LANGUAGE IDENTIFICATION BY TONES : LAHU, AKHA, AND KAREN

ATTASITH BOONSAWASD

A THESIS SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF ARTS (LINGUISTICS)
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
2001

ISBN 974-04-0741-2

LANGUAGE IDENTIFICATION BY TONES : LAHU, AKHA, AND KAREN

ATTASITH BOONSAWASD

A THESIS SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF ARTS (LINGUISTICS)
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
2001

ISBN 974-04-0741-2

Thesis
entitled

LANGUAGE IDENTIFICATION BY TONES : LAHU, AKHA, AND KAREN

Mr.Attasith Boonsawasd
Candidate

Assoc.Prof.Somsonge Burusphat, Ph.D.
Major-Advisor

Assoc.Prof.Sujaritlak Deepadung, Ph.D.
Co-advisor

Assoc.Prof.Pitsamai Yupho, Ph.D.
Co-advisor

Assoc.Prof.Amon Thavisak, Ph.D.
Co-advisor

Asst.Prof. Anchalee Pongpun
M.A. (Applied Linguistics)
Acting Dean
Faculty of Graduate Studies

Assoc.Prof.Sujaritlak Deepadung, Ph.D.
Chairman
Master of Arts Programme in Linguistics
Institute of Language and Culture for
Rural Development

Thesis
entitled

LANGUAGE IDENTIFICATION BY TONES : LAHU, AKHA, AND KAREN

was submitted to the Faculty of Graduate Studies, Mahidol University
for the degree of Master of Arts (Linguistics)
on
September 28, 2001

Attasith Boonsawasd
.....
Mr.Attasith Boonsawasd
Candidate

Somsonge Burusphat
.....
Assoc.Prof.Somsonge Burusphat, Ph.D.
Chairman

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

Pitsamai Yupho
.....
Assoc.Prof.Pitsamai Yupho, Ph.D.
Member

Amon Thavisak
.....
Assoc.Prof.Amon Thavisak, Ph.D.
Member

Theraphan L. Thongkum
.....
Assoc.Prof.Theraphan Luangthongkum, Ph.D.
Member

Anchalee Pongpun
.....
Asst.Prof. Anchalee Pongpun
M.A. (Applied Linguistics)
Acting Dean
Faculty of Graduate Studies
Mahidol University

Suriya Ratanakul
.....
Prof.Khunying Suriya Ratanakul, Ph.D.
Director
Institute of Language and Culture for Rural Development
Mahidol University

ACKNOWLEDGEMENT

This thesis was completed with the kind support of many people and an organization to whom I would like to express my deep appreciation and great thanks. First and foremost, I would like to thank the Thailand Research Fund (TRF) for financial support during my research, which is part of the TRF M.A. Thesis Network Program.

Other people have provided a great deal of input. Associate Professor Dr. Theraphan Luangthongkum of Chulalongkorn University, the co-ordinator of the TRF M.A. Thesis Network Project on Tone, for her kind help and concern. Associate Professor Dr. Somsonge Burusphat, my supervisor, Associate Professor Dr. Sujaritlak Deepadung, Associate Professor Dr. Pitsamai Yupho, and Associate Professor Dr. Amon Thavisak, my committee members, of the Institute of language and culture for rural development, Mahidol University, have read and commented on various versions of this work and made specific comments to improve examples and explanations. I would like to thank Mrs.Yaowalak Mankong and Mr.Chokchai Saengsuk for providing me the accommodation during my field work. I would also like to thank my parents and my sister for their unfailing encouragement.

Finally, I must also express my acknowledgement to all of my informants for sparing me their time. Without their help, it would not have been possible for me to accomplish this work.

Attasith Boonsawasd

4136583 LCLG/M : MAJOR : LINGUISTICS ; M.A. (LINGUISTICS)
KEY WORD : IDENTIFICATION / TONE / LAHU / AKHA / KAREN
ATTASITH BOONSAWASD : LANGUAGE IDENTIFICATION BY TONES : LAHU, AKHA, AND KAREN. THESIS ADVISOR : SOMSONGE BURUSPHAT, Ph.D., SUJARITLAK DEEPADUNG, Ph.D., PITSAMAI YUPHO, Ph.D., AMON THAVISAK, Ph.D.169 P. ISBN 974-04-0741-2

This study is an attempt to identify the Lahu, Akha, and Karen languages by using the tonal systems and tone features of Chiangrai's Northern Thai (CNT) dialect pronounced by The Lahu, Akha, and Karen people living in Mueng district, Chiangrai province, Thailand, as criteria. A computer software program called "CECIL" was used to analyze the tone features by considering the fundamental frequency of each tone in both citation form and connected speech.

The analysis yielded interesting results in terms of a) citation form and b) connected speech.

a) In citation form, there are 4 tones in CNT dialect pronounced by the Lahu and Akha; 6 tones in CNT dialect pronounced by Karen; which was also similar to native CNT speakers. Even though the number of tones in CNT dialect pronounced by the Lahu and Akha are the same, there are differences in the pattern of tonal split and coalescence. The tone characteristics in CNT dialect pronounced by the Karen and native CNT speakers are different in the way that Karen tend to pronounce the tones on checked syllables with the glottalized tones, whereas native CNT speakers do not.

b) In connected speech, there are 5 tones in CNT dialect pronounced by the Lahu, 4 tones in CNT dialect pronounced by the Akha, and 6 tones in CNT dialect pronounced by the Karen and also native CNT speaker.

In conclusion, the research findings indicate overwhelmingly that it is possible to identify which speaker is the Lahu, Akha, or Karen in speech form, when these people speak CNT dialect by using tones as criteria.

4136583 LCLG/M : สาขาวิชา : ภาษาศาสตร์ ; ศศ.ม. (ภาษาศาสตร์)

อรรถสิทธิ์ บุญสวัสดิ์ : การกำหนดภาษาโดยใช้เกณฑ์วรรณยุกต์ : ลาฮู อาข่า กะเหรี่ยง (LANGUAGE IDENTIFICATION BY TONES : LAHU, AKHA, AND KAREN). คณะกรรมการควบคุมวิทยานิพนธ์ : สมทรง บุรุษพัฒน์, Ph.D., สุจริตลักษณ์ ดีผดุง, Ph.D., พิศมัย อยู่โพธิ์, Ph.D., อมร ทวีศักดิ์, Ph.D. 169 หน้า. ISBN 974-04-0741-2

งานวิจัยเรื่องนี้ต้องการกำหนดภาษาลาฮู อาข่า และกะเหรี่ยง โดยใช้ระบบเสียงวรรณยุกต์และสัทลักษณะของวรรณยุกต์ในภาษาไทยถิ่นเหนือ (เชียงราย) ที่ออกเสียงโดยคนลาฮู อาข่า และกะเหรี่ยง ซึ่งอาศัยอยู่ในอำเภอเมือง จังหวัดเชียงราย ประเทศไทย เป็นเกณฑ์ โปรแกรมCECILเป็นโปรแกรมที่ใช้ในการวิจัยครั้งนี้เพื่อวิเคราะห์สัทลักษณะของวรรณยุกต์ โดยพิจารณาที่ค่าความถี่มูลฐานของวรรณยุกต์ ทั้งในคำพูดเดี่ยวและคำพูดต่อเนื่อง

ผลการวิเคราะห์ข้อมูลแสดงให้เห็นว่าในคำพูดเดี่ยว ภาษาไทยถิ่นเหนือ(เชียงราย) ที่ออกเสียงโดยคนลาฮูและอาข่า มี 4 วรรณยุกต์ ในขณะที่ภาษาไทยถิ่นเหนือ (เชียงราย) ที่ออกเสียงโดยคนกะเหรี่ยงมี 6 วรรณยุกต์เหมือนกับคนเมืองเชียงราย แม้ว่าจำนวนวรรณยุกต์ภาษาไทยถิ่นเหนือ (เชียงราย) ที่ออกเสียงโดยคนลาฮูและอาข่าจะเท่ากัน แต่ก็มีความแตกต่างกันในเรื่องการแตกตัวและการรวมตัวของวรรณยุกต์ ขณะที่สัทลักษณะของวรรณยุกต์ภาษาไทยถิ่นเหนือ (เชียงราย) ที่ออกเสียงโดยคนกะเหรี่ยงและคนเมืองเชียงรายจะแตกต่างกันตรงที่คนกะเหรี่ยงมักจะออกเสียงวรรณยุกต์ในพยางค์ตายเป็นเสียงวรรณยุกต์ที่มีการปิดเส้นเสียงร่วมด้วย

ส่วนในคำพูดต่อเนื่อง ภาษาไทยถิ่นเหนือ (เชียงราย) ที่ออกเสียงโดยคนลาฮูมี 5 วรรณยุกต์ ที่ออกเสียงโดยคนอาข่ามี 4 วรรณยุกต์ และที่ออกเสียงโดยคนกะเหรี่ยงและคนเมืองเชียงรายมี 6 วรรณยุกต์

ดังนั้น วรรณยุกต์จึงเป็นสัทลักษณะอย่างหนึ่งที่สามารถใช้เป็นปัจจัยกำหนดได้ว่าใครเป็นคนลาฮู อาข่า หรือกะเหรี่ยง เมื่อคนเหล่านี้พูดภาษาไทยถิ่นเหนือ (เชียงราย)

CONTENTS

	Page
ACKNOWLEDGEMENT	**iii**
ABSTRACT	**iv**
LIST OF TABLES	**viii**
LIST OF FIGURES	**xi**
CHAPTER	
I INTRODUCTION	**1**
1.1 Rationale	1
1.2 Objective of the Study	3
1.3 Benefits of the Study	4
1.4 Scope of the Study	4
1.5 Research Hypothesis	4
1.6 Definition of Terms	5
1.7 Background of Places of Gathering Data	7
1.8 List of Informants	11
II LITERATURE REVIEW	**13**
2.1 General Information about the Lahu, Akha, Karen, and Northern Thai People	13
2.2 Tonal Systems and Tone Features of the Lahu, Akha, Karen Languages, and Northern Thai Dialect	15
2.3 Other Related Literatures	19
III MATERIALS AND METHODS	**21**
3.1 Place of Gathering Data	21
3.2 Samples	21
3.3 Materials Used in the Study	23
3.4 Methods of Gathering Data	25
3.5 Methods of Data Analyzing	28

CONTENTS (CONT.)

	Page
IV TONAL SYSTEMS AND TONE FEATURES OF CHIANGRAI'S NORTHERN THAI DIALECT, LAHU, AKHA, AND KAREN PRONOUNCED BY THE NATIVE SPEAKERS	**35**
4.1 Tonal Systems and Tone Features of Chiangrai's Northern Thai Dialect	35
4.2 Tonal System and Tone Features of Lahu	53
4.3 Tonal System and Tone Features of Akha	59
4.4 Tonal System and Tone Features of Karen	63
V TONAL SYSTEMS AND TONE FEATURES OF CHIANGRAI'S NORTHERN THAI DIALECT PRONOUNCED BY THE LAHU, AKHA, AND KAREN PEOPLE	**68**
5.1 Tonal Systems and Tone Features of Chiangrai's Northern Thai Dialect Pronounced by Lahu	68
5.2 Tonal Systems and Tone Features of Chiangrai's Northern Thai Dialect Pronounced by Akha	83
5.3 Tonal Systems and Tone Features of Chiangrai's Northern Thai Dialect Pronounced by Karen	97
VI TONAL COMPARISONS	**116**
6.1 Tonal Comparison between Chiangrai's Northern Thai Dialect Pronounced by the Lahu, Akha, and Karen People and Their Native Languages	116
6.2 Tonal Comparison between Chiangrai's Northern Thai Dialect Pronounced by the Lahu, Akha, and Karen People and the Native Speakers	121
6.3 Tonal Comparisons among the Ethnic Groups	132
VII CONCLUSION	**145**
7.1 Summary	145
7.2 Discussion	154
7.3 Suggestions for Further Studies	156
BIBLIOGRAPHY	**157**
APPENDIX	**160**
BIOGRAPHY	**169**

LIST OF TABLES

		Page
Table 1 :	Tonal Variation of 4 Dialects of Kham Mueng	17
Table 2 :	Tonal Variation of the Western and Eastern Kham Mueng	18
Table 3 :	Tones of Northern Thai Dialect	18
Table 4 :	Proto - Thai Tones	19
Table 5 :	Comparison of Linguistic Features between Thai and Minority Languages	20
Table 6 :	A Checklist for Determining Tones in Northern Thai Dialect	24
Table 7 :	Smooth Syllables	24
Table 8 :	Checked Syllables	25
Table 9 :	Fundamental Frequency and Duration of "Khaw"	29
Table 10:	Fundamental Frequency of "Khaw" in MS Excel	30
Table 11:	The Average of "Khaw" at 0%	30
Table 12:	The Average of "Khaw" at 0% - 100%	31
Table 13:	Pattern of Tones in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers	35
Table 14:	Pattern of Tones in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers	43
Table 15:	Comparison of Tonal System between Citation Form and Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers	51
Table 16:	Comparison of Tone Features between Citation Form and Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers	52
Table 17:	Pattern of Tones in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Lahu	68
Table 18:	Pattern of Tones in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Lahu	74
Table 19:	Comparison of Tonal Systems between Citation Form and Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Lahu	81
Table 20:	Comparison of Tone Features between Citation Form and Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Lahu	82
Table 21:	Pattern of Tones in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Akha	83
Table 22:	Pattern of Tones in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Akha	89
Table 23:	Comparison of Tonal System between Citation Form and Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Akha	95

LIST OF TABLES (CONT.)

		Page
Table 24:	Comparison of Tone Features between Citation Form and Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Akha	96
Table 25:	Pattern of Tones in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Karen	97
Table 26:	Pattern of Tones in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	105
Table 27:	Comparison of Tonal Systems between Citation Form and Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	113
Table 28:	Comparison of Tone Features between Citation Form and Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	114
Table 29:	Comparison of Tonal Systems between Chiangrai's Northern Thai Dialect Pronounced by the Lahu, Akha, and Karen People and Their Native Languages in Citation Form	116
Table 30:	Comparison of Tone Features between Chiangrai's Northern Thai Dialect Pronounced by Lahu and His Native Language	118
Table 31:	Comparison of Tone Features between Chiangrai's Northern Thai Dialect Pronounced by Akha and His Native Language	119
Table 32:	Comparison of Tone Features between Chiangrai's Northern Thai Dialect Pronounced by Karen and His Native Language	121
Table 33:	Comparison of Tonal System in Citation Form between Chiangrai's Northern Thai Dialect Pronounced by the Lahu, Akha, and Karen People and Native Speakers	122
Table 34:	Comparison of Tonal System in Connected Speech between Chiangrai's Northern Thai Dialect Pronounced by the Lahu, Akha, and Karen People and Native Speakers	123
Table 35:	Comparison of Tone Features in Citation Form between Chiangrai's Northern Thai Dialect Pronounced by Lahu and Native Speakers	124
Table 36:	Comparison of Tone Features in Citation Form between Chiangrai's Northern Thai Dialect Pronounced by Akha and Native Speakers	125
Table 37:	Comparison of Tone Features in Citation Form between Chiangrai's Northern Thai Dialect Pronounced by Karen and Native Speakers	127
Table 38:	Comparison of Tone Features in Connected Speech between Chiangrai's Northern Thai Dialect Pronounced by Lahu and Native Speakers	128

LIST OF TABLES (CONT.)

		Page
Table 39:	Comparison of Tone Features in Connected Speech between Chiangrai's Northern Thai Dialect Pronounced by Akha and Native Speakers	129
Table 40:	Comparison of Tone Features in Connected Speech between Chiangrai's Northern Thai Dialect Pronounced by Karen and Native Speakers	131
Table 41:	Comparison of Tonal System in Citation Form between Chiangrai's Northern Thai Dialect Pronounced by Lahu and Akha	132
Table 42:	Comparison of Tonal System in Citation Form between Chiangrai's Northern Thai Dialect Pronounced by Lahu and Karen	133
Table 43:	Comparison of Tonal System in Citation Form between Chiangrai's Northern Thai Dialect Pronounced by Akha and Karen	134
Table 44:	Comparison of Tonal System in Connected Speech between Chiangrai's Northern Thai Dialect Pronounced by Lahu and Akha	134
Table 45:	Comparison of Tonal System in Connected Speech between Chiangrai's Northern Thai Dialect Pronounced by Lahu and Karen	135
Table 46:	Comparison of Tonal System in Connected Speech between Chiangrai's Northern Thai Dialect Pronounced by Akha and Karen	136
Table 47:	Comparison of Tone Features in Citation Form between Chiangrai's Northern Thai Dialect Pronounced by Lahu and Akha	136
Table 48:	Comparison of Tone Features in Citation Form between Chiangrai's Northern Thai Dialect Pronounced by Lahu and Karen	138
Table 49:	Comparison of Tone Features in Citation Form between Chiangrai's Northern Thai Dialect Pronounced by Akha and Karen	139
Table 50:	Comparison of Tone Features in Connected Speech between Chiangrai's Northern Thai Dialect Pronounced by Lahu and Akha	141
Table 51:	Comparison of Tone Features in Connected Speech between Chiangrai's Northern Thai Dialect Pronounced by Lahu and Karen	142
Table 52:	Comparison of Tone Features in Connected Speech between Chiangrai's Northern Thai Dialect Pronounced by Akha and Karen	143
Table 53:	Comparison of Tone Features among 4 ethnic groups	152

LIST OF FIGURES

Page

Figure 1 : Map of Thailand 2
Figure 2 : Ruammit Village 8
Figure 3 : Klaangtung Village 10
Figure 4 : Map of Mae-Yao Sub-District 26
Figure 5 : The Average of Fundamental Frequency of "Khaw (*knee*)" 31
Figure 6 : The Average of Each Word Pronounced by Achong Mayer 32
Figure 7 : The Fundamental Frequency Range Divided into 5 Sections 32
Figure 8 : Low-Falling-Rising Tone 33
Figure 9 : Tone 1 in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 36
Figure 10 : Tone 2 on Smooth Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 37
Figure 11 : Tone 2 on Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 37
Figure 12 : Tone 3 on Smooth and Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 38
Figure 13 : Tone 4 on Smooth and Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 39
Figure 14 : Tone 5 on Smooth Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 40
Figure 15 : Tone 5 on Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 40
Figure 16 : Tone 6 in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 41
Figure 17 : Tone Features in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 42
Figure 18 : Tone 1 in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 43
Figure 19 : Tone 2 on Smooth Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 44
Figure 20 : Tone 2 on Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 45
Figure 21 : Tone 3 on Smooth and Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 46
Figure 22 : Tone 4 on Smooth and Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 47

LIST OF FIGURES (CONT.)

Page

Figure 23 : Tone 5 on Smooth Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 48
Figure 24 : Tone 5 on Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 48
Figure 25 : Tone 6 in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 49
Figure 26 : Tone Features in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Native Speakers 50
Figure 27 : Tone 1 of Lahu Pronounced by Native Speaker 54
Figure 28 : Tone 2 of Lahu Pronounced by Native Speaker 54
Figure 29 : Tone 3 of Lahu Pronounced by Native Speaker 55
Figure 30 : Tone 4 of Lahu Pronounced by Native Speaker 55
Figure 31 : Tone 5 of Lahu Pronounced by Native Speaker 56
Figure 32 : Tone 6 of Lahu Pronounced by Native Speaker 56
Figure 33 : Tone 7 of Lahu Pronounced by Native Speaker 57
Figure 34 : Tone Features of Lahu Pronounced by Native Speaker 58
Figure 35 : Tone 1 of Akha Pronounced by Native Speaker 59
Figure 36 : Tone 2 of Akha Pronounced by Native Speaker 60
Figure 37 : Tone 3 of Akha Pronounced by Native Speaker 60
Figure 38 : Tone 4 of Akha Pronounced by Native Speaker 61
Figure 39 : Tone 5 of Akha Pronounced by Native Speaker 61
Figure 40 : Tone Features of Akha Pronounced by Native Speaker 62
Figure 41 : Tone 1 of Karen Pronounced by Native Speaker 63
Figure 42 : Tone 2 of Karen Pronounced by Native Speaker 64
Figure 43 : Tone 3 of Karen Pronounced by Native Speaker 64
Figure 44 : Tone 4 of Karen Pronounced by Native Speaker 65
Figure 45 : Tone 5 of Karen Pronounced by Native Speaker 65
Figure 46 : Tone 6 of Karen Pronounced by Native Speaker 66
Figure 47 : Tone Features of Karen Pronounced by Native Speaker 67
Figure 48 : Tone 1 in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Lahu 69
Figure 49 : Tone 2 on Smooth Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Lahu 70
Figure 50 : Tone 2 on Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Lahu 70
Figure 51 : Tone 3 on Smooth and Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Lahu 71
Figure 52 : Tone 4 on Smooth and Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Lahu 72

LIST OF FIGURES (CONT.)

