.	gun	ปืน	sana?	sana?
684.	hammer	ฆ้อน	mi de	məj de
685.	hat	หมวก	magin	magin
686.	hoe	จอบ	n lou?	n lou?
687.	kettle	กาต้มน้ำ	kim	kim
688.	key, lock	กุญแจ	lasiak, malouh	malauh
689.	knife	มีด (กลาง)	pua?	mapua?
690.	knife (razor)	มีดเล็กปลายแหลม	?atim	?atim
691.	knife (large knife)	มีดใหญ่ (อีโต้)	paduk	mapua? duṅ
692.	ladle, stick used for stirring food while cooking	ทัพพี	lă?	lă?
693.	letter	จดหมาย	pai?	pai?
694.	lid, cover	ฝา	sablik	sabrik
695.	mark	เครื่องหมาย	maj	maj
696.	mat	เสื่อ (เสื่อ)	m bew	m bew
697.	matches	ไม้ขีด	makriah	?ep ṅo
698.	medicine	ยา	sanăm	sanăm
699.	mortar	ครก	m bo, katouh (small mortar)	m bo

No.	English	Thai	Da-ang	Dara-ang
700.	necklace	สร้อยคอ	sica rɔj	van khriw
701.	needle	เข็ม	malăt	malăc
702.	pan	กระทะ	makhak	makhaŋ
703.	pants	กางเกง	sala	sala
704.	pestle	สาก	glɔŋ duh, ŋ kre	ŋ kre
705.	photograph	รูปภาพ	ʔarip	thapuŋ
706.	pillow	หมอน	makəm	makəm
707.	pipe	ท่อ	makaʔouʔ	makalouʔ
708.	plate	จาน	salaiʔ	salaj
709.	pot ¹	หม้อหนึ่ง	glaw	glaw
710.	pot ²	หม้อ	kalouʔ, kabo	kalouʔ
711.	ring	แหวน	sikanu	sikanu
712.	round thing	ก้อน	kaluan	kaluan
713.	sandals	รองเท้าแตะ		sok khlep
714.	scissors	กรรไกร	kre	kam re
715.	shirt	เสื้อผู้ชาย	sato	sato
716.	sickle	เคียว	ŋ vaiʔ	ŋ vaiʔ
717.	skirt	ผ้าถุง	glak	glaŋ
718.	song	เพลง	mɔ	mɔ
719.	spear	หอก	n liah	bla liah
720.	stand, prop	เก้าอี้	dɪŋouh	m baŋ (chair)
721.	stick	ไม้เรียว	m phiaʔ	m phiaʔ
722.	table	โต๊ะ	matin, khouʔ	matij
723.	things	สิ่งของ	kro	kro
724.	trap	กับดัก	ʔaduh	ʔaduh
725.	trap (sling trap)	กับดัก (สาย)	sadiaʔ	sadiaʔ
726.	turban	ผ้าโศกหัว	kamaiʔ	kamaiʔ

No.	English	Thai	Da-ang	Dara-ang
727.	whet stone	หินลับมีด	mala?	ṃaw la?
12. Place/house				
728.	beam of the roof	คาน ็ื่อ	manăk	manăk
729.	bridge	สะพาน	kabik	kabik
730.	corner	มุม	katou?	katou?
731.	coffin	โลงศพ	kalai?, jadək	kalai?
732.	door	ประตู	malouh	malouh
733.	fence	รั้ว (ไม้ไฟ)	lok	loṅ
734.	field	สวน (เชิงเขา)	man	man
735.	fireplace	เตาไฟ	kafak	kafaṅ
736.	grave yard	ป่าช้า	barew	barew
737.	house	บ้าน	kak	kaṅ
738.	hut	กระท่อม	thip	thip
739.	land	ที่ดิน	?oṅ kak	?oṅ
740.	monastery	วัด	ʃok	ʃoṅ
741.	pen	ปากกา		kapim
742.	post, pole	เสา	ro:k	roṅ
743.	rice field	ทุ่งนา	na	doṅ na
744.	road, path	ถนน	n ten	n teṅ
745.	roof	หลังคา	katu?	katu?
746.	school	โรงเรียน	ʃoṅ	hoṅ hen
747.	shelf	ชั้นวาง	ṅ jak	ṅ jaṅ
748.	sieve above the fireplace	ตะแกรงเหนือเตาไฟ	kabəj, n ruh	kabəj
749.	stairs	บันได	n tek	n teṅ
750.	tomb	หลุมศพ	ṅ ?uan	ṅ ?uan
751.	trap	กับดัก	kapim	kapim
752.	veranda	ระเบียง	n grah	grah

No.	English	Thai	Da-ang	Dara-ang
753.	village	หมู่บ้าน	rov	rov
754.	wall	ผนัง กำแพง	rek	reŋ
13. Deitics and Grammatical words				
755.	almost, quite	เกือบ	dihoc	ram
756.	already, finished	เสร็จ แล้ว	hoc	hoc
757.	always	เสมอ	se	se
758.	and	และ กับ	gaj	gaj
759.	another, once more	อีก	pɔlac	pɔ, pɔɛ?
760.	early	เข้า เร็ว ก่อน	cew, cew hoc	cew
761.	exactly, specific	ชัด	bri	bri
762.	fast, quick	เร็ว	he	he
763.	if	ถ้า		se
764.	long (time)	นาน	len	len
765.	not ¹	ไม่	ɣǎw	ɣǎw
766.	not ²	ไม่	tu	tu
767.	too much	มาก	tək	tək
768.	used to	เคย	dəm	dəm
769.	while, when	เมื่อ ตอน		na, sɔɔ?
770.	with	กับ	dop, kado?	dop
771.	(not) yet	ยัง	nam	nam
14. Adjectives				
772.	all gone	หมด	toc	toc
773.	all the way through	ทะลุ		lu?
774.	astringent	ฝาด		brət
775.	bad	เลว	ɣǎw mɔm, ɣǎw kja?	ɣǎw mɔm, tu mɔm

No.	English	Thai	Da-ang	Dara-ang
776.	beautiful	สวย	chi?	chi?
777.	big	ใหญ่	tak	taŋ
778.	bitter	ขม	sai? sɔk	ซอŋ
779.	blind	บอด	ŋaj ʔap	ŋaj ʔap
780.	bloom	บาน	bräh	bräh
781.	boiling	เดือด	sanäm	sanäm
782.	bored	เบื่อ	pə	pə
783.	bright	สว่าง	blak	blaŋ
784.	broken	แตก หรือ หัก	kalac, kabak	kalac
785.	bud	ตูม	dim	dim
786.	cheap	ถูก	khre	khre
787.	clear	ใส	saŋa	saŋa
788.	clever, smart	ฉลาด		lo:k
789.	cold	หนาว	gät	gät
790.	cool	เย็น	gia?	gia?
791.	cracked	ร้าว	di:grăp	di:grăp
792.	crooked, winding	คดงอ	gou?, gou? gai?	gou?, gai?, gou? gai?
793.	cross-eyes	(ตา) เหล่	naj sabli?	ŋaj sabli?
794.	deaf	(หู) หนวก	ka?aw, kadăn	ka?aw
795.	delicious	อร่อย	saŋaih	saŋaih
796.	difficult	ยาก	ŋap	ŋap
797.	diligent	ขยัน	ʔon	ʔon
798.	dirty	สกปรก	katih	kadih
799.	drunk	เมา	jei?	jei?
800.	dry	แห้ง	kahauh, hen	heŋ
801.	dry, withered	เหี่ยว	kahauh	kahauh