Page

Figure 53 : Tone Features in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Lahu 73
Figure 54 : Tone 1 in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Lahu 75
Figure 55 : Tone 2 on Smooth Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Lahu 75
Figure 56 : Tone 2 on Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Lahu 76
Figure 57 : Tone 3 on Smooth and Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Lahu 77
Figure 58 : Tone 4 on Smooth and Checked Syllables in Connected Speech Of Chiangrai's Northern Thai Dialect Pronounced by Lahu 78
Figure 59 : Tone 5 on Smooth Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Lahu 78
Figure 60 : Tone 5 on Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Lahu 79
Figure 61 : Tone Features in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Lahu 80
Figure 62 : Tone 1 in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Akha 84
Figure 63 : Tone 2 in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Akha 85
Figure 64 : Tone 3 on Smooth and Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Akha 85
Figure 65 : Tone 4 on Smooth and Long-Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Akha 86
Figure 66 : Tone 4 on Short-Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Akha 87
Figure 67 : Tone Features in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Akha 88
Figure 68 : Tone 1 in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Akha 90
Figure 69 : Tone 2 in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Akha 90
Figure 70 : Tone 3 on Smooth and Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Akha 91
Figure 71 : Tone 4 on Smooth and Long-Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Akha 92

LIST OF FIGURES (CONT.)

	Page
Figure 72 : Tone 4 on Short-Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Akha	93
Figure 73 : Tone Features in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Akha	94
Figure 74 : Tone 1 in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Karen	98
Figure 75 : Tone 2 on Smooth Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Karen	99
Figure 76 : Tone 2 on Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Karen	99
Figure 77 : Tone 3 on Smooth and Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Karen	100
Figure 78 : Tone 4 on Smooth and Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Karen	101
Figure 79 : Tone 5 on Smooth Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Karen	102
Figure 80 : Tone 5 on Checked Syllables in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Karen	102
Figure 81 : Tone 6 in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Karen	103
Figure 82 : Tone Features in Citation Form of Chiangrai's Northern Thai Dialect Pronounced by Karen	104
Figure 83 : Tone 1 in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	106
Figure 84 : Tone 2 on Smooth Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	107
Figure 85 : Tone 2 on Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	107
Figure 86 : Tone 3 on Smooth and Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	108
Figure 87 : Tone 4 on Smooth and Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	109
Figure 88 : Tone 5 on Smooth Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	110
Figure 89 : Tone 5 on Checked Syllables in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	110
Figure 90 : Tone 6 in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	111
Figure 91 : Tone Features in Connected Speech of Chiangrai's Northern Thai Dialect Pronounced by Karen	112
Figure 92 : Comparison of the Tone Features in Citation Form	150
Figure 93 : Comparison of the Tone Features in Connected Speech	151

CHAPTER I

INTRODUCTION

1.1 Rationale

In Southeast Asia, Thailand is one of the countries where a number of minority groups possessing their own languages have been living. Considering the language family spoken in Thailand, the Sino-Tibeton language family is rare, because the minority groups that speak the languages of Sino-Tibeton family such as Karen, Lahu, Akha, and Lisu are all immigrants.

Karen, the largest and most populated minority group, has been living in Thailand for over 200 years. Most of Karen migrated from Burma because of political conflicts with the Burmese. Presently, Karen are settled in the western border of Thailand, which is adjacent to Burma from its northern part downwarding toward Prachuapkirikhan. Karen in Thailand are roughly divided into 4 sub-groups based on their languages' features as following: Sgaw, Pwo, Bwe, and Taungthu, among which Sgaw is the largest group, which consists of population of about 500,000.

Lahu, commonly known as Mussur, originating from China and Tibet, immigrated to Thailand over 150 years ago because of political and governing issues. Apart from this reason, some Lahu were also persuaded by western missionaries 50 years ago moving to Thailand through Burma path. Now Lahu, the first group immigrated to Thailand and speaking the middle Lolo branch of Tibeto-Burman language family, consists of about 82,000 people living on the high mountains of the northern part of Thailand.

Akha has a population of 30,000 people, which is fewer than those of Lahu. Akha immigrated from China and passed through Burma, Lao, and Thailand. But there is no evidence to indicate when they immigrated into Thailand. Most of Akha nowadays live north of the Mae-Kok river in Chiangrai province. According to Chiangrai map in detail, it apparently shows that the Akha people live near the Lahu village which provides a great opportunity for cultural blending and exchanging with each other. This, contributes to Chiangrai as an interesting place for the minority study in terms of both language and culture.

Mae-Yao, one of Chiangrai's sub-districts, is filled with minority immigrants. According to survey at the end of year 1998, there are 4 groups as follows: Lahu 3,769, Akha 3,738, Karen 1,704, and Yao 302, totaling 9,513 persons.

Figure 1 : *Map of Thailand*

Each minority group lives separately though they still contact and visit each other regularly due to their close villages' location, For instance, Chalae village, an Akha village, is situated next to a Lahu village. Another reason for those minority contact is that this sub-district has much beautifully attractive scenery-like mountains, waterfall and river attracting a wide rage of tourist attention. Thus, the minorities employ this sub-district as their daily market center that gives them a chance to stay in contact on a regular basis.

Since there are several minority languages spoken in this location, lingua franca used to communicate across their different groups is studied. It is evident that 90% of Lahu, Akha, and Karen groups are able to use Chiangrai's Northern Thai dialect as lingua franca. Meanwhile the rest, 10% out of 100%, are able to speak other minority languages. For example, some Akha are able to speak the Lahu language with the Lahu people. So, it is not necessary for some Lahu and Akha to use Chiangrai's Northern Thai dialect as lingua franca to communicate among the minorities.

However, though Lahu, Akha, and Karen can speak Chiangrai's Northern Thai dialect, they cannot speak as well as the native speakers. In other words, there is an interference of their native languages, such as an absence of final consonants.

Hence, to identify the native language of these minority groups with respect to Chiangrai's Northern Thai dialect spoken as lingua franca, it is practical to do so by considering linguistic features of these minority languages.

In this study, I consider only tones because each language has different tonal systems. Lahu has 7 tones (Solot 1986), Akha has 5 tones (Lewis 1968), and Karen has 6 tones (Puttachart 1983). Therefore, when these minority groups speak Chiangrai's Northern Thai dialect, their tonal systems and tone features should interfere with the tonal systems and tone features of Chiangrai's Northern Thai dialect in a different way.

1.2 Objective of the Study

1. To analyze the tonal systems and tone features of Chiangrai's Northern Thai dialect and the Lahu, Akha, and Karen languages pronounced by native speaker.
2. To analyze the tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen.
3. To compare the tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen with their native languages.
4. To compare the tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen with those by native Chiangrai's Northern Thai speakers.
5. To identify the Lahu, Akha, and Karen languages by using tones as criteria.

1.3 Benefits of the Study

1. To know the tonal systems and tone features of Chiangrai's Northern Thai dialect and the Lahu, Akha, and Karen languages pronounced by the native speaker.
2. To know the tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen people.
3. To know the similarities and dissimilarities of the tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen people and their native languages.
4. To know the similarities and dissimilarities of the tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen people and by the native Chiangrai's Northern Thai speakers.
5. To be able to identify the minority languages by using tones as criteria.
6. To know the problem of tonal pronunciation of Lahu, Akha, and Karen speakers which is useful for teaching Chiangrai's Northern Thai dialect to these people.
7. To use the results of the analysis as a guideline for identifying the other minority languages afterwards.

1.4 Scope of the Study

1. To analyze the tonal systems and tone features of the minority languages in only citation form.
2. To analyze the tonal systems and tone features of Chiangrai's Northern Thai dialect in both citation form and connected speech.
3. To analyze the tone features by using the CECIL program (Computerised Extraction of Components of Intonation in Languages).
4. To analyze the tone features by considering fundamental frequencies of each tone.
5. A checklist for determining tones in Chiangrai's Northern Thai dialect which is created by the author adapted from Gedney's checklist for determining tones.
6. Tonal systems and tone features of the minority languages and Chiangrai's Northern Thai dialect are obtained from the Lahu, Akha, Karen and Chiangrai's Northern Thai people living at Mae-Yao sub-district, Mueng district, Chiangrai province.

1.5 Research Hypothesis

Tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen would be different according to the tonal systems and tone features of each minority language due to the interference of their native languages. This enables us to identify which speaker is the Lahu, Akha, or Karen when these people speak Chiangrai's Northern Thai dialect.

1.6 Definition of Term

Allotone

Any of the different forms of a tone. For example, the tone /2/ in Chiangrai's Northern Thai dialect has two allotones which are in complementary distribution. There is a mid-rising tone occurring with smooth syllables and a high-rising tone occurring with checked syllables.

CECIL

CECIL (Computerised Extraction of Components of Intonation in Languages) is a speech analysis system produced by the Summer Institute of Linguistics (SIL). It provides facilities to record, analyze, save to disk, and replay short sections of speech. (Manual of CECIL program)

Checked

The term is also found as an alternative to closed, in the description of syllables.: a checked syllable is one ending in a consonant, and a checked vowel is a vowel occurring in such a syllable. (Crystal 1991 : 52)

Citation Form

The form of a linguistic unit when it is cited in isolation, for purposes of discussion. More specifically, the term refers to the pronunciation given to a word when it is produced in isolation, and not in connected speech. (Crystal 1991 : 54)

Connected Speech

A term used in linguistics to refer to spoken language when analysed as a continuous sequence, as in normal utterances and conversations. Its significance lies in the contrast implied with studies of linguistic units seen in isolation, such as an individual sound word or phrase, which were the subject-matter of much traditional linguistic enquiry. It is now realised that important changes happen to these units when they are used in connected speech, as demonstrated by such processes as assimilation and elision, e.g. *and* becoming */n/* in such phrases as *boys and girls.* (Crystal 1991 : 73)

Dialect

A regionally or socially distinctive variety of language, identified by a particular set of words and grammatical structures. Spoken dialects are usually also

associated with a distinctive pronunciation, or accent. Any language with a reasonably large number of speakers will develop dialects, especially if there are geographical barriers separating groups of people from each other, or if there are divisions of social class. One dialect may predominate as the official or standard form of the language, and this is the variety which may come to be written down. (Crystal 1991 : 102)

Duration

A term used in phonetics, to refer to the length of time involved in the articulation of a sound of syllable. Distinctions between relatively 'long' and relatively 'short' durations are measured in units of time, such as the millisecond (msec). In speech, the absolute duration of sound is dependent to a considerable extent on the overall tempo of speaking. Issues which need reference to duration include the study of rhythm, consonant articulation, and juncture. (Crystal 1991 : 115)

Fundamental Frequency

A term derived from the study of the physics of sound, and used in acoustic phonetics, referring to the lowest frequency component in a complex sound wave (other components being known as the 'harmonics'). Frequency refers to the number of complete cycles (opening and closing movements) of vocal cord vibration in a unit of time (per second). The 'fundamental', or Fo ('f nought'), is of particular importance in studies of intonation, where it displays a reasonably close correspondence with the pitch movements involved. It is measured in hertz (Hz), a term which has replaced the older 'cycles per second'. (Crystal 1991 : 147)

Glottalized Tone

The term is used to refer to what is heard as a glottal stop at the end of some tones.

Lingua Franca

A language that is used for communication between different groups of people, each speaking a different language. The lingua franca could be an internationally used language of communication (e.g. English), it could be the native language of one of the groups, or it could be a language which is not spoken natively by any of the groups but have a simplified sentence structure and vocabulary and is often a mixture of two or more languages. (Richards, Platt, and Weber 1987 : 166)

Native Speaker

A term used in linguistics to refer to someone for whom a particular language is a 'native language' (also called *'first language'*, or *'mother tongue'*). The

implication is that this language, having been acquired naturally during childhood, is the one about which a speaker will have the most reliable intuitions, and whose judgements about the way the language is used can therefore be trusted. (Crystal 1991 : 230)

Pitch

The auditory property of a sound that enables a listener to place it on a scale going from low to high, without considering the acoustic properties, such as the frequency of the sound. (Ladefoged, 1975: 280)

Stress

The use of extra respiratory energy during a syllable. (Ladefoged, 1975: 281)

Tone

Height of pitch and change of pitch which is associated with the pronunciation of syllables or words and which affects the meaning of the word. (Richards, Platt, and Weber 1987 : 294)

1.7 Background of Place of Gathering Data

1.7.1 Huaykhomnai Village

Located at Moo 1, it is of 20 Akha households grouping together around the plain and mountain slope areas. Most Akha men will gain employment in town during daytime and will be back to the village at night; meanwhile women will be at home with the elders. Staying home, women and elders are told not to contact or talk to any strangers, due to the drug news in the village made by a television station last year. This news was broadcasted on television demonstrating drug purchasing and the taking of a drug, which apparently very much defamed the village image. Thereafter, strangers have not been welcome to the village.

1.7.2 Ruammit Village

Many hilltribes, Lahu, Akha, Karen, and Yao live at Moo 2, among which Karen has the largest populace. This village, therefore, is called 'Baan Karen Ruammit'. Over the last ten years, this village only accounted for 4 households, which was surrounded by a wide range of forest which had many kinds of fierce animals. This made the villagers aware of wild creatures at all times when going out in the surrounding area. In the old days, the villagers earned their living by farming,

Figure 2 : ***Ruammit Village***

and doing orchard labor. Later, the number of the population increased. The forest condition has gradually changed and has been replaced by the village. Some have foreseen that the village location is apt as a tourist attraction site due to its location, which is near the Kok river, whereas the village backside remains a prosperous forest, and the waterfall as well. The villagers then got some elephants there for tourists which includes to the mountain and waterfall. Also, some retail shops have been established to sell souvenirs. During the same period, other hilltribes immigrated to the village and earn their major living by selling souvenirs which became a highly successful business because of the increasing tourist volume.

1.7.3 Huaysaikhaaw Village

Over 10 households of Akha are situated at Huaynamrin, Moo 3. The Akha here mostly are farmers, but some are silver ornament merchants. One of the Akha manufacturers told us that this silver site is the most beautiful genuine silver site and the silver is of the best quality in Thailand. Besides, some Akha living at Ruammit village originated from this village, so most of products sold at Ruammit village is derived from here.

1.7.4 Sanpaayaang Village

About 36 households of Akha at Moo 6 are at Baan Sancharern, which is about 10 kilometers away from the community. The Akha have just moved here recently and currently have poor living conditions. Most of them get hired in town earning about 80-100 baht a day. The Akha who are about 30-50 years old are rarely able to communicate with Nothern Thai dialect. So, it was too difficult to collect data here.

1.7.5 Klaangtung Village

Situated at Moo 7, Baan Sukjai is the place where the Ahka are living together near the town, which is the subsidiary of Klaangtung village. It consists of about 40 households. The general living standard is fairy healthy. It comprises of an underground water system and television sets the rely on battery usage because so far no electrical system has been installed. During day time, men get hired and work on farms, and then return home at night, whereas young girls and elders stay home all day. At nighttime everybody will often group, talk and have alcoholic beverages. Also, they often help each other. For example, when there is a new house building or old house fixing, all Akha will stop doing their regular work and come to help each other without any labor charge. This phenomenon maybe seen through all hilltribes.

1.7.6 Huaykhomnok Village

Despite staying at the same area, Moo 10, Akha, Lahu, and Karen will live separately. That is, the Lahu live in an uphill area, whereas Karen, the most

Figure 3 : ***Klaangtung Village***

populous group, live in plains area. Most of Karen are wealthy; almost all of them possess cars. Many roads have been constructed throughout the village. Too, there is electricity and hydrant water. This is due partly because the village leader is a developer and assists the village in becoming more prosperous than those of others in the same district. For instance, the textile industry becomes a household industry for creating jobs and earning money for all villagers. Drugs are strictly prohibited and the people are protected from drug dealers. Those breaking the drug taboo would be exiled from the village. Besides, every weekend, a meeting is held at the village leader's house in order to discuss possible solutions of problems or current issues. Attendees may suggest ideas and contribute freely through out the meetings.

1.7.7 Huaymaesai Village

More than 10 households of Lahu live at Baan Chafu, Moo 11, which is the subsidiary of Huaymaesai village. Lahu living at Baan chafu emigrated from Doi-Tung over 20 years; almost all of them are rather poor. They grow rice and raise pigs for consumption, whereas some get hired in town earning about 70-80 baht a day. Communications are not facilitated enough because some parts of the village have very bumpy rock roads, which are not good for travelling in the rainy season.

1.7.8 Patung Village

Patung village is located at Paa-O-Donchai sub-district, Mueng district, Chiangrai province. All people in this location are Northern Thai. Most of them have fair living conditions and earn their living by growing ginger crops, maintaining orchards, and ordinary farming, producing rice and other staples.

1.8 List of Informants

There are 40 informants divided into 4 ethnic groups as follows :

1.8.1 Lahu

1. Tobo Chasee, 48 years old, Huaymaesai village.
2. Laoja Chasue, 33 years old, Huaymaesai village.
3. Chakue Chasae, 32 years old, Huaymaesai village.
4. Chapae Losa, 40 years old, Huaymaesai village.
5. Chachor Lifu, 42 years old, Huaymaesai village.
6. Pa-ae Haeso, 32 years old, Ruammit village.
7. Chatee Saencawa, 33 years old, Ruammit village.
8. Chatae Saenmai, 48 years old, Ruammit village.
9. Pitak Pumer, 35 years old, Ruammit village.
10. Chanu Srisuwan, 35 years old, Ruammit village.

1.8.2 Akha

1. Akor Ube, 30 years old, Klaangtung village.
2. Loya Mayer, 39 years old, Klaangtung village.
3. Achong Chermue, 48 years old, Klaangtung village.
4. Apha Mayer, 36 years old, Huaysaikhaaw village.
5. Achong Mayer, 38 years old, Huaysaikhaaw village.
6. Apha Mayer, 39 years old, Sanpaayaang village.
7. Achee Mayer, 44 years old, Huaykhomnok village.
8. Acha Merlaeku, 39 years old, Ruammit village.
9. Lopha Merlaeku, 35 years old, Ruammit village.
10. Acho Amor, 32 years old, Huaykhomnai village.

1.8.3 Karen

1. Buje Baehae, 44 years old, Ruammit village.
2. Dikuhae Sapasiko, 49 years old, Ruammit village.
3. Boonchai Anusornkasem, 38 years old, Ruammit village.
4. Kampan Tataep, 49 years old, Ruammit village.
5. Songkraan Nasaw, 42 years old, Huaykhomnok village.
6. Somsak Wimu, 31 years old, Huaykhomnok village.
7. Sompong Katu, 41 years old, Huaykhomnok village.
8. Sombuun Turaworn, 38 years old, Huaykhomnok village.
9. Intong Turaworn, 34 years old, Huaykhomnok village.
10. Wichit Saenluang, 40 years old, Huaykhomnok village.

1.8.4 Chiangrai's Northern Thai

1. Wittaya Pannakit, 38 years old, Patung village.
2. Boontawee Chaikaew, 40 years old, Patung village.
3. Inpan Tippala, 47 years old, Patung village.
4. Songsak Kamkaew, 32 years old, Patung village.
5. Intip Chansom, 45 years old, Patung village.
6. Pikul Chailangka, 32 years old, Patung village.
7. Sutisak Donchai, 32 years old, Patung village.
8. Sanan Muengchai, 41 years old, Patung village.
9. Boontan Tepkamtai, 32 years old, Patung village.
10. Duangdee Tammawong, 47 years old, Huaysaikhaaw village.