No.	English	Thai	Da-ang	Dara-ang
802.	durable	ทน	gǎk	gǎŋ
803.	empty	ว่าง		blo
804.	expensive	แพง	ŋauh	ŋauh
805.	far	ไกล	n tok	toŋ
806.	fat	อ้วน	glan	glap
807.	female (animal)	ตัวเมีย (ไก่ตัวเมีย)	ʔajak	ʔajap
808.	fragrant	หอม	h̄un	h̄un
809.	full	เต็ม	nouʔ	nouʔ
810.	full, satiated	อิ่ม	phe	phe
811.	good	ดี	he gjaʔ, sakhja, m̄om	boʔ, m̄om, sakhja
812.	hard	แข็ง	plom, khǎʔ	plom
813.	heavy	หนัก	cǎn	cǎn
814.	hot	ร้อน	sudaʔ	sodaʔ
815.	humpback	หลังโก่ง	katuʔ guh	kaguh
816.	hunched up, curled up	งอ, โคนิ่ง	kavǎk	kavǎŋ, gouʔ
817.	hungry	หิว	kaplan	kaprap
818.	itchy	คัน	sadun	sadun
819.	jealous	อิจฉา	l̄aiʔ, tul̄aiʔ	l̄aiʔ
820.	late	ช้า	nan	nan
821.	lazy	ขี้เกียจ	kran	kran
822.	leak	รั่ว	rɔc	rɔc
823.	light (weight, noise)	เบา	ŋ cə	ŋ cə
824.	live	มีชีวิต	ʔim	ʔim
825.	long	ยาว	tok	toŋ

No.	English	Thai	Da-ang	Dara-ang
826.	murky of water	(น้ำ) ขุ่น	?im katun	katun
827.	narrow	แคบ	kakhia?	kakhia?
828.	near	ใกล้	khria?	khria?
829.	new	ใหม่	kamaj	kamaj
830.	numb	ชา	mapran	mapraŋ
831.	old-aged	แก่	kăt	kăt
832.	pointed	แหลม	băt	băc
833.	poor	จน	phlan	phlan
834.	quiet	เงียบ	jen, ɲək	jen, ɲəŋ
835.	raw	ดิบ	?im	?im
836.	remaining, left over	เหลือ	kaloj	kaloj
837.	rich	รวย	khřăm	khřăm
838.	right	ถูกต้อง	kaje	kaɲa
839.	ripe	สุก	sin	sin
840.	rotten	เน่า	?ăm	?ăm
841.	rough	ขรุขระ	khă?, saciaw	khă?
842.	round	กลม	kalăk	kalăŋ
843.	rowdy	ร้าย	haj	haj
844.	sad	เศร้า	glə	glə
845.	salty	เค็ม	sək	səŋ
846.	same	เหมือน	kaŋen	ŋen, lakaŋen
847.	scraped	ถูออก	ŋ kli?	ŋ kli?
848.	sharp	คม	lăm	lăm
849.	shine, sparkle	กระพริบ	mabriw	mabriw
850.	short (height)	เตี้ย	tiam	tiam
851.	short (length)	สั้น	tiam	tiam
852.	shy	อาย	saj	saj

No.	English	Thai	Da-ang	Dara-ang
853.	sick, hurt, pain	เจ็บ ปวด	sɔ	sɔ
854.	skinny	ผอม		khiah
855.	slow	ช้า	kre	kre
856.	small	เล็ก	n tɛʔ	diteʔ
857.	smooth	เรียบ	khjɔ	lɔm
858.	sour	เปรี้ยว	prak	praŋ
859.	spicy	เผ็ด	ʔaʔ	ʔaʔ
860.	steep	ชัน	m bǎʔ	baŋbǎʔ
861.	stingy	จู้เหนียว	griaʔ	griaʔ
862.	straight	ตรง	ŋ si	ŋ si
863.	stupid	โง่	rə	rə
864.	sweet	หวาน	ŋam	ŋam
865.	swollen	บวม	ʔauh	ʔauh
866.	tall	สูง	ca	ca
867.	tame	เชื่อง		ŋɛ
868.	tasteless	จืด จาง	ple	ple
869.	teared	ขาด	kapjac	kapjac
870.	thick	หนา	hǎt	hǎt
871.	thin	บาง	dɪrɛw	dɪrɛw
872.	tired	เหนื่อย	nun	nun
873.	torn	(เชือก) ขาด	kadǎt	kadǎt
874.	wet	เปียก	ʔam ɲaʔ	m ɲaʔ
875.	wide	กว้าง	vauh, kavauh	vauh, kavah
15. Colors				
876.	black	ดำ	vɔk	vɔŋ
877.	blue	น้ำเงิน	khɔk	khɔŋ
878.	green	เขียว	ŋian	ŋian
879.	red	แดง	ren	rɛŋ