CHAPTER II

LITERATURE REVIEW

Before collecting data on fieldwork, I have reviewed related literature in the following topics:

2.1 General information about the Lahu, Akha, Karen and Northern Thai people.

2.2 Tonal systems and tone features of the Lahu, Akha, Karen languages, and Northern Thai dialect.

2.3 Other related literature.

2.1 General Information about the Lahu, Akha, Karen and Northern Thai People

2.1.1 Lahu

Lahu is the hill dweller whose language is affiliated with Tibeto-Burman Linguistic family, Burmese Lolo-branch. Their origin was in the south western Yunnan, in the People's Republic of China. The people call themselves *Lahu.* Other people have different terms for them. The Chinese people in Yunnan call them *Lo-hei* and the Tai-people in the Shan State call them *Mussuh.* This name was later adopted by the Northern Thai. The Lahu people have the status of minority in whatever country they settle down. These people scattered themselves in the area of the northern part of Indo-Chinese peninsula: southwestern Yunnan, the People's Republic of China, eastern Burma, north western Laos and northern Thailand, with the total population of approximately 281,000.

In Thailand, the Lahu people is one of the hilltribe minority groups migrated from Yunnan, the People's Republic of China, into the northern part of Thailand about one hundred years ago. Their settlement is in the area of Chiangrai, Chiangmai, Lampang, Maehongson, and Tak with a population of 25,000. The Lahu, like other minority groups in Thailand, create many problems for the host country e.gs., growing opium and destroying the forest with their *slash and burn* farming technique. (Solot 1986 : 1)

2.1.2 Akha

The Akha, because they are widespread, are known by a variety of names in various locations. They call themselves *Akha*, *Akho*, or *Ako*. The Akha of Laos and the few in North Vietnam are known by only two names : *Kaw* and *Kha Ko*. The Akha of China are also known by a variety of names. The term most frequently used are *Aka*, *Akha-Jen*, *Akha*, *Akho*, and *Kaw Ko*. The term *Ako* is used by the Chinese to refer to those individuals of mixed Akha and Chinese ancestry. Another term, *Woni*, which is sometimes applied to the Akha in China, actually refers to the various Lolo (Tibeto-Burman) speaking groups of Southern Yunnan.

According to written sources, the first Akha village in Thailand was probably established in 1903 in the Phayaphai region of Hin-Taek, near the Myanmar border. Other villages followed, according to the source there were probably not more than 2,500 Akha living in Thailand by the end of World War II. In 1964 there were approximately 7,000 and by mid-1983 they numbered 24,000, which means their population has more than doubled three times in 38 years. Some population is from migration, but approximately 3% a year is from births in the Akha community. (Panadda 1993 : 6)

2.1.3 Karen

Karen, the largest hill tribal group in Thailand, are called by the Northern Thai *Yang*, and by the Thai in other parts of the country *Kariang*. The Karen people call themselves *Pakakayo*, which means "mankind".

Karen's origin was from Mongolia 2,000 years ago, who later escaped from war to live in Tibet. Afterward when attacked by Chinese army, they moved downwards to the South, beginning at the low flat plains of the Yaengsikiang river and afterward to Salween river in Burma.

Karen have been migrating into Thailand from Burma since the middle of the eighteenth century (some 200 years ago), because of political conflicts with the Burmese. Their settlements are found widely distributed along the eastern Burmese border and along the western border of Thailand, extending to the North and the East. That is, they settle in both the uplands and the low lands in the area of Maehongson, Tak, and Kanchanaburi province, where most of them live. Others are scattered in the areas of Chiangrai, Lampang, Lamphun, Prae, Chiangmai and downwards to the western frontier of the central part of Thailand. (Puttachart 1983 : 6)

2.1.4 Northern Thai

The Northern Thai people of the northern part of Thailand live in 8 provinces. They include Maehongson, Chiangmai, Lamphun, Chiangrai, Lampang, Phayaw, Phrae, and Nan. They call themselves *Khon-Mueng*, which means "town people" and call their language as *Kam-Mueng*, which means "town language" (*Kam* - language or word while *Mueng* - town or city), because they are settled in the plain areas where they are surrounded by mountainous areas inhabited by varieties of hilltribe people such as Miao, Yao, Karen, Akha, Lahu, and Lisu.

Lanna Thai, the name of their former kingdom, is well known to the Thai people as *Tin-Tai-Ngaam* or a land of beautiful Thai girls. The Northern Thai or Lanna people have their own script, literature, and culture. The Lanna script is very similar to the Shan script used by Shan people in Burma and in the religions texts of Laos. Some letters are also common to Mon and Burmese script. About 95 percent of the Lanna people are Buddhists with animistic beliefs. Most of them are peace lovers. (Ruengdet 1981 : 1-2)

2.2 Tonal Systems and Tone Features of the Lahu, Akha, Karen Languages, and Northern Thai Dialect

2.2.1 Tonal System and Tone Features of the Lahu Language

Matisoff (1973) states that there are 7 tones in Lahu. They are 5 open tones and 2 checked tones as follows:

Tone 1	33	mid
Tone 2	21	low - falling
Tone 3	54	high - falling
Tone 4	11	very low
Tone 5	45	high - rising
Tone 6	54ʔ	high - checked
Tone 7	21ʔ	low - checked

Bradley (1979) states that there are 7 tones in Red Lahu which are the same as Black Lahu as follows:

Tone 1	high - falling tone
Tone 2	half - low falling tone
Tone 3	half - high rising tone
Tone 4	low level tone
Tone 5	mid level tone
Tone 6	high - falling checked tone
Tone 7	half - low falling checked tone

The first five tones all occur in long vowel syllables which could be called "open". Tones 6 and 7 differ from tones 1 to 5. They are short vowel syllables with a final glottal stop which could be called "checked".

Solot Sirisai (1986) states that 7 tones in Lahu Nyi are divided into 3 glottalized tones and 4 non - glottalized tones as follows:

Tone 1	22	mid low level tone
Tone 2	22ʔ	mid low level glottalized tone
Tone 3	33	mid level tone
Tone 4	44	mid high level tone
Tone 5	45ʔ	high contour glottalized tone
Tone 6	44ʔ	mid high level glottalized tone
Tone 7	45	high contour tone

2.2.2 Tonal System and Tone Features of the Akha Language

Lewis (1968) states that there are 5 tones in Akha. They are 3 level tones occurring with oral vowels and 2 level tones occurring with laryngealized vowels.

Panadda (1993) states that there are 5 tones in Akha as follows:

/1/ - mid-level tone
/2/ - creaky-mid-level tone
/3/ - mid-low-falling tone
/4/ - glottalized-low-falling tone
/5/ - high-level tone

Goodman (1996) states that the Akha in Thailand can be divided into 3 groups : Ulo, Lomi, and Pamee. Though mostly their language features are the same, but they are somewhat different in some vocabulary and consonant pronunciations.

Goodman refers to Lewis that there are 5 tones in Akha, but in his book he focuses on high tone, low tone, and nasalization.

2.2.3 Tonal System and Tone Features of the Karen Language

Puttachart (1983) states that there are 6 tones in Karen. They are:

/1/ mid level tone
/2/ breathy high level tone
/3/ breathy low level tone
/4/ creaky low tone
/5/ glottalized high tone
/6/ glottalized low tone

2.2.4 Tonal System and Tone Features of Northern Thai Dialect

Brown (1965) states that there are the same number of tones in all Kham mueng with the same patterns of tonal split. However, Kham Mueng can be divided into 4 groups according to the tonal variations. They are:

1. Chiangrai dialect
2. Phrae - Nan dialect
3. Lampang dialect
4. Chiangmai dialect

The following chart is adapted from Brown (1965) to illustrate the tonal variation of 4 groups.

Table 1 : *Tonal variation of the 4 dialects of Kham Mueng*

Tones / Northern Thai Dialect	1	2	3	4	5	6
Chiangrai						
Phrae-Nan						
Lampang						
Chiangmai						

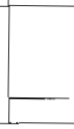
Mündhenk (1967) studies Kham Mueng spoken in 13 areas such as, Maehongson, Maesariang, Comthong, Chiangmai, Chiangrai, Nan, Lampang, Phrae, Lap-lae, Thoen, Tak, Sawhai and Khubua.

He states that Kham Mueng can be divided into 2 groups based on the tonal variation.

(i) Western Kham Mueng : This group comprises of Kham Mueng spoken in Maehongson, Masariang, Comthong, Chiangmai, Thoen, Tak, and Sawhai.

(ii) Eastern Kham Mueng : Kham Mueng spoken in Chiangrai, Lampang, Phrae, Nan, Lap-lae, and Khubua belong to this group.

Table 2 : *Tonal variation of the Western and Eastern Kham Mueng*

Tone	1	2	3	4	5
Western Kham Mueng					
Eastern Kham Mueng					

Katsura (1969) studies the phonological systems of Kham Mueng by collecting data from Chiangmai, Chiangrai, Maehongson, Lamphun, Lampang and Phrae. He finds that Kham Mueng can be classified into 2 groups according to the variation of tones in columns A3 and A4 of Gedney's tone test diagram.

(i) Chiangmai, Maehongson, and Lamphun have the mid level tone.
(ii) Chiangrai, Lampang, and Phrae have the mid level tone with a slightly rising at the end.

Ruengdet (1988) states that the Northern Thai dialect can be divided into 3 sub-dialects : Chiangmai, Chiangrai, and Phrae-Nan sub-dialect.

The Northern Thai dialect consists of 19-20 consonants, eighteen vowels, three diphthongs and six tones.

Tone 1 mid tone
Tone 2 low tone
Tone 3 falling tone
Tone 4 high tone
Tone 5 rising tone
Tone 6 high falling tone

Table 3 : *Tones of Northern Thai dialect*

	A	B	C	DL	DS
1	5	2	6	2	4/5
2	5	?	6	2	4/5
3	1	2	6	2	4/5
4	1	3	4	3	6

2.3 Other Related Literature

Gedney (1972) has presented a short-cut to discovering the structure of the tonal system of a Tai dialect by using a checklist for determining tones in Tai dialects which is obtained from the relation between initial consonants and tones as following :

	A	B	C	DL	DS
Voiceless friction sound, *s, hm, ph, etc.	1	5	9	13	17
Voiceless unaspirated, *p, t, k, etc.	2	6	10	14	18
Glottal, *ʔ, *ʔb, etc.	3	7	11	15	19
Voiced, *b, m, l, z, etc.	4	8	12	16	20
	Smooth Syllables			Checked Syllables	

This diagram displays a maximum of possible tonal distinctions resulting from the various types of tonal splits that have been described. In any given dialect there will be a division of each column of the chart into two or three tones, or in some cases no such division at all in one column or another. Most dialects will also show coalescence or syncretism between two or more belonging to different columns.

Suriya (1980) states that the problem of the Akha, Lahu, and Lisu children to learn the Thai language is the interference of their native languages in the secondary language.

She has compared the linguistic features of Thai with Akha, Lahu, and Lisu as follows:

Table 5 : ***Comparison of linguistic features between Thai and minority languages.***

Language / Linguistic features	Thai	Akha, Lahu, and Lisu
1. initial consonant	+ /r/ /s/ /n/	- /r/ /ts/ /ñ /
2. initial cluster consonant	/y/, /r/, /l/, /w/	/y/ (Akha), /w/ (Lahu and Lisu)
3. final consonant	+ final consonant	- final consonant
4. vowel	long and short vowel are significant	long and short vowel are not significant
5. sentence	Subject Verb Object	Subject Object Verb

CHAPTER III

MATERIALS AND METHODS

3.1 Place of Gathering Data

I selected the speech community of Mae-Yao sub-district, Mueng district, Chiangrai province, a highly cosmopolitan area composed of several ethnic groups, as the source for gathering data from Lahu, Akha, and Karen.

For Chiangrai's Northern Thai people, I selected Patung village, Paa-O-Donchai sub-district, Mueng district, Chiangrai province, because I have relatives living there.

3.2 Samples

A total of forty informants were chosen to be samples for this study and were divided into 4 groups:

(i) 10 Lahu
(ii) 10 Akha
(iii) 10 Karen
(iv) 10 Chiangrai's Northern Thai

The criteria for selecting the informants are:

3.2.1 Gender

All informants must be male, because in this study I have to consider the fundamental frequency. Male and female informants have different fundamental frequency range, that is, female informants have higher pitch than male; therefore, only one sex should be studied.

The reason for choosing men is male at Mae-Yao can speak Chiangrai's Northern Thai dialect fluently, whereas the female cannot because they rarely communicate with people outside their community.

3.2.2 Age

The informants have to be between 30-50 years old because the younger mostly have education in Thai school, they may have an interference from Standard Thai and the older probably have problems in speaking, such as the inefficiency of vocal cord or tooth loss, that can induce them produce unclear speech.

For my informants the youngest one is 31 years old and the oldest is 49.

3.2.3 Occupation

Most of my informants are farmers and laborers. Most laborers can speak Chiangrai's Northern Thai dialect fluently because they get employment with the Northern Thai people in town.

3.2.4 Education

All informants in each ethnic group, except Chiangrai's Northern Thai, must not have education in Thai school or ever, must not higher than primary education because Standard Thai may interfere when these people speak Chiangrai's Northern Thai dialect.

3.2.5 Settlement

Firstly, I stipulated the informants must be born in their village but I could not find one. All of them were immigrants. Then, I stipulated that the informants, Lahu, Akha, and Karen, must live in their village more than 30 years and the Northern Thai people must be born and live in their village.

3.2.6 Language Use

Chiangrai's Northern Thai : must speak Chiangrai's Northern Thai dialect as native language.

Lahu : must speak Lahu as native language and Chiangrai's Northern Thai dialect as lingua franca.

Akha : must speak Akha as native language and Chiangrai's Northern Thai dialect as lingua franca.

Karen : must speak Karen as native language and Chiangrai's Northern Thai dialect as lingua franca.

3.3 Materials Used in the Study

3.3.1 Word List for Determining Tones

There are two wordlists used in the research as follows:

1. Lahu, Akha, and Karen wordlist
2. Chiangrai's Northern Thai dialect wordlist

The first lists were obtained from the following theses : *The Phonological Description of Lahu Nyi Language Spoken in Chayi Village, Patung Sub-District, Mae Chan District, Chiangrai Province* (Solot 1986), *A Phonological study of Akha in Pa-Kha-Suk-jai Village, Tambol Mae-Sa-Long-Nok, King-Ampher Mae-Fa-Luang, Chiangrai Province* (Panadda 1993), and *The Phonology of Sgaw Karen, with Comparisons with Thai* (Puttachart 1983).

The second list was created by this author, adapted from Gedney's checklist for determining tones as follows:

1. There are total 20 words in the list, placed in the tone box which are A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, C4, DL1, DL2, DL3, DL4, DS1, DS2, DS3, and DS4.
2. Initial consonants in box A1, B1, C1, DL1, and DS1 are high consonant.
3. Initial consonants in box A2, A3, B2, B3, C2, C3, DL2, DL3, DS2, and DS3 are middle consonant.
4. Initial consonants in box A4, B4, C4, DL4, and DS4 are low consonant.
5. Words in box A1-4, B1-4, and C1-4 are smooth syllables.
6. Words in box DL1-4 are long-checked syllables.
7. Words in box DS1-4 are short-checked syllables.
8. Initial consonants in each box are voiceless sound except box A3, B3, C3, DL3, and DS3 are voiced.
9. Words in each box are monosyllabic words.
10. Vowels in each box are low central unrounded vowel : a.

Table 6 : *A checklist for determining tones in Northern Thai dialect*

khaa 'leg'	khaw 'knee'	khaaw 'rice'	khaat 'to be torn'	khat 'to scrub'
taa 'eye'	paa 'jungle'	paa 'aunt'	paat 'to sweep'	pat 'to wipe'
daaw 'star'	daang 'piebald'	daay 'cord'	daap 'sword'	dak 'to trap'
khaang 'chin'	kham 'dusk'	khaa 'to trade'	khaat 'to buckle'	khat 'to select'

After I had created this wordlist, I checked these 20 words with native Northern Thai who lived in Bangkok for correcting the list. Since there is a word that differs from Northern Thai dialect, for example "naan (a long time)" is pronounced as "[mɔɔn] (a long time)" in northern Thai dialect then I had to correct the list by using another word.

Thereafter, I brought these 20 words to sampling, 5 times each word, total 100 words divided into 60 smooth syllables and 40 checked syllables as the following table:

Table 7 : *Smooth syllables*

1. khaa1 'leg'	11. daaw1 'star'	21. daay2 'cord'	31. kham3 'dusk'	41. taa3 'eye'	51. khaaw5 'rice'
2. paa1 'jungle'	12. paa3 'jungle'	22. taa1 'eye'	32. daang3 'piebald'	42. daang4 'piebald'	52.khaang5 'chin'
3. khaa1 'to trade'	13. khaaw1 'rice'	23. khaw2 'knee'	33. paa5 'jungle'	43. khaa5 'leg'	53. taa4 'eye'
4. daang1 'piebald'	14. khaw1 'knee'	24. khaa3 'to trade'	34. daaw4 'star'	44.khaang4 'chin'	54. daay5 'cord'
5. khaang1 'chin'	15. paa2 'aunt'	25. khaaw3 'rice'	35. khaw3 'knee'	45. khaa4 'to trade'	55. kham4 'dusk'
6. paa2 'jungle'	16. kham2 'dusk'	26. paa4 'jungle'	36. daay3 'cord'	46. khaaw4 'rice'	56. khaa5 'to trade'
7. khaa2 'leg'	17. daay1 'cord'	27.khaang2 'chin'	37. taa2 'eye'	47. daay4 'cord'	57. paa5 'aunt'
8. daang2 'piebald'	18. daaw2 'star'	28. khaa3 'leg'	38.khaang3 'chin'	48. paa4 'aunt'	58. khaw5 'knee'
9. paa1 'aunt'	19. khaaw2 'rice'	29. daaw3 'star'	39. khaa4 'leg'	49. daang5 'piebald'	59. kham5 'dusk'
10. kham1 'dusk'	20. khaa2 'to trade'	30. paa3 'aunt'	40. daaw5 'star'	50. khaw4 'knee'	60. taa5 'eye'

Table 8 : *Checked syllables*

1. khaat1 'to be torn'	9. khat2 'to select'	17. dak2 'to trap'	25. khat3 'to scrub'	33. dak4 'to trap'
2. daap1 'sword'	10. khat1 'to scrub'	18. khaat3 'to buckle'	26. daap3 'sword'	34. pat5 'to wipe'
3. pat1 'to wipe'	11. paat2 'to sweep'	19. khaat3 'to be torn'	27. pat4 'to wipe'	35. khaat5 'to buckle'
4. dak1 'to trap'	12. khaat2 'to be torn'	20. khat2 'to scrub'	28. khaat5 'to be torn'	36. khat5 'to select'
5. paat1 'to sweep'	13. khaat2 'to buckle'	21. khat4 'to select'	29. paat4 'to sweep'	37. daap5 'sword'
6. khaat1 'to buckle'	14. pat3 'to wipe'	22. dak3 'to trap'	30. khat4 'to scrub'	38. paat5 'to sweep'
7. khat1 'to select'	15. khat3 'to select'	23. khaat4 'to be torn'	31. khaat4 'to buckle'	39. dak5 'to trap'
8. pat2 'to wipe'	16. daap2 'sword'	24. paat3 'to sweep'	32. daap4 'sword'	40. khat5 'to scrub'

3.3.2 Instruments

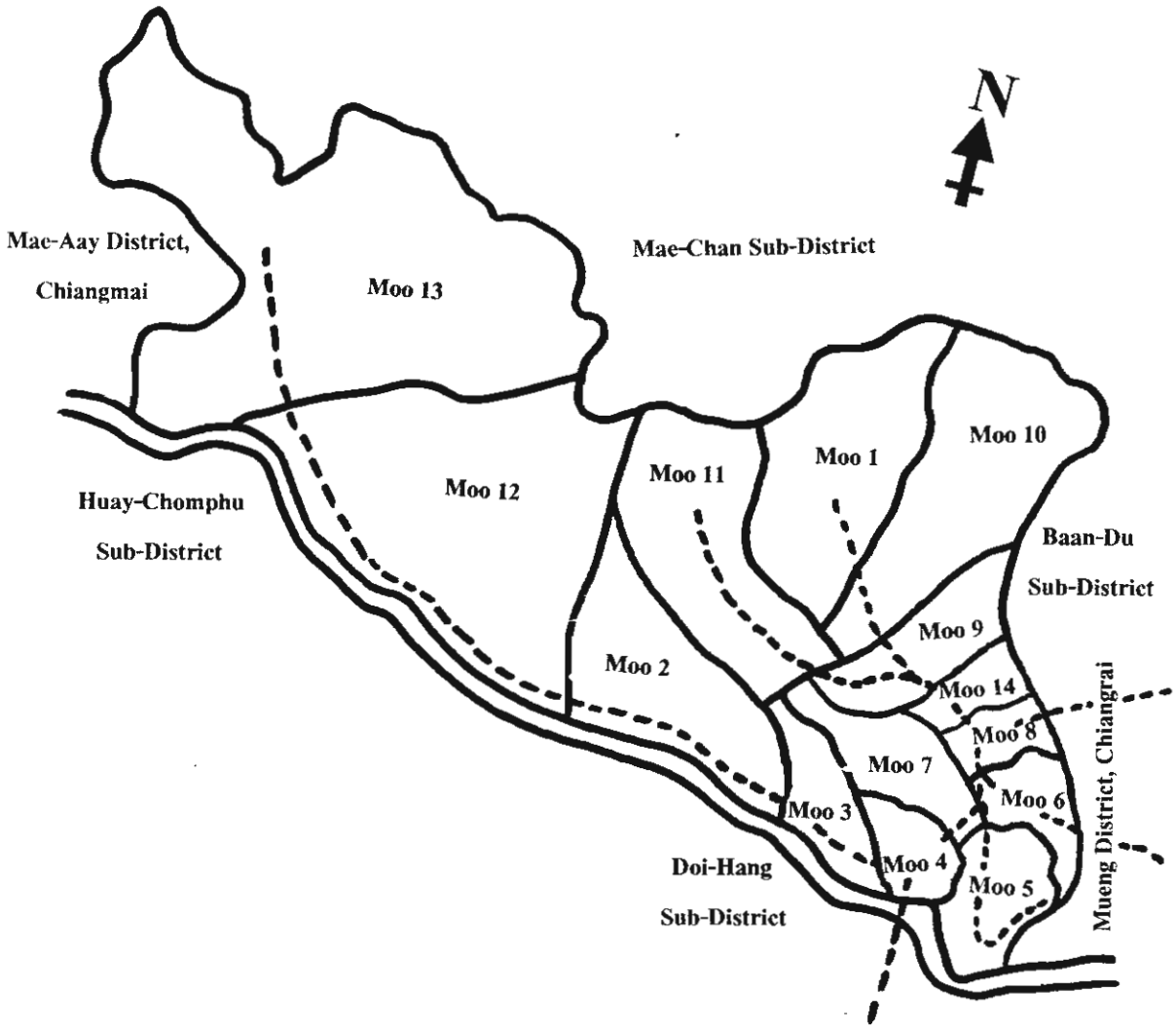
1. Aiwa stereo radio cassette recorder, version JS479.
2. Forty cassettes (Sony EF60).
3. Pictures.
4. A computer software program CECIL version 2.2.

3.4 Method of Gathering Data

At the beginning of March, 2000, I went to survey field information at Mae-Yao sub-district, Mueng district, Chiangrai province.

At first, I had contacted the leader of Mae-Yao and asked for the map and the list of village names in this area. The villages at Mae-Yao are as follows:

1. Moo 1, Huaykhomnai village
2. Moo 2, Ruammit village
3. Moo 3, Huaysaikhaaw village
4. Moo 4, Rimkok village
5. Moo 5, Paa-ao village
6. Moo 6, Sanpaayaang village
7. Moo 7, Klaangtung village
8. Moo 8, Saimoon village
9. Moo 9, Tungluang village
10. Moo 10, Huaykhomnok village
11. Moo 11, Huaymaesai village
12. Moo 12, Kwaewuadam village
13. Moo 13, Panasawan village
14. Moo 14, Siriraat village



1. Moo 1, Huaykhomnai village
2. Moo 2, Ruammit village
3. Moo 3, Huaysaikhaaw village
4. Moo 4, Rimkok village
5. Moo 5, Paa-ao village
6. Moo 6, Sanpaayaang village
7. Moo 7, Klaangtung village
8. Moo 8, Saimoon village
9. Moo 9, Tungluang village
10. Moo 10, Huaykhomnok village
11. Moo 11, Huaymaesai village
12. Moo 12, Kwaewuadam village
13. Moo 13, Panasawan village
14. Moo 14, Siriraat village

Figure 4 : ***Map of Mae-Yao Sub-district***

But there are merely 9 villages where the hilltribe lives. They are:

1. Moo 1, Huaykhomnai village
2. Moo 2, Ruammit village
3. Moo 3, Huaysaikhaaw village
4. Moo 6, Sanpaayaang village
5. Moo 7, Klaangtung village
6. Moo 10, Huaykhomnok village
7. Moo 11, Huaymaesai village
8. Moo 12, Kwaewuadam village
9. Moo 13, Panasawan village

Since I knew the name and location of the villages, I decided to survey the lifestyles of people in each village first. Thereafter, I started to gather data in every village where the hilltribes live, except Moo 12, Khwaewuadam village, and Moo 13, Panasawan village, because both villages are very far away from the other villages.

For data gathering, I interviewed a total of forty informants and recorded their pronunciation in both citation form and connected speech into the cassette recorder. The methods are as follows:

1.) Citation form

For Chiangrai's Northern Thai dialect, each of informants was presented with the picture catalog and was asked to pronounce the wordlist with the sentence frame, "Au kam waa.....song tuea (to say a word.....twice.)", following each picture. There were 100 words for each informant and 4,000 words for all informants.

For the native languages, Lahu, Akha, and Karen, the informants were asked to pronounce the selected words from a wordlist. They would then repeated each word after me in their native languages. That is, I said the word in Chiangrai's Northern Thai dialect first and then the informant pronounced that word in his native language clearly and slowly.

2.) Connected speech

In both Chiangrai's Northern Thai dialect and the native languages of each group, the informants could talk about whatever they want such as biography, farming, tradition, etc. Each word chosen from connected speech must be stressed and does not occur at initial or final position of utterance.

3.5 Methods of Data Analyzing

3.5.1 To analyze the tonal systems of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, Karen and native speaker

Auditory judgement was used in analyzing the tonal systems of Chiangrai's Northern Thai dialect. The tonal system of each informant was divided into 4 groups. They are:

Group 1 tonal system of Chiangrai's Northern Thai dialect pronounced by Lahu.

Group 2 tonal system of Chiangrai's Northern Thai dialect pronounced by Akha.

Group 3 tonal system of Chiangrai's Northern Thai dialect pronounced by Karen.

Group 4 tonal system of Chiangrai's Northern Thai dialect pronounced by native speaker.

3.5.2 To analyze the tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, Karen and native speaker

1. A computer software program called "CECIL" was used to analyze the tone features by considering fundamental frequency and fundamental frequency curve of each utterance. The procedures are as follows:

1.1 Turn on the computer and click ***wincecil*** icon.
1.2 Click ***setting*** > ***general program setting*** > ***use color*** for convenience to consider the fundamental frequency curve.
1.3 Click ***record utterance*** > press ***play*** button on cassette recorder > ***record*** > ***ok***.
1.4 Click ***frequency graph derivation*** to adjust the fundamental frequency range.
1.5 Set the origin of word by pressing ***shift*** button while clicking the left of mouse
1.6 Set the end of word by clicking the left of mouse.
1.7 Set the duration of every word by normalization.
1.8 Measure fundamental frequency every 10% interval beginning with 0% until 100%, total 11 points.

For example, the duration of a word is 159 milliseconds.

10% of all of duration is $\frac{159}{10} = 15.9 \approx 16$ milliseconds.

0% = 0 millisecond
Fo = 109.7 Hz

10% = 16 milliseconds
Fo = 108.4 Hz

20% = 32 milliseconds
Fo = 107.4 Hz

30% = 48 milliseconds
Fo = 106.3 Hz

40% = 64 milliseconds
Fo = 106.1 Hz

50% = 80 milliseconds
Fo = 106.2 Hz

60% = 96 milliseconds
Fo = 106.7 Hz

70% = 112 milliseconds
Fo = 107.4 Hz

80% = 128 milliseconds
Fo = 107.2 Hz

90% = 144 milliseconds
Fo = 107.7 Hz

100% = 160 milliseconds
Fo = 108.8 Hz

1.9 Record the results into the table below.

Table 9 : *Fundamental frequency and duration of "khaw"*

Name *Achong Mayer* **Age** *38 years old* **Village** *Huaysaikhaaw* **Ethnic group** *Akha*												
word ***'knee'***	*Duration (ms)*	*0%*	*10%*	*20%*	*30%*	*40%*	*50%*	*60%*	*70%*	*80%*	*90%*	*100%*
khaw No.1	90.0	122.6	122.6	121.8	120.6	119.4	118.4	117.5	116.1	114.3	112.6	111.7
khaw No.2	168.0	111.1	110.3	108.7	107.7	106.6	106.4	106.2	106.0	105.2	102.9	101.3
khaw No.3	199.0	111.7	109.6	107.9	107.2	106.9	106.8	106.4	106.1	106.6	105.8	105.2
khaw No.4	159.0	109.7	108.4	107.4	106.3	106.1	106.2	106.7	107.4	107.2	107.7	108.8
khaw No.5	136.0	115.8	111.1	107.4	106.4	106.1	106.0	106.4	107.0	107.4	106.9	106.6

2. Compile the fundamental frequency for chart plotting by Microsoft Excel as follows:

2.1 Insert the results, the same as 1.9, but no duration data into the table.

Table 10 : *Fundamental frequency of "khaw"in MS Excel*

	A	B	C	D	E	F	G	H	I	J	K	L
1	**Name** *Achong Mayer* **Age** *38 years old* **Village** *Huaysaikhaaw* **Group** *Akha*											
2		*0%*	*10%*	*20%*	*30%*	*40%*	*50%*	*60%*	*70%*	*80%*	*90%*	*100%*
3	*khaw No.1*	122.6	122.6	121.8	120.6	119.4	118.4	117.5	116.1	114.3	112.6	111.7
4	*khaw No.2*	111.1	110.3	108.7	107.7	106.6	106.4	106.2	106.0	105.2	102.9	101.3
5	*khaw No.3*	111.7	109.6	107.9	107.2	106.9	106.8	106.4	106.1	106.6	105.8	105.2
6	*khaw No.4*	109.7	108.4	107.4	106.3	106.1	106.2	106.7	107.4	107.2	107.7	108.8
7	*khaw No.5*	115.8	111.1	107.4	106.4	106.1	106.0	106.4	107.0	107.4	106.9	106.6
8												

2.2 Calculate the average of fundamental frequency of the word.

2.2.1 Click on ***B8***.

2.2.2 Highlight ***B8*** to ***B3*** by pressing ***Shift*** and arrow key (↑).

2.2.3 Click ***insert function > average > ok***.

2.2.4 Insert ***B3:B7*** average at ***number 1*** block then click ***ok***.

2.2.5 The average of "*khaw*" at 0% is **114.2**.

Table 11 : *The average of "khaw" at 0%*

	A	B	C	D	E	F	G	H	I	J	K	L
1	**Name** *Achong Mayer* **Age** *38 years old* **Village** *Huaysaikhaaw* **Group** *Akha*											
2		*0%*	*10%*	*20%*	*30%*	*40%*	*50%*	*60%*	*70%*	*80%*	*90%*	*100%*
3	*khaw No.1*	122.6	122.6	121.8	120.6	119.4	118.4	117.5	116.1	114.3	112.6	111.7
4	*khaw No.2*	111.1	110.3	108.7	107.7	106.6	106.4	106.2	106.0	105.2	102.9	101.3
5	*khaw No.3*	111.7	109.6	107.9	107.2	106.9	106.8	106.4	106.1	106.6	105.8	105.2
6	*khaw No.4*	109.7	108.4	107.4	106.3	106.1	106.2	106.7	107.4	107.2	107.7	108.8
7	*khaw No.5*	115.8	111.1	107.4	106.4	106.1	106.0	106.4	107.0	107.4	106.9	106.6
8	*Average*	**114.2**										

2.2.6 Click on ***B8 > copy***.
2.2.7 Click on ***C8 > paste*** then the average of "khaw" at 10% is ***112.4***.
2.2.8 Click on ***D8 > paste, E8 > paste, F8 > paste, ... ,L8 > paste*** then the average of "khaw" at 20% - 100% will present.

Table 12 : *The average of "khaw" at 0%-100%*

	A	B	C	D	E	F	G	H	I	J	K	L
1	**Name** *Achong Mayer* **Age** *38 years old* **Village** *Huaysaikhaaw* **Group** *Akha*											
2		*0%*	*10%*	*20%*	*30%*	*40%*	*50%*	*60%*	*70%*	*80%*	*90%*	*100%*
3	*khaw No.1*	122.6	122.6	121.8	120.6	119.4	118.4	117.5	116.1	114.3	112.6	111.7
4	*khaw No.2*	111.1	110.3	108.7	107.7	106.6	106.4	106.2	106.0	105.2	102.9	101.3
5	*khaw No.3*	111.7	109.6	107.9	107.2	106.9	106.8	106.4	106.1	106.6	105.8	105.2
6	*khaw No.4*	109.7	108.4	107.4	106.3	106.1	106.2	106.7	107.4	107.2	107.7	108.8
7	*khaw No.5*	115.8	111.1	107.4	106.4	106.1	106.0	106.4	107.0	107.4	106.9	106.6
8	*Average*	**114.2**	**112.4**	**110.6**	**109.6**	**109.0**	**108.8**	**108.6**	**108.5**	**108.1**	**107.2**	**106.7**

2.3 Highlight ***A2*** to ***L8*** by mouse.
2.4 Click ***insert chart*** > select chart type '***line***' > ***next*** > select series in ***rows*** > ***next***.
2.5 Chart title: ***The average of fundamental frequency of "khaw"***.
Category [X] axis : ***duration (%)***.
Value [Y] axis : ***Fo (Hz)***.
Then click ***next***.
2.6 Place chart as a new sheet.
2.7 Click ***finish***.
2.8 Adjust the chart properly.

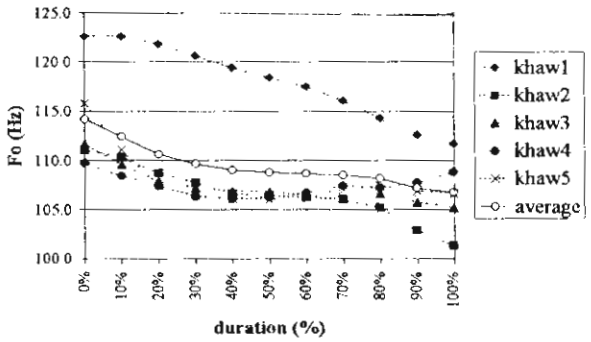


Figure 5 : *The average of fundamental frequency of "khaw (knee)"*

3. Use the same procedure with other words then put each chart into the same diagram for analyzing tone features as follows:

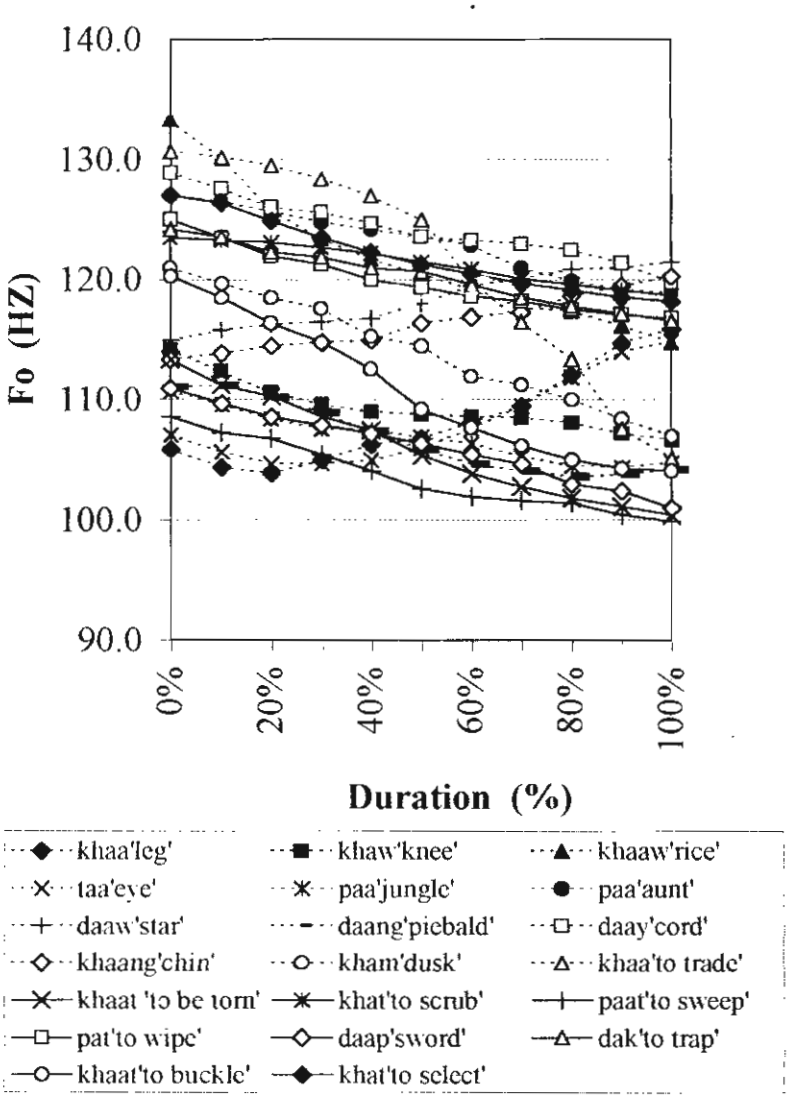


Figure 6 : ***The average of each word pronounced by Achong Mayer***

3.1 Draw the parallel line with X axis from 0% to 100% at the lowest range of fundamental frequency curve and draw the parallel again at the highest range of fundamental frequency curve of the chart.

3.2 The six lines are drawn horizontally to divide the fundamental frequency range into 5 sections. The first two lines represent the first fundamental frequency range (Pornsri, 1989). Note that if the five lines are drawn, the first line will also represent the first fundamental frequency range. Kalaya (1990) states that if the fundamental frequency range is divided into five sections (six horizontal lines), the fundamental frequency range can be studied in more detail than other studies.

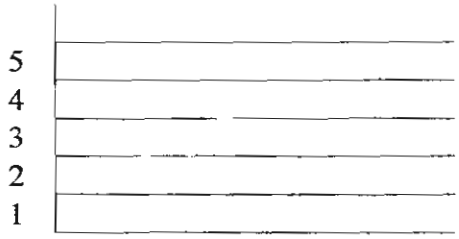


Figure 7 : ***The fundamental frequency range divided into 5 sections***

1st section means low pitch
2nd section means mid-low pitch
3rd section means mid pitch
4th section means mid-high pitch
5th section means high pitch

To describe the pitch of each tone, I use the 2 or 3 numeral to describe the beginning point, change point, and the end of the point of fundamental frequency curve. For example:

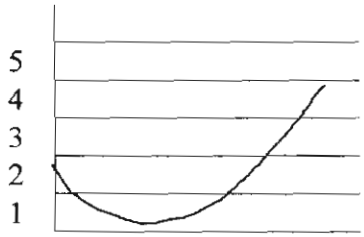


Figure 8 : ***Low-falling-rising tone***

From the chart, the beginning point of fundamental frequency curve is at the 2nd section; the change point is at the 1st section; and the end of the point is at the 4th section then describe [214] as low-falling-rising tone.

4. After finishing the analysis of the tone features of all informants, I divide them into 4 groups, the same as analyzing tonal systems.

Group 1 tone features of Chiangrai's Northern Thai dialect pronounced by Lahu.

Group 2 tone features of Chiangrai's Northern Thai dialect pronounced by Akha.

Group 3 tone features of Chiangrai's Northern Thai dialect pronounced by Karen.

Group 4 tone features of Chiangrai's Northern Thai dialect pronounced by native speakers.

5. Calculate the average of each group. As if the apparent difference is found in the same group then separate it as a sub-tone feature in the ethnic group.

6. Compare the tone features of Chiangrai's Northern Thai dialect of each group.

3.5.3 To analyze the tonal systems and the tone features of the Lahu, Akha, and Karen languages

Analyze the record data of each group by WinCECIL program which is the same as 3.5.2. The tonal system is based on smooth syllables only, because the Lahu, Akha, and Karen languages have no checked syllables.