No.	English	Thai	Da-ang	Dara-ang
880.	white	ขาว	luj	luj
881.	yellow	เหลือง	n den	deɲ
16. Numbers				
882.	one	หนึ่ง	ʔu, ləih	ʔu, ləih
883.	two	สอง	haʔa	ʔa
884.	three	สาม	ʔoj	ʔoj
885.	four	สี่	m phuan	m phuan
886.	five	ห้า	m phǎn	m phǎn
887.	six	หก	n do	n do
888.	seven	เจ็ด	m bu	m bu
889.	eight	แปด	n da	n da
890.	nine	เก้า	n dim	n dim
891.	ten	สิบ	gə	gə
892.	twenty	ยี่สิบ	ʔa gə	ʔa gə
893.	hundred	ร้อย	majauh	majauh
894.	ten thousand	หมื่น	m̩in, ʔu m̩in	m̩in
17. Quantifiers				
895.	all	ทั้งหมด		toc, b̩toc
896.	as much as	น้อย		m prec
897.	every	ทุกๆ	d̩on	d̩on
898.	few	น้อย	ʔitɕiak, m pret	ʔicak
899.	little, some	บ้าง	kalauh, ʔiciak	kalauh
900.	many	มาก	k̩in	k̩in
901.	more than, exceed	มากกว่า	ləm	ləm
902.	some	บาง		maɲ
903.	too much	มากๆ	thuan	thuan

No.	English	Thai	Da-ang	Dara-ang
18. Question words				
904.	how	อย่างไร	pajmɔ	pajmɔ
905.	how many	เท่าไร	ṅaṅ, khemɔ	ṅaṅ
906.	what?	อะไร	mase	mase
907.	when?	เมื่อไร		dɔmɔ
908.	where?	ที่ไหน	simɔ	dɪmɔ
909.	who?	ใคร	ʔase	ʔase
19. Classifiers				
910.	animal	ตัว	do	do
911.	bunch of flowers	ช่อ	m pok	ṅ jonṅ
912.	bunch of banana	หวี	kaba	kaba
913.	group of people or animals	ฝูง	phik	phij
914.	long thing	ลำ	ṅok	ṅonṅ
915.	lump	ก้อน	dɪluan	dɪkluan
916.	pair	คู่	dɪbram	dɪbram
917.	person	คน	vi	vi
918.	piece (general)	อัน	bok	bonṅ
919.	piece of something which is unmarred	ลำ	lun	lun
920.	pile	กอง	pim	pim
20. Unit of measurement				
921.	arm's length	วา	dăp	dăp
922.	cubit	ศอก	kanih	kanih
923.	palm span	คืบ	kasan	kasan

BIOGRAPHY

NAME	Mr. Supakit Buakaw
DATE OF BIRTH	31 October 1981
PLACE OF BIRTH	Ubon Ratchathani, Thailand
INSTITUTIONS ATTENDED	Srinakharinwirot University, 2001-2004 Bachelor of Science (Geography) Minor: Linguistics Mahidol University, 2005-2012 Doctor of Philosophy (Linguistics)
RESEARCH GRANTS	Thailand Research Fund (TRF) through the Royal Golden Jubilee Ph.D. Program (Grant No. PHD/00302550)
HOME ADDRESS	96 M. 19 Nonsawang Kudkhaopun Ubon Ratchathani 34270, Thailand Tel. (+66) 45-383-033 E-mail: supakitbuakaw@gmail.com