3.5.4 To compare the tonal systems and the tone features

After finishing the data analysis, the tonal systems and tone features of Chiangrai s Northern Thai dialect pronounced by the Lahu, Akha, and Karen people will be compared in three ways as follows:

(i) To be compared with their native languages in only citation form because the researcher has not yet mastered the whole systems of the Lahu, Akha, and Karen languages, so it is difficult for the researcher to single out the words from the connected speech.

(ii) To be compared with Chiangrai s Northern Thai dialect pronounced by the native speakers in both citation form and connected speech.

(iii) To be compared with each other in both citation form and connected speech.

CHAPTER IV

TONAL SYSTEMS AND TONE FEATURES OF CHIANGRAI'S NORTHERN THAI DIALECT, LAHU, AKHA, AND KAREN PRONOUNCED BY NATIVE SPEAKERS

The results of the analysis indicate that there are 6 tones in Chiangrai's Northern Thai Dialect, 7 tones in Lahu, 5 tones in Akha, and 6 tones in Karen as follows:

4.1 Tonal Systems and Tone Features of Chiangrai's Northern Thai Dialect

4.1.1 Tonal system in citation form

Table 13 : ***Pattern of tones in citation form of Chiangrai's Northern Thai dialect pronounced by native speakers***

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 5*	*Tone 3*	*Tone 2*
Tone 2	*Tone 4*	*Tone 6*	*Tone 4*	*Tone 5*

Following table 13, the tonal system, it is interesting to note that tone ***A*** reflects the glottalization split and the tones in other columns, ***B***, ***C***, ***DL***, and ***DS***, always reflect the voiced-voiceless split.

4.1.2 Tone features in citation form

1) Tone 1 : Low - falling - rising tone [212]

The pitch pattern of this tone starts at 105.3 Hz, and glides down to about 98.3 Hz, then rises quickly to about 107.5 Hz (see figures 9 and 17).

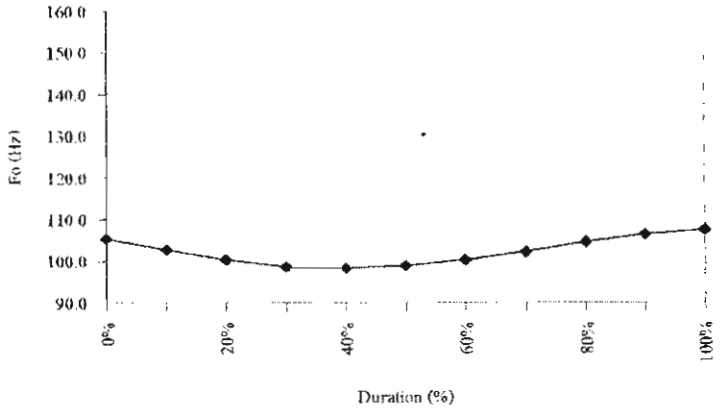


Figure 9 : ***Tone 1 in citation form of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[hu:^{212}]	'ear'
	[k^{h}a:^{212}]	'leg'
	[pi:^{212}]	'year'
	[kin^{212}]	'to eat'

2.) Tone 2 has 2 allotones which are in complementary distribution as follows:

2.1) Low - rising tone (occurs with smooth syllables) [23]

The pitch pattern of this tone starts at 116.5 Hz and glides up to about 126.6 Hz (see figures 10 and 17).

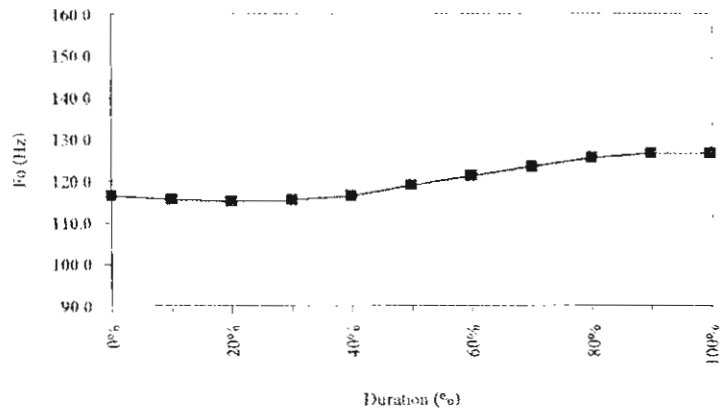


Figure 10 : ***Tone 2 on smooth syllables in citation form of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[bin^{23}]	'to fly'
	[dæːŋ^{23}]	'red'
	[miː^{23}]	'hand'
	[nɔːn^{23}]	'to lie down'

2.2) Mid - rising tone (occurs with checked syllables) [35]

The pitch pattern of this tone starts at 127.2 Hz and rises to about 146.4 Hz (see figures 11 and 17).

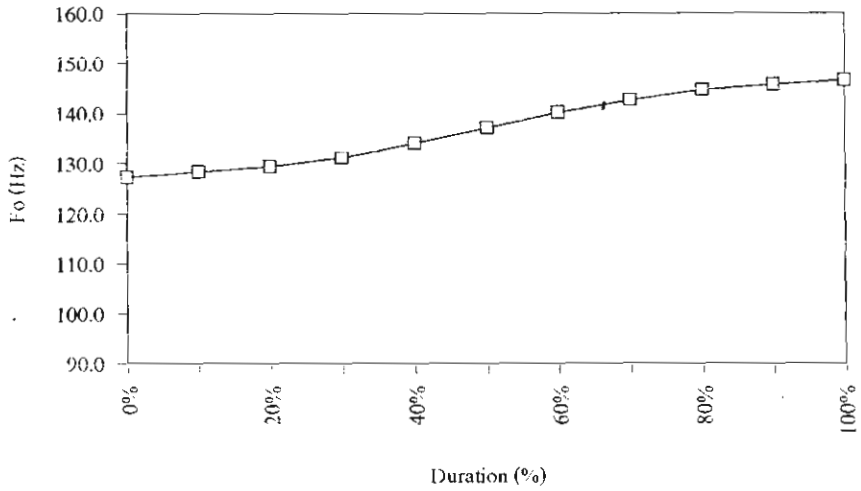


Figure 11 : ***Tone 2 on checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[pʰak^{35}]	'vegetable'
	[sip^{35}]	'ten'
	[tok^{35}]	'to fall'
	[ʔok^{35}]	'chest'

3.) Tone 3 : Low - level tone [22]

The pitch pattern of this tone starts at 120.7 Hz on smooth syllables and 120.3 Hz on checked syllables and glides down a little to about 110.0 Hz on smooth syllables and 112.4 Hz on checked syllables (see figures 12 and 17).

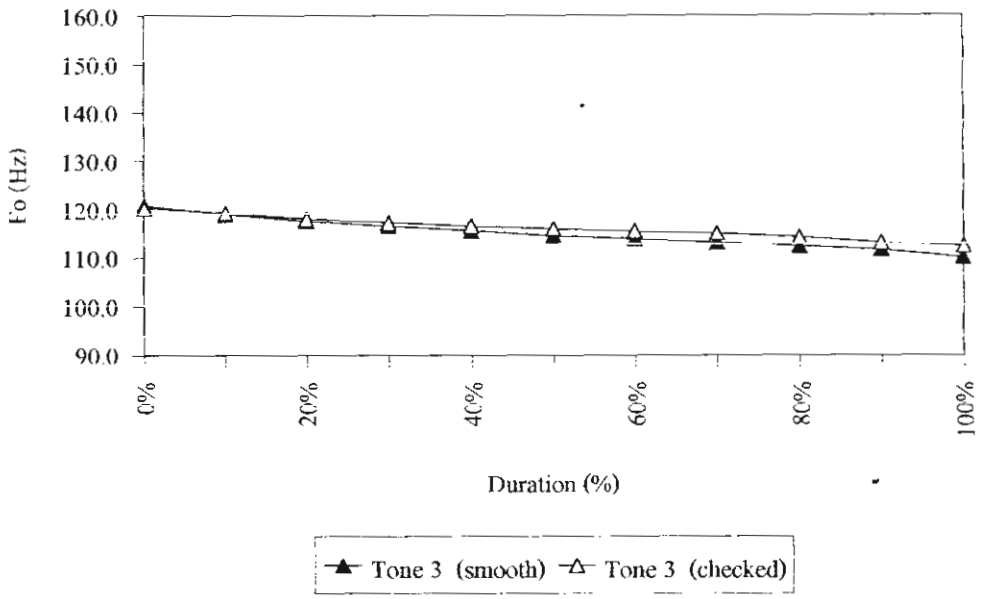


Figure 12 : ***Tone 3 on smooth and checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[si:^{22}]	'four'
	[taw^{22}]	'turtle'
	[bæŋ^{22}]	'to divide'
	[k^{h}a:t^{22}]	'to be torn'
	[kɔ:t^{22}]	'to embrace'
	[bɔ:t^{22}]	'blind'

4.) Tone 4 : Mid - falling tone [31]

The pitch pattern of this tone starts at 124.1 Hz on smooth syllables and 125.4 Hz on checked syllables and falls to about 95.1 Hz on smooth syllables and 103.1 Hz on checked syllables (see figures 13 and 17)

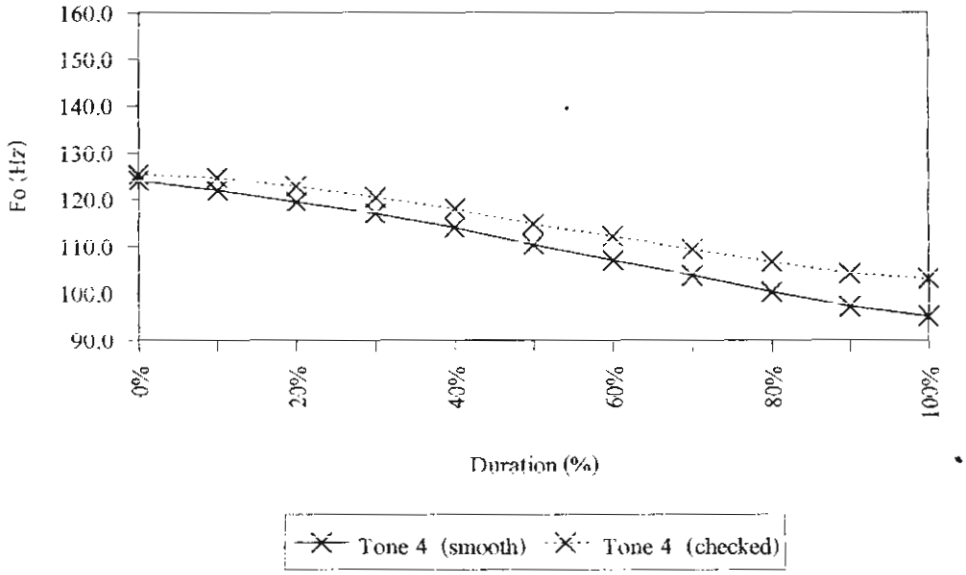


Figure 13 : ***Tone 4 on smooth and checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[pɔ:^{31}]	'father'
	[hay^{31}]	'plantation'
	[liət^{31}]	'blood'
	[ha:k^{31}]	'root'

5.) Tone 5 has 2 allotones which are in complementary distribution as follows:

5.1) High-mid-falling tone (occurs with smooth syllables) [43]

The pitch pattern of this tone starts at 138.1 Hz and glides down to about 122.6 Hz (see figures 14 and 17).

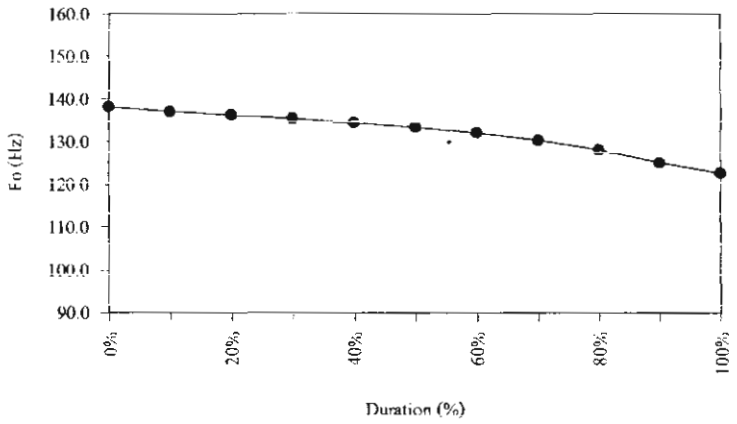


Figure 14 : ***Tone 5 on smooth syllables in citation form of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[ya:^{43}]	'grass'
	[ka:w^{43}]	'nine'
	[tom^{43}]	'to boil'
	[da:y^{43}]	'cord'

5.2) High-high-falling tone (occurs with checked syllables) [54]

The pitch pattern of this tone starts at 152.9 Hz and glides down to about 140.2 Hz (see figures 15 and 17).

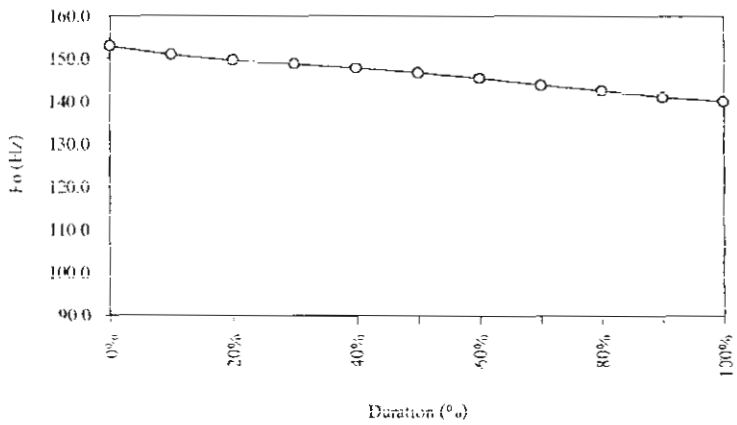


Figure 15 : ***Tone 5 on checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[hak^{54}]	'to love'
	[nok^{54}]	'bird'
	[wat^{54}]	'temple'
	[k^{h}at^{54}]	'to select'
	[lep^{54}]	'nail'
	[mot^{54}]	'ant'

6.) Tone 6 : High - low falling tone [52]

The pitch pattern of this tone starts at 154.0 Hz and falls quickly to about 106.7 Hz (see figures 16 and 17).

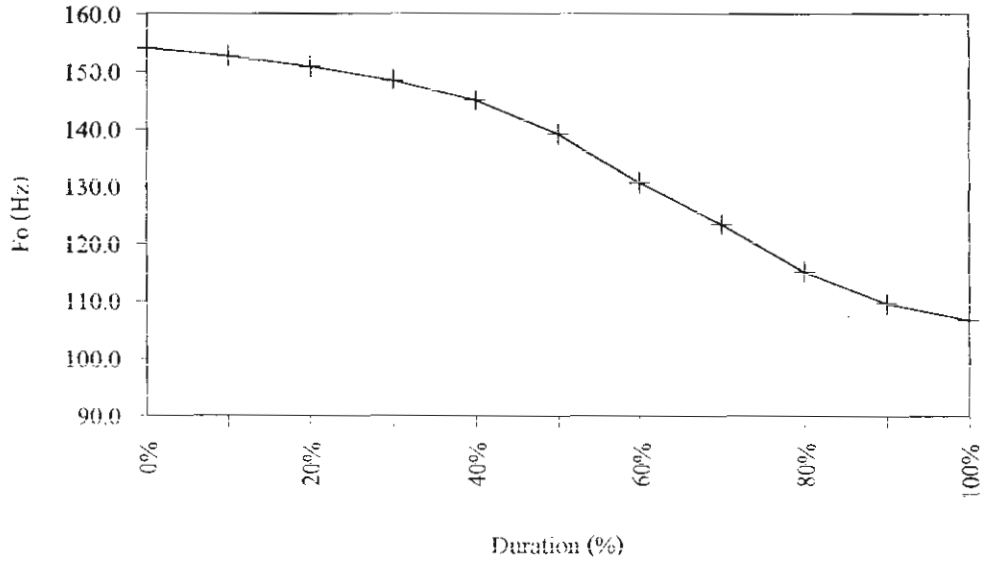


Figure 16 : ***Tone 6 in citation form of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[kiw^{52}]	'eyebrows'
	[to:ŋ^{52}]	'stomach'
	[na:m^{52}]	'water'
	[lin^{52}]	'tongue'
	[ma:^{52}]	'horse'

All the tones on smooth and checked syllables are put into the same diagram as follows:

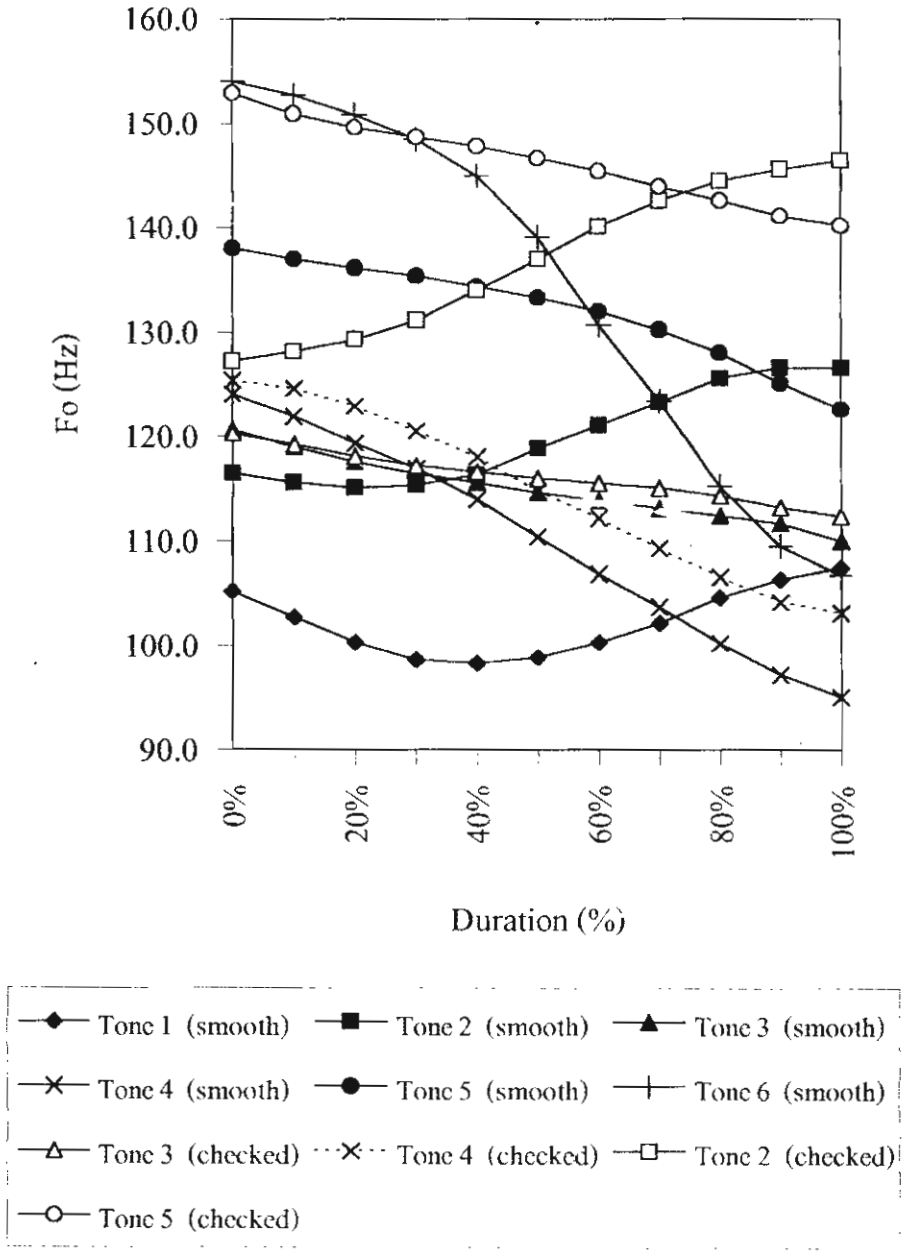


Figure 17 : ***Tone features in citation form of Chiangrai's Northern Thai dialect pronounced by native speakers***

4.1.3 Tonal system in connected speech

Table 14 : ***Pattern of tones in connected speech of Chiangrai's Northern Thai dialect pronounced by the native speakers***

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 5*	*Tone 3*	*Tone 2*
Tone 2	*Tone 4*	*Tone 6*	*Tone 4*	*Tone 5*

Following table 14, the tonal system, it is interesting to note that tone ***A*** reflects the glottalization split and the tones in other columns, ***B***, ***C***, ***DL***, and ***DS***, always reflect the voiced-voiceless split.

4.1.4 Tone features in connected speech

1.) Tone 1 : Low - falling - rising tone [212]

The pitch pattern of this tone starts at 123.6 Hz, and glides down to about 112.6 Hz, then rises quickly to about 126.9 Hz (see figures 18 and 26).

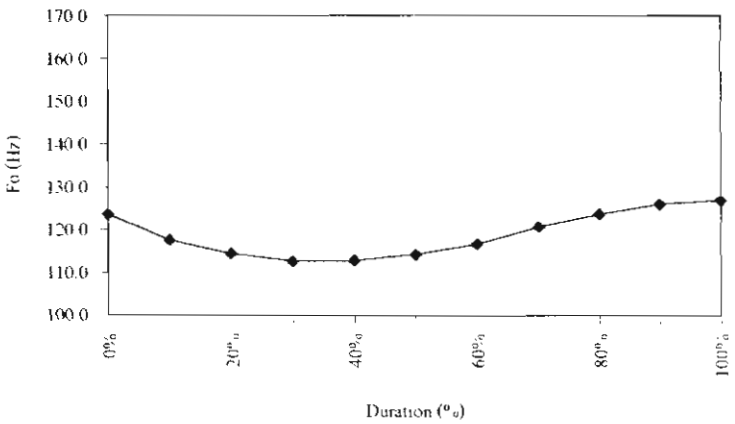


Figure 18 : ***Tone 1 in connected speech of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[si:^{212}]	'color'
	[mu:^{212}]	'pig'
	[tæ:ŋ^{212}]	'cucumber or melon'
	[kɔ:ŋ^{212}]	'pile'

2.) Tone 2 has 2 allotones which are in complementary distribution as follows:

2.1) Mid - rising tone (occurs with smooth syllables) [35]

The pitch pattern of this tone starts at 134.5 Hz and rises quickly to about 158.7 Hz (see figures 19 and 26).

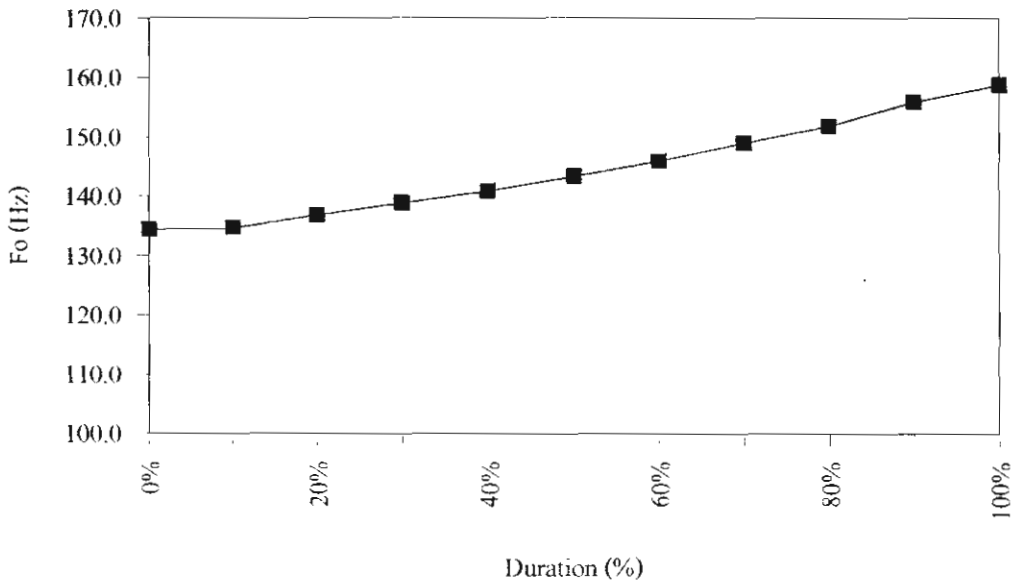


Figure 19 : ***Tone 2 on smooth syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[diən^{35}]	'month'
	[di:^{35}]	'good'
	[mi:^{35}]	'to have'
	[pæ:ŋ^{35}]	'expensive'

2.2) High - rising tone (occurs with checked syllables) [45]

The pitch pattern of this tone starts at 153.0 Hz and glides up to about 169.5 Hz (see figures 20 and 26).

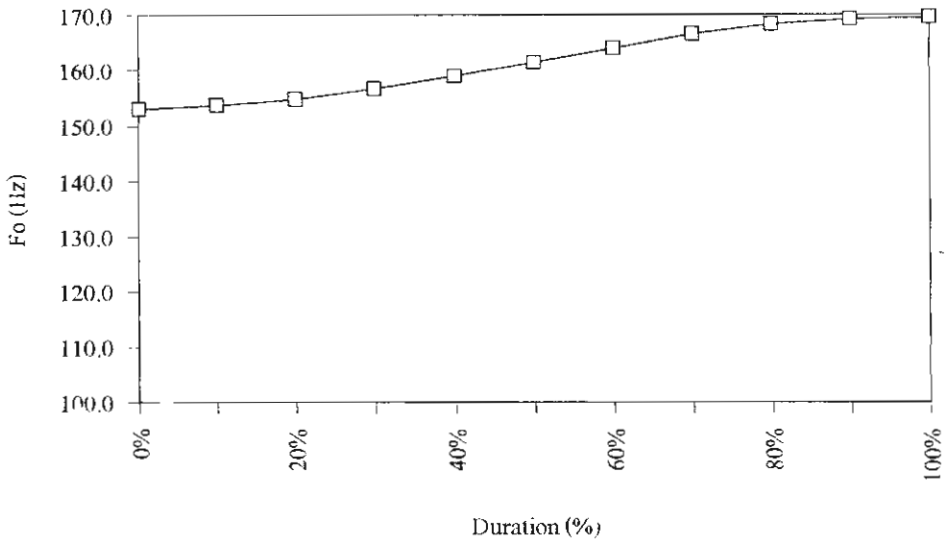


Figure 20 : ***Tone 2 on checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[lek^{45}]	'iron'
	[tat^{45}]	'to cut'
	[dip^{45}]	'raw'
	[bat^{45}]	'card'

3.) Tone 3 : Low - falling tone [21]

The pitch pattern of this tone starts at 127.4 Hz on smooth syllables and 127.2 Hz on checked syllables and glides down to about 114.2 Hz on both smooth and checked syllables (see figures 21 and 26).

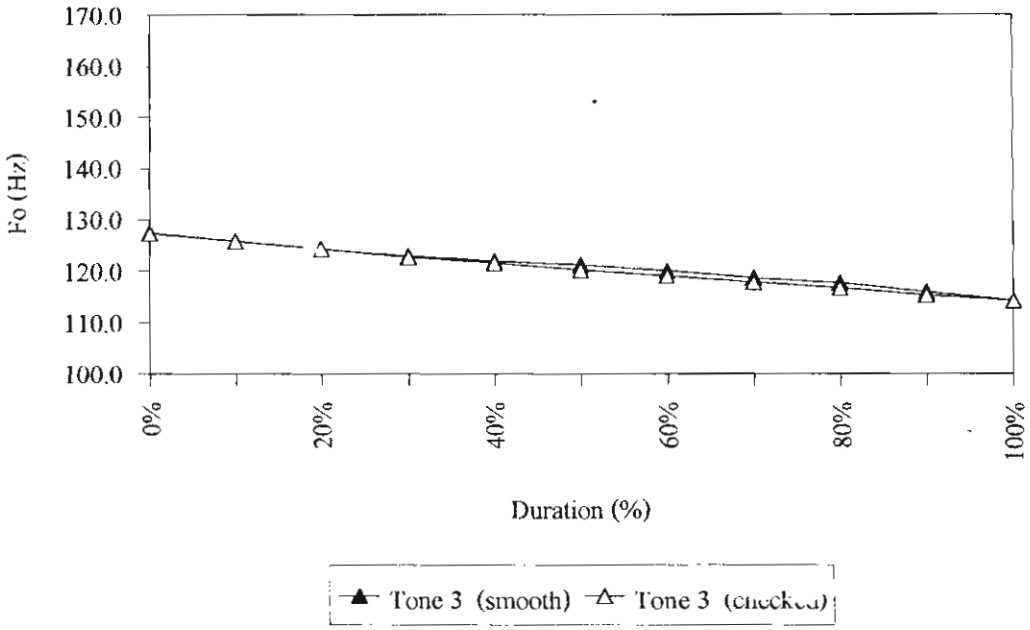


Figure 21 : ***Tone 3 on smooth and checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[$k^ha:w^{21}$]	'news'
	[kaw^{21}]	'ancient, old'
	[den^{21}]	'prominent'
	[$t^hu:k^{21}$]	'cheap'
	[$pæ:t^{21}$]	'eight'
	[$bɔ:k^{21}$]	'to tell'

4.) Tone 4 : Mid - falling tone [31]

The pitch pattern of this tone starts at 142.9 Hz on smooth syllables and 141.4 Hz on checked syllables and falls quickly to about 105.3 Hz on smooth syllables and 103.4 Hz on checked syllables (see figures 22 and 26).

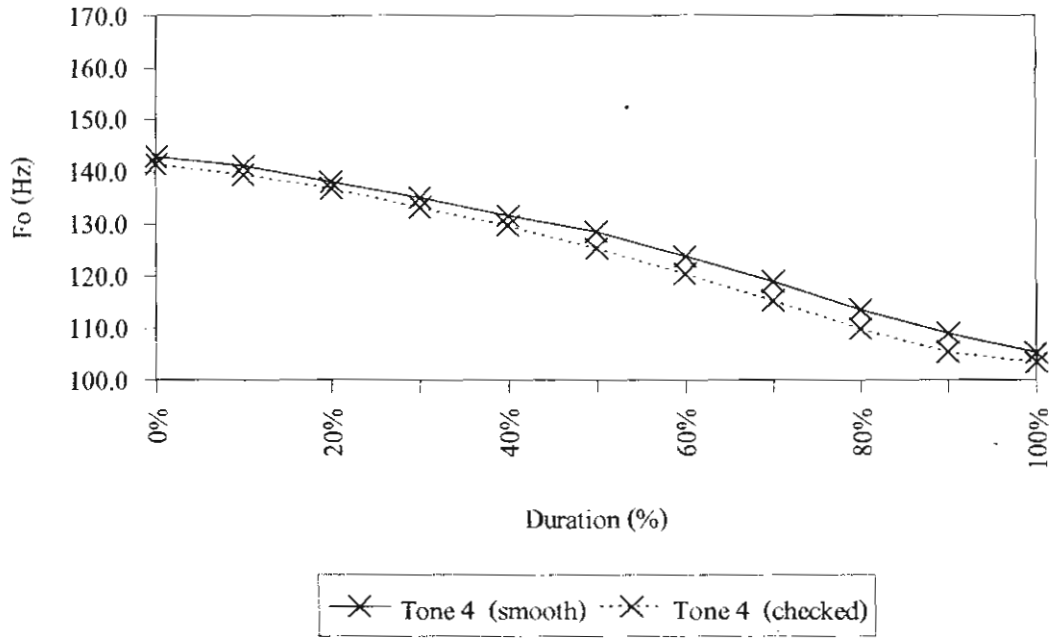


Figure 22 : ***Tone 4 on smooth and checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[cuəy^{31}]	'to help'
	[t^{h}iəw^{31}]	'to travel'
	[cæ:^{31}]	'to steep'
	[t^{h}aw^{31}]	'to be equal to'

5.) Tone 5 has 2 allotones which are in complementary distribution as follows:

5.1) High-mid-falling tone (occurs with smooth syllables) [43]

The pitch pattern of this tone starts at 151.5 Hz and glides down to about 133.1 Hz (see figures 23 and 26).

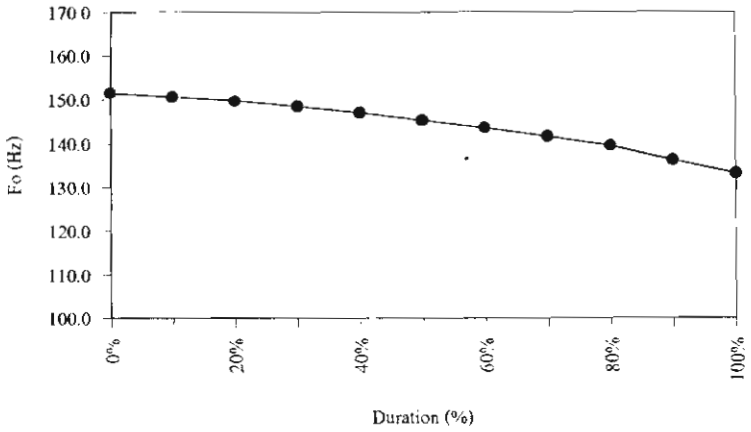


Figure 23 : ***Tone 5 on smooth syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[hæːŋ^{43}]	'dry'
	[caːŋ^{43}]	'to hire'
	[baːn^{43}]	'house'
	[daːn^{43}]	'side'

5.2) High-high-falling tone (occurs with checked syllables) [54]

The pitch pattern of this tone starts at 169.6 Hz and glides down to about 151.7 Hz (see figures 24 and 26).

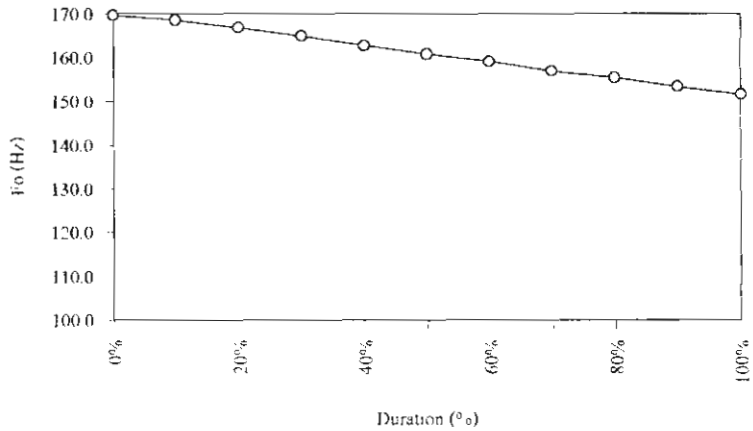


Figure 24 : ***Tone 5 on checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[mat^{54}]	'to tie'
	[rap^{54}]	'to receive'
	[met^{54}]	'seed'
	[p^{h}ap^{54}]	'to fold'
	[lot^{54}]	'to reduce'

6.) Tone 6 : High - low falling tone [52]

The pitch pattern of this tone starts at 166.4 Hz and falls quickly to about 117.7 Hz (see figures 25 and 26).

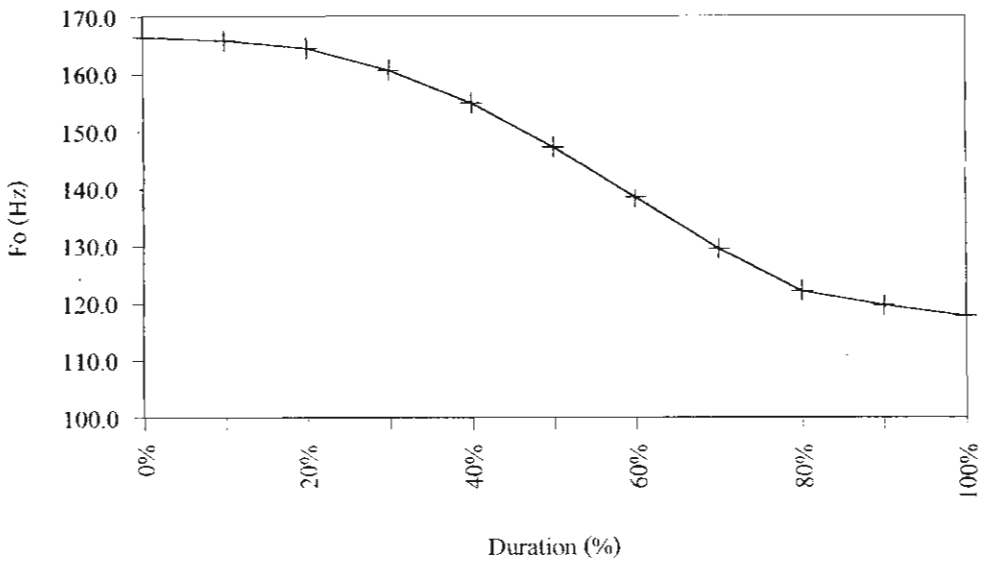


Figure 25 : ***Tone 6 in connected speech of Chiangrai's Northern Thai dialect pronounced by native speakers***

Ex.	[si:^{52}]	'to buy'
	[t^{h}a:y^{52}]	'rear'
	[fa:^{52}]	'sky'
	[ma:y^{52}]	'wood'
	[lɔ:y^{52}]	'hundred'

All the tones on smooth and checked syllables are put into the same diagram as follows:

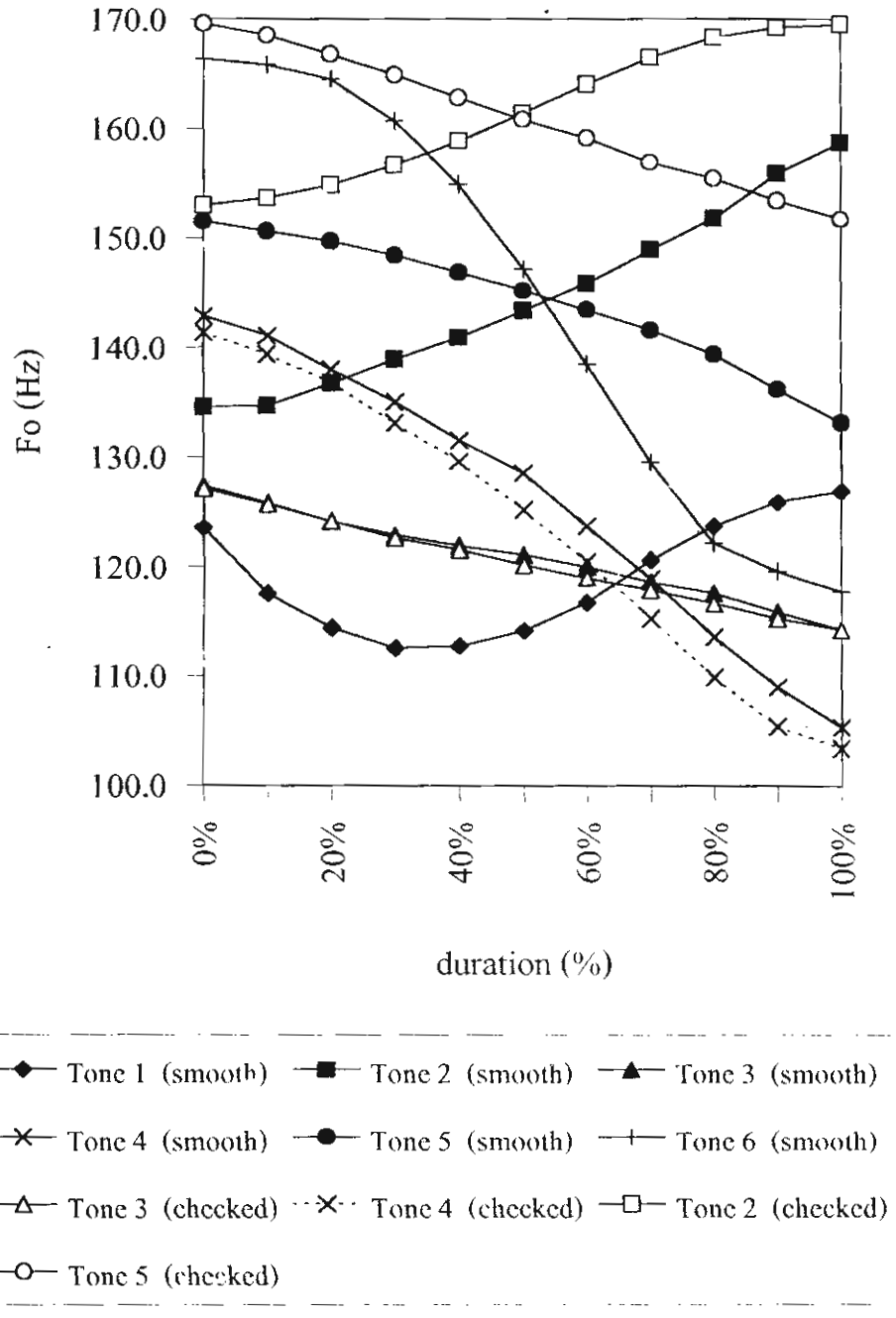


Figure 26 : ***Tone features in connected speech of Chiangrai's Northern Thai dialect pronounced by native speakers***

4.1.5 Comparison of tonal systems and tone features between citation form and connected speech

1.) Tonal system

Table 15 : ***Comparison of tonal systems between citation form and connected speech of Chiangrai's Northern Thai dialect pronounced by native speakers***

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 5*	*Tone 3*	*Tone 2*
Tone 2	*Tone 4*	*Tone 6*	*Tone 4*	*Tone 5*

Citation form

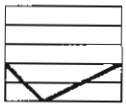
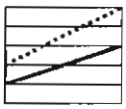
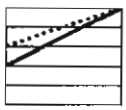
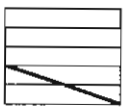
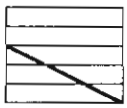
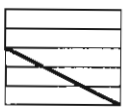
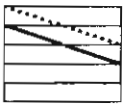
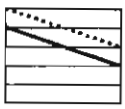
A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 5*	*Tone 3*	*Tone 2*
Tone 2	*Tone 4*	*Tone 6*	*Tone 4*	*Tone 5*

Connected speech

Table 15 indicates that the tonal systems in both citation form and connected speech are not different. That is, tone ***A*** reflects the glottalization split and the tones in other columns, ***B***, ***C***, ***DL***, and ***DS***, always reflect the voiced-voiceless split.

2.) Tone features

Table 16 : ***Comparison of tone features between citation form and connected speech of Chiangrai's Northern Thai dialect pronounced by native speakers***

Form of Speech / Tone	**Citation form**	**Connected speech**
Tone 1	Low - falling - rising tone [212] 105.3 Hz - 98.3 Hz - 107.5 Hz 	Low - falling - rising tone [212] 123.6 Hz - 112.6 Hz - 126.9 Hz 
Tone 2	Low - rising tone [23] (smooth) 116.5 Hz - 126.6 Hz Mid - rising tone [35] (checked) 127.2 Hz - 146.4 Hz 	Mid - rising tone [35] (smooth) 134.5 Hz - 158.7 Hz High - rising tone [45] (checked) 153.0 Hz - 169.5 Hz 
Tone 3	Low - level tone [22] 120.7 Hz - 110.0 Hz (smooth) 120.3 Hz - 112.4 Hz (checked) 	Low - falling tone [21] 127.4 Hz - 114.2 Hz (smooth) 127.2 Hz - 114.2 Hz (checked) 
Tone 4	Mid - falling tone [31] 124.1 Hz - 95.1 Hz (smooth) 125.4 Hz - 103.1 Hz (checked) 	Mid - falling tone [31] 142.9 Hz - 105.3 Hz (smooth) 141.4 Hz - 103.4 Hz (checked) 
Tone 5	High - mid - falling tone [43] 138.1 Hz -122.6 Hz (smooth) High - high - falling tone [54] 152.9 Hz - 140.2 Hz (checked) 	High - mid - falling tone [43] 151.5 Hz - 133.1 Hz (smooth) High - high - falling tone [54] 169.6 Hz - 151.7 Hz (checked) 

(Table 16)

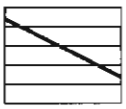
Form of Speech / Tone	**Citation form**	**Connected speech**
Tone 6	High - low - falling tone [52] 154.0 Hz - 106.7 Hz 	High - low - falling tone [52] 166.4 Hz - 117.7 Hz 

Table 16 indicates that the tone features in citation form are different from connected speech in tones 2 and 3 as follows:

(i) Tone 2, mid-rising tone in citation form occurs with checked syllables whereas mid-rising tone in connected speech occurs with smooth syllables.

(ii) Tone 3, the feature of this tone in citation form is low level tone whereas the tone feature in connected speech is low falling tone.

Concerning the fundamental frequency, it is interesting to note that the fundamental frequencies of each tone in citation form are lower than in connected speech.

4.2 Tonal System and Tone Features of Lahu

4.2.1 Tonal system

I have analyzed the tonal system in citation form of the Lahu language pronounced by an informant who is native Lahu speaker. The results were found that the Lahu language has 7 tones as follows:

Tone 1 low - level tone
Tone 2 low - level - glottalized tone
Tone 3 mid - falling tone
Tone 4 high - falling tone
Tone 5 high - falling - glottalized tone
Tone 6 high - level tone
Tone 7 high - level - glottalized tone

4.2.2 Tone features

1.) Tone 1 : Low - level tone [22]

The pitch pattern of this tone starts at 122.1 Hz, glides down a little to about 119.7 Hz, and rises to about 123.1 Hz, then falls quickly to about 117.1 Hz (see figures 27 and 34).

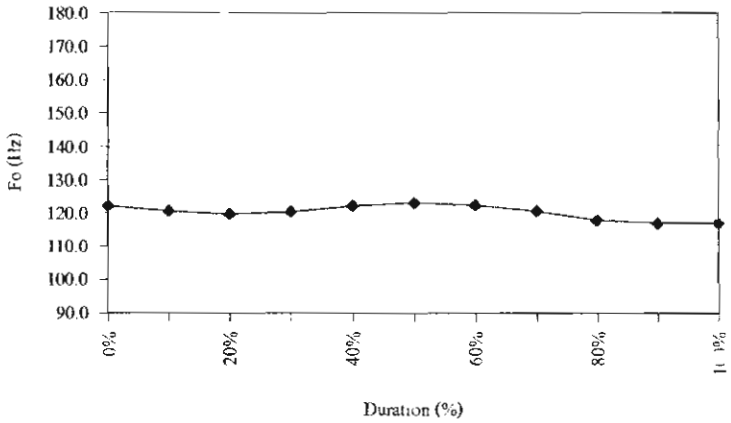


Figure 27 : ***Tone 1 of Lahu pronounced by native speaker***

Ex. [$p^h ɔ^{22}$] 'to open'
[$p^h ɛ^{22}$] 'to tie'

2.) Tone 2 : Low - level - glottalized tone [22?]

The pitch pattern of this tone starts at 122.3 Hz and glides down a little to about 116.0 Hz. The glottal stop is heard at the end of the tone (see figures 28 and 34).

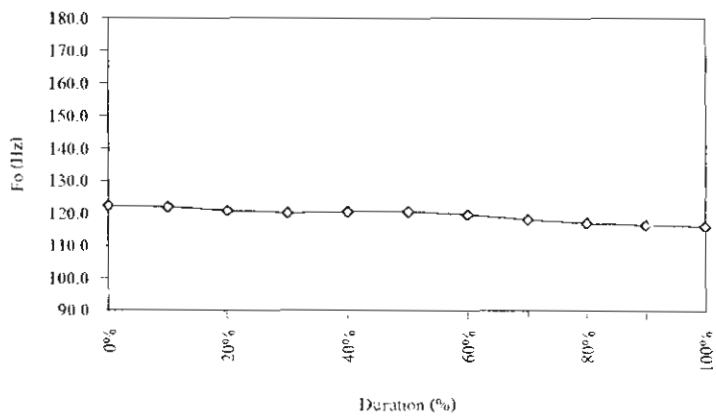


Figure 28 : ***Tone 2 of Lahu pronounced by native speaker***

Ex. [$p^hu^{22?}$ tsɯ^{22}] 'papaya'
[tɛ$^{22?}$] 'to fart'

3.) Tone 3 : Mid - falling tone [31]

The pitch pattern of this tone starts at 134.7 Hz and falls quickly to about 99.3 Hz (see figures 29 and 34).

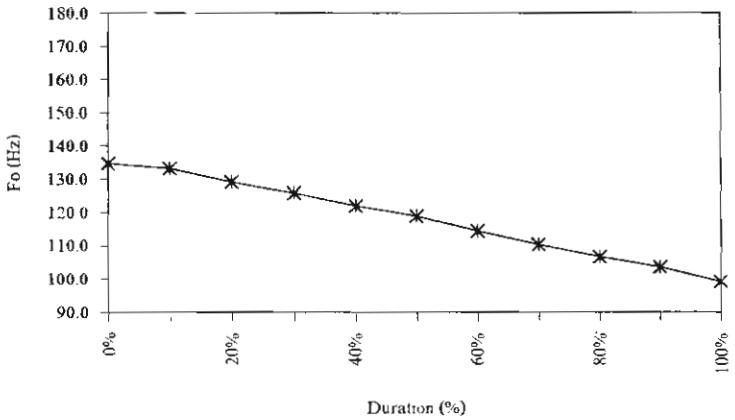


Figure 29 : ***Tone 3 of Lahu pronounced by native speaker***

Ex. [$p^hɯ^{31}$] 'dog'
[bi^{31}] 'full'

4.) Tone 4 : High - falling tone [42]

The pitch pattern of this tone starts at 145.7 Hz and falls quickly to about 122.9 Hz (see figures 30 and 34).

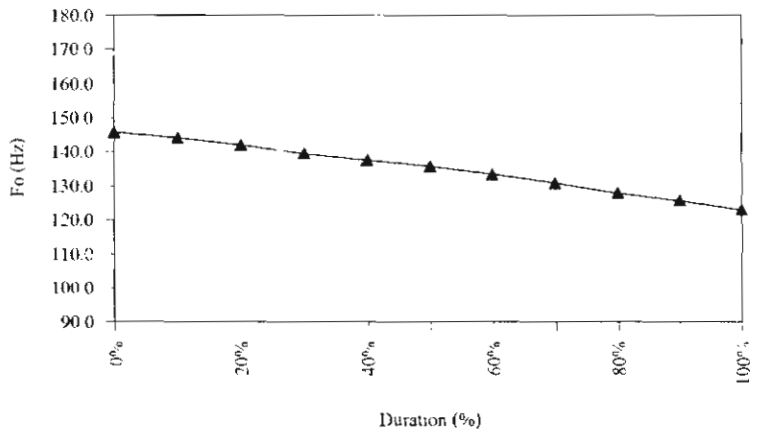


Figure 30 : ***Tone 4 of Lahu pronounced by native speaker***

Ex. [pɯ^{42} tu^{42}] 'comb'
[mɯ^{42}] 'song'

5.) Tone 5 : High - falling - glottalized tone [43ʔ]

The pitch pattern of this tone starts at 147.3 Hz and glides down to about 130.3 Hz. The glottal stop is heard at the end of the tone (see figures 31 and 34).

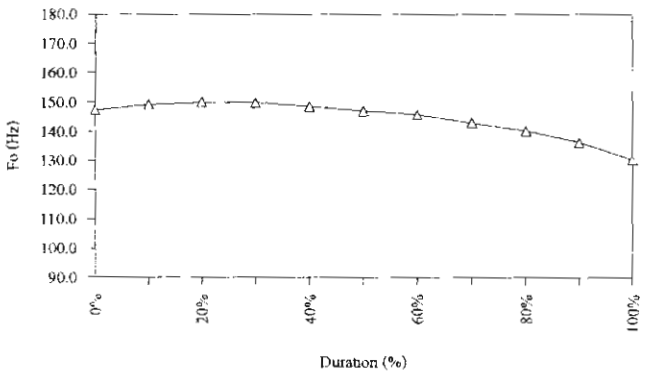


Figure 31 : *Tone 5 of Lahu pronounced by native speaker*

Ex. [tu^{43ʔ}] 'to bail'
[ŋa^{43ʔ}] 'fish'

6.) Tone 6 : High - level tone [55]

The pitch pattern of this tone starts at 165.3 Hz, rises to about 167.9 Hz, and glides down a little to about 162.7 Hz (see figures 32 and 34).

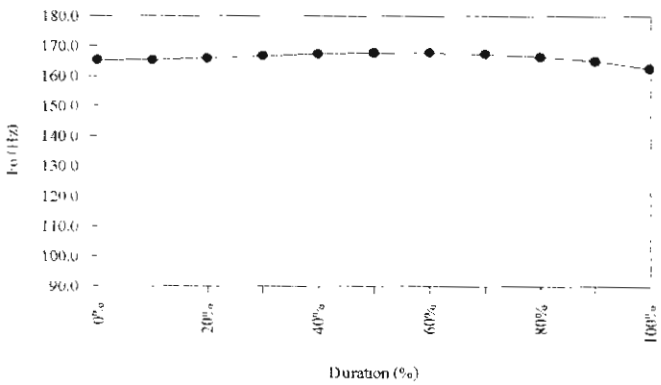


Figure 32 : *Tone 6 of Lahu pronounced by native speaker*

Ex. [pɯ^{55}] 'mosquito, a fly'
[pe^{55}] 'waste'

7.) Tone 7 : High - level glottalized tone [55ʔ]

The pitch pattern of this tone starts at 159.3 Hz and glides up to about 163.8 Hz, then falls quickly to about 159.2 Hz. The glottal stop is heard at the end of the tone (see figures 33 and 34).

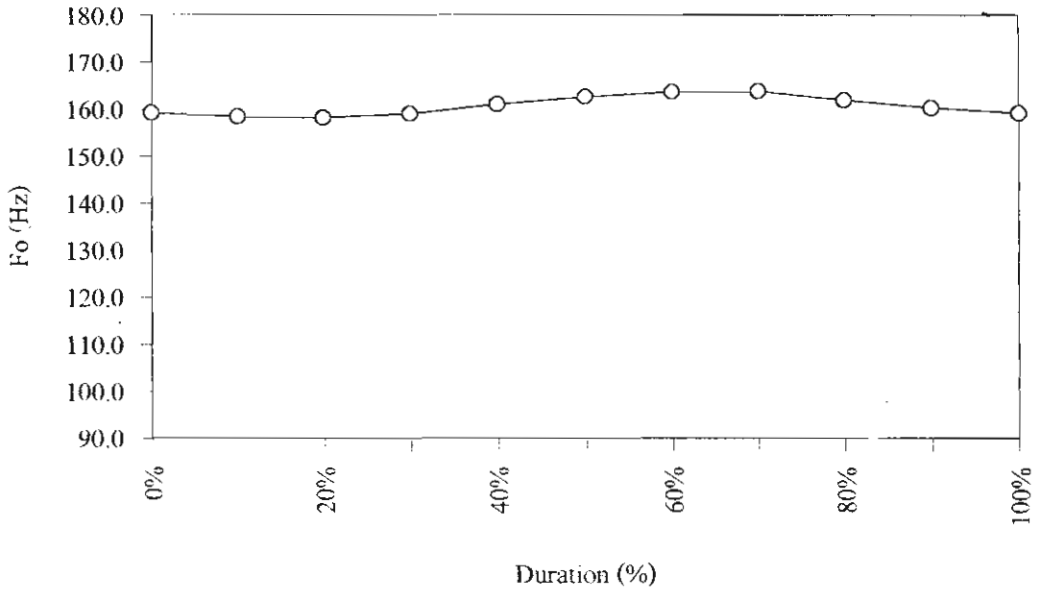


Figure 33 : ***Tone 7 of Lahu pronounced by native speaker***

Ex. [ŋɛ^{55ʔ}] 'bird'
[pɔ^{55ʔ}] 'to jump'

Each tone of Lahu is put into the same diagram as follows:

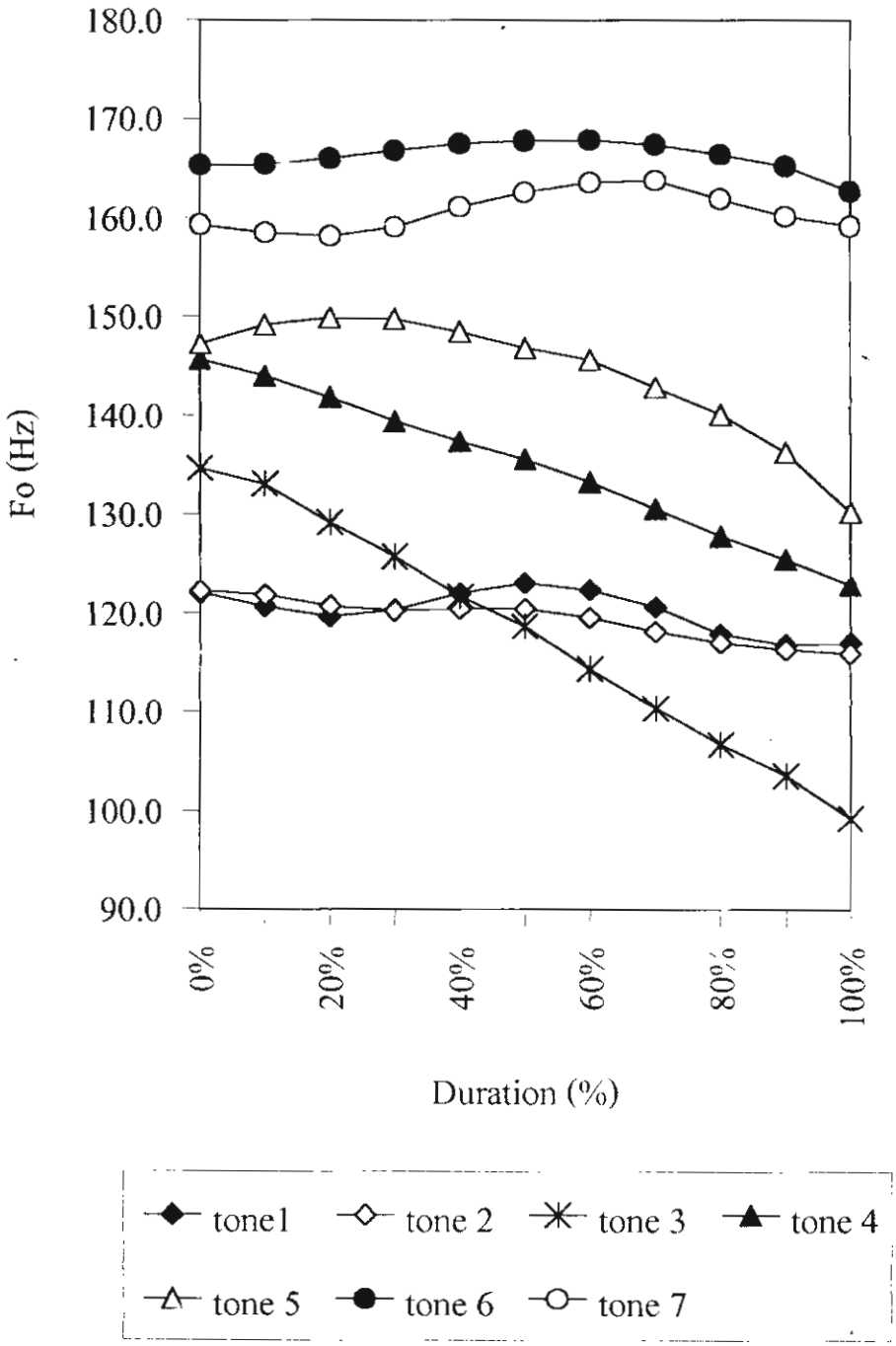


Figure 34 : ***Tone features of Lahu pronounced by native speaker***

4.3 Tonal system and tone features of Akha

4.3.1 Tonal system

There are 5 tones in Akha as follows :

Tone 1 low - falling tone
Tone 2 low - falling - glottalized tone
Tone 3 mid - level tone
Tone 4 mid - rising tone
Tone 5 high - level tone

4.3.2 Tone features

1.) Tone 1 : Low - falling tone [21]

The pitch pattern of this tone starts at 114.1 Hz and glides down to about 99.3 Hz (see figures 35 and 40).

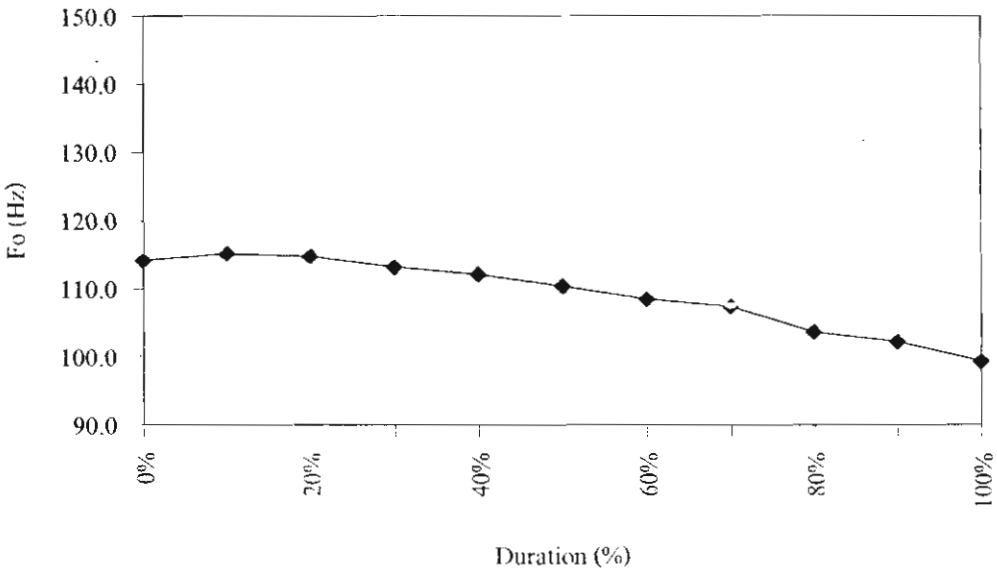


Figure 35 : ***Tone 1 of Akha pronounced by native speaker***

Ex. [kɔ^{21} dʒɔ^{21}] 'mountain'
[mɛ^{21} ʔə^{33}] 'to teach'

2.) Tone 2 : Low - falling - glottalized tone [21ʔ]

The pitch pattern of this tone starts at 115.9 and glides down to about 109.1 Hz. The glottal stop is heard at the end of the tone (see figures 36 and 40).

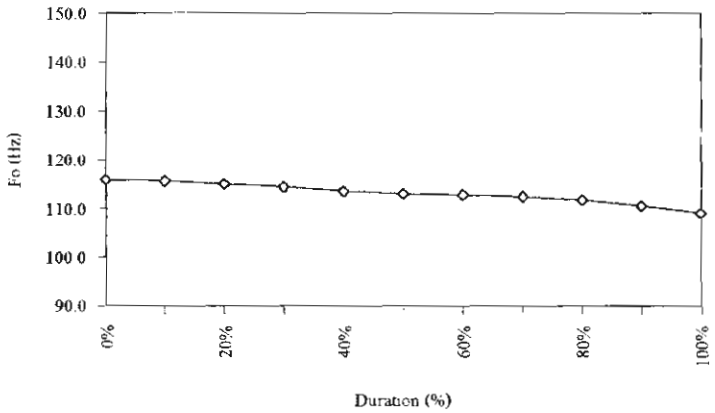


Figure 36 : ***Tone 2 of Akha pronounced by native speaker***

Ex.	[ko^{21ʔ}]	'six'
	[kɔ^{21ʔ} ʔə^{33}]	'to bite'

3.) Tone 3 : Mid - level tone [33]

The pitch pattern of this tone starts at 128.0 Hz and glides down to about 125.1 Hz (see figures 37 and 40).

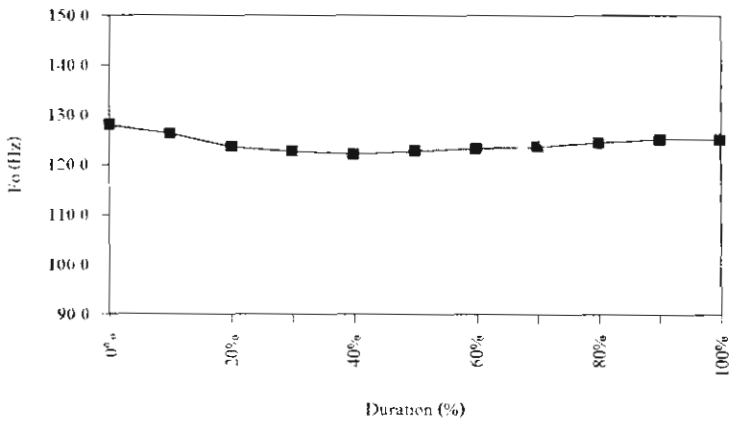


Figure 37 : ***Tone 3 of Akha pronounced by native speaker***

Ex. [sɛ^{33} p^{h}u^{55}] 'garlic'
[ba^{33} ʔə^{33}] 'to grill, to toast'

4.) Tone 4 : Mid - rising tone [34]

The pitch pattern of this tone starts at 122.6 Hz and glides up to about 138.7 Hz, then falls a little to 135.8 Hz (see figures 38 and 40).

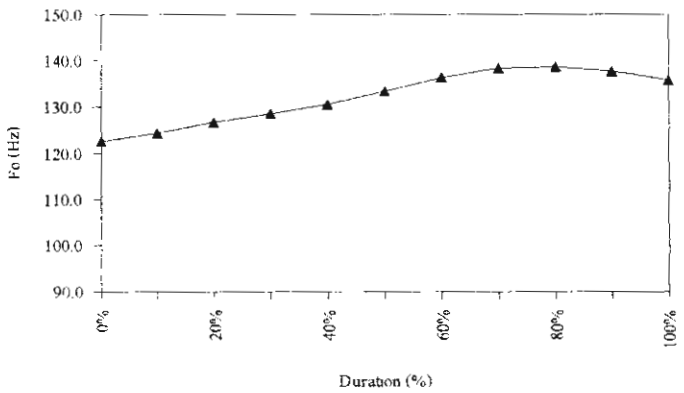


Figure 38 : ***Tone 4 of Akha pronounced by native speaker***

Ex. [ba^{21} ba^{34}] 'cheek'
[kɔ^{21} du^{34}] 'top of the mountain'

5.) Tone 5 : High - level tone [55]

The pitch pattern of this tone starts at 142.3 Hz and glides up to about 148.6 Hz, then falls a little to about 146.7 Hz (see figures 39 and 40).

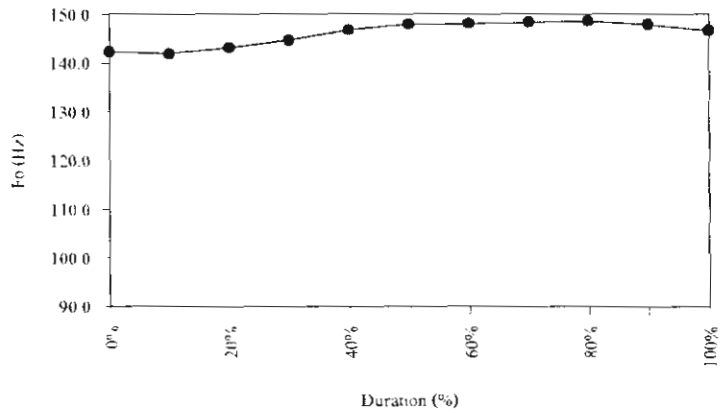


Figure 39 : ***Tone 5 of Akha pronounced by native speaker***

Ex. [bi^{55} jɔ^{21ʔ}] 'to be inclined'
[ko^{21ʔ} ts^{h}e^{55}] 'sixty'

Each tone of Akha is put into the same diagram as follows

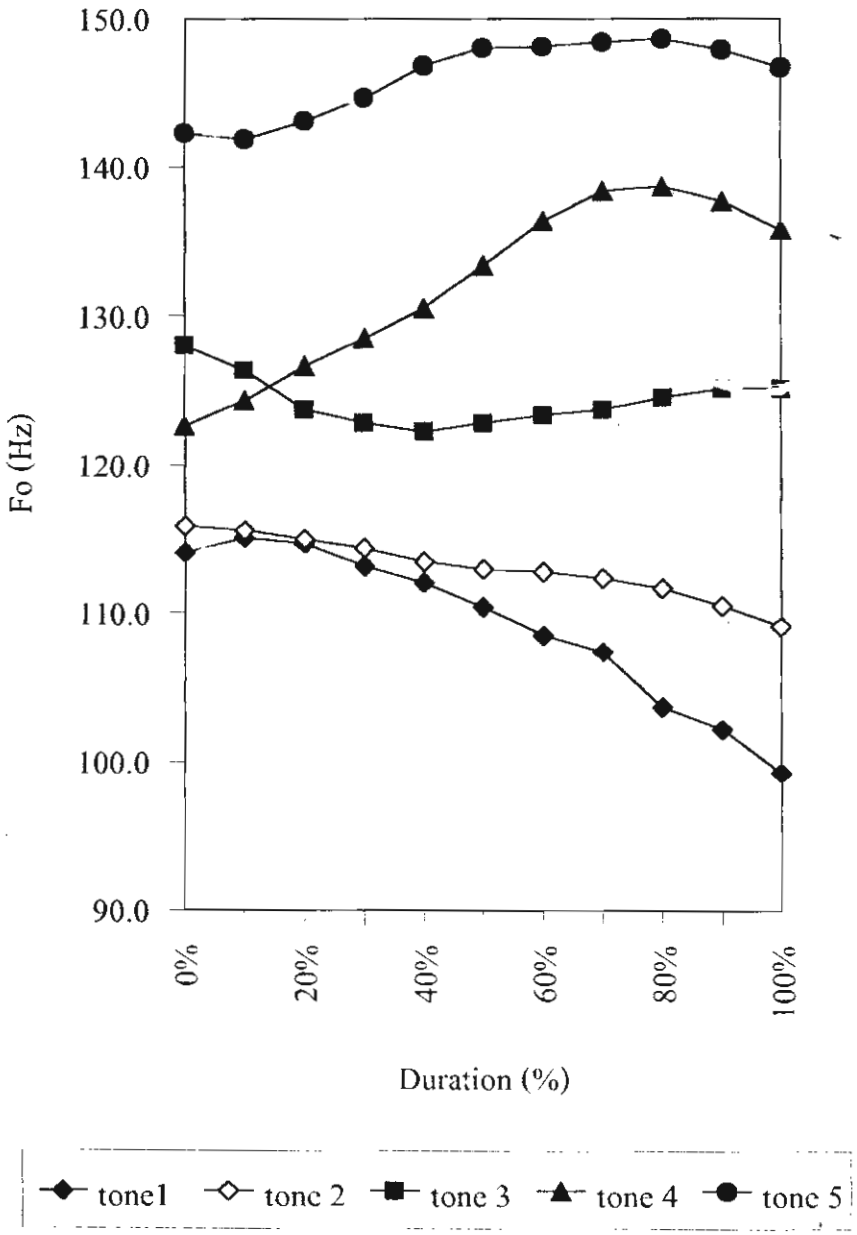


Figure 40 : ***Tone features of Akha pronounced by native speaker***

4.4 Tonal System and Tone Features of Karen

4.4.1 Tonal system

There are 6 tones in Karen as follows :

Tone 1 low - level tone
Tone 2 mid - level tone
Tone 3 high - falling tone
Tone 4 high - falling - glottalized tone
Tone 5 high - level tone
Tone 6 high - level - glottalized tone

4.4.2 Tone features

1.) Tone 1 : Low - level tone [22]

The pitch pattern of this tone starts at 92.5 Hz and glides down to about 87.0 Hz (see figures 41 and 47).

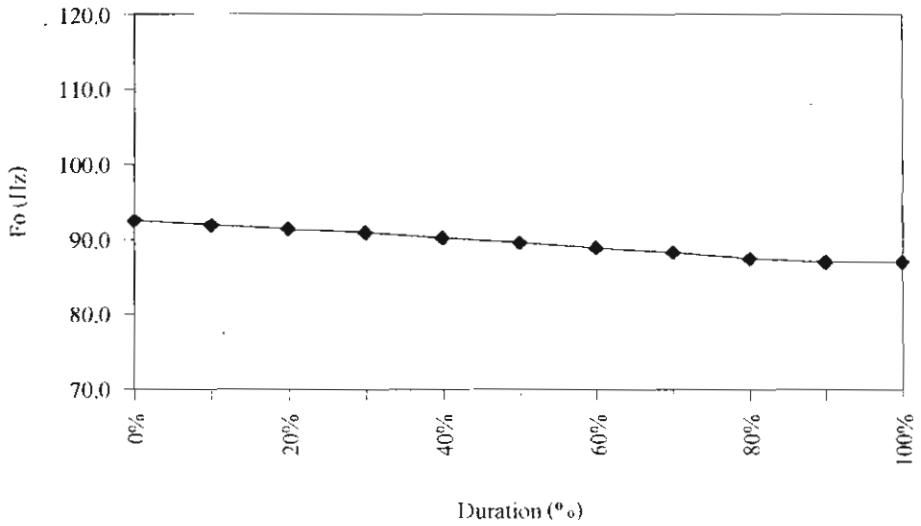


Figure 41 : ***Tone 1 of Karen pronounced by native speaker***

Ex. [me^{22}] 'rice'
[puu^{22}] 'to wash hair'

2.) Tone 2 : Mid - level tone [33]

The pitch pattern of this tone starts at 99.3 Hz and glides down to about 96.5 Hz (see figures 42 and 47).

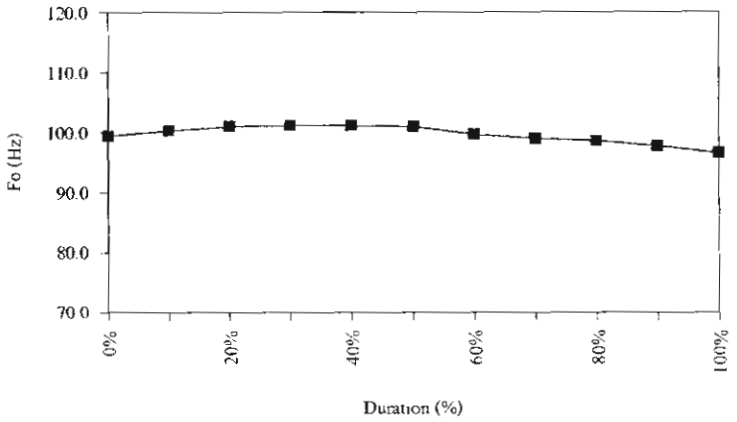


Figure 42 : ***Tone 2 of Karen pronounced by native speaker***

Ex.	[tʌ^{33}]	'one'
	[mɛ^{33}]	'tooth'

3.) Tone 3 : High - falling tone [41]

The pitch pattern of this tone starts at 106.4 Hz and falls quickly to about 76.8 Hz (see figures 43 and 47).

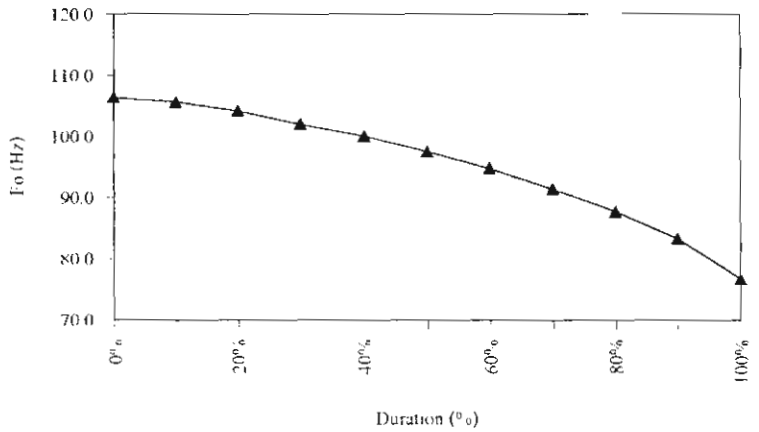


Figure 43 : ***Tone 3 of Karen pronounced by native speaker***

Ex. [mɛ^{41}] 'tail'
[me^{41}] 'correct, right'

4.) Tone 4 : High - falling - glottalized tone [42ʔ]

The pitch pattern of this tone starts at 102.8 Hz and falls quickly to about 86.1 Hz in the second section. The glottal stop is heard at the end of the tone (see figures 44 and 47).

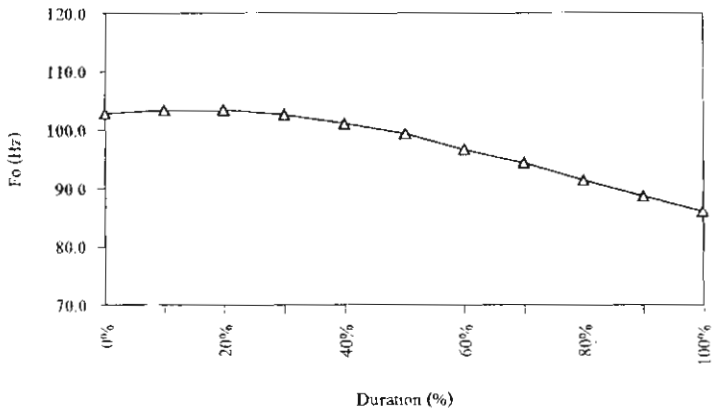


Figure 44 : ***Tone 4 of Karen pronounced by native speaker***

Ex. [me^{42ʔ} ʔu^{33}] 'fire'
[t^{h}a^{33} t^{h}a^{42ʔ}] 'to weave'

5.) Tone 5 : High - level tone [44]

The pitch pattern of this tone starts at 104.2 Hz and glides up to about 109.1 Hz (see figures 45 and 47).

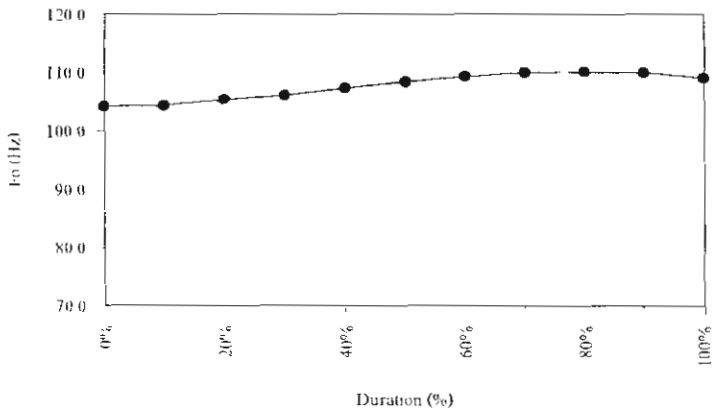


Figure 45 : ***Tone 5 of Karen pronounced by native speaker***

Ex. [mɛ^{44} t^{h}i^{33}] 'tear'
[pi^{44}] 'sticky'

6.) Tone 6 : High - level - glottalized tone [55ʔ]

The pitch pattern of this tone starts at 115.1 Hz and glides up to about 117.4 Hz. The glottal stop is heard at the end of the tone (see figures 46 and 47).

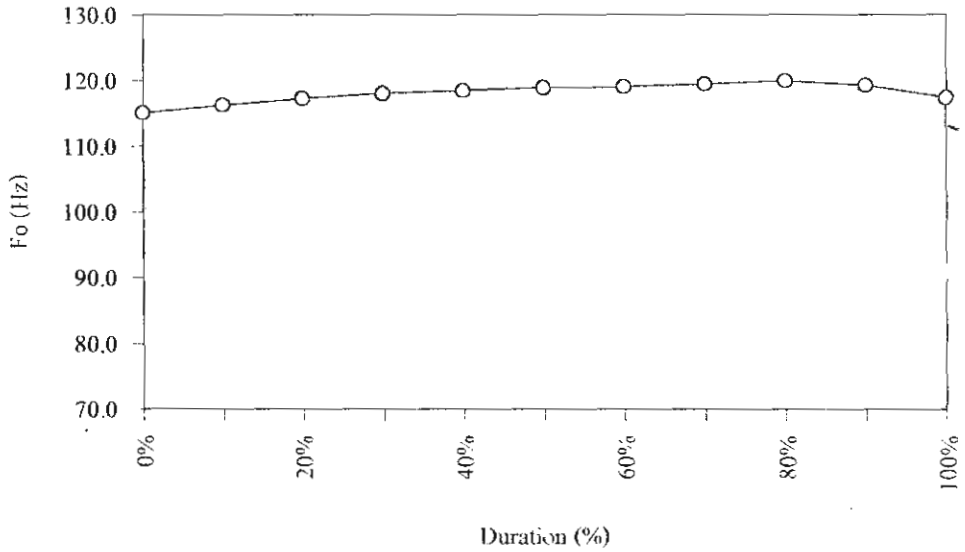


Figure 46 : ***Tone 6 of Karen pronounced by the native speaker***

Ex. [mɛ^{55ʔ}] 'sand'
[t^{h}a^{55ʔ}] 'iron, needle'

All the six tones of Karen are put in the following figure.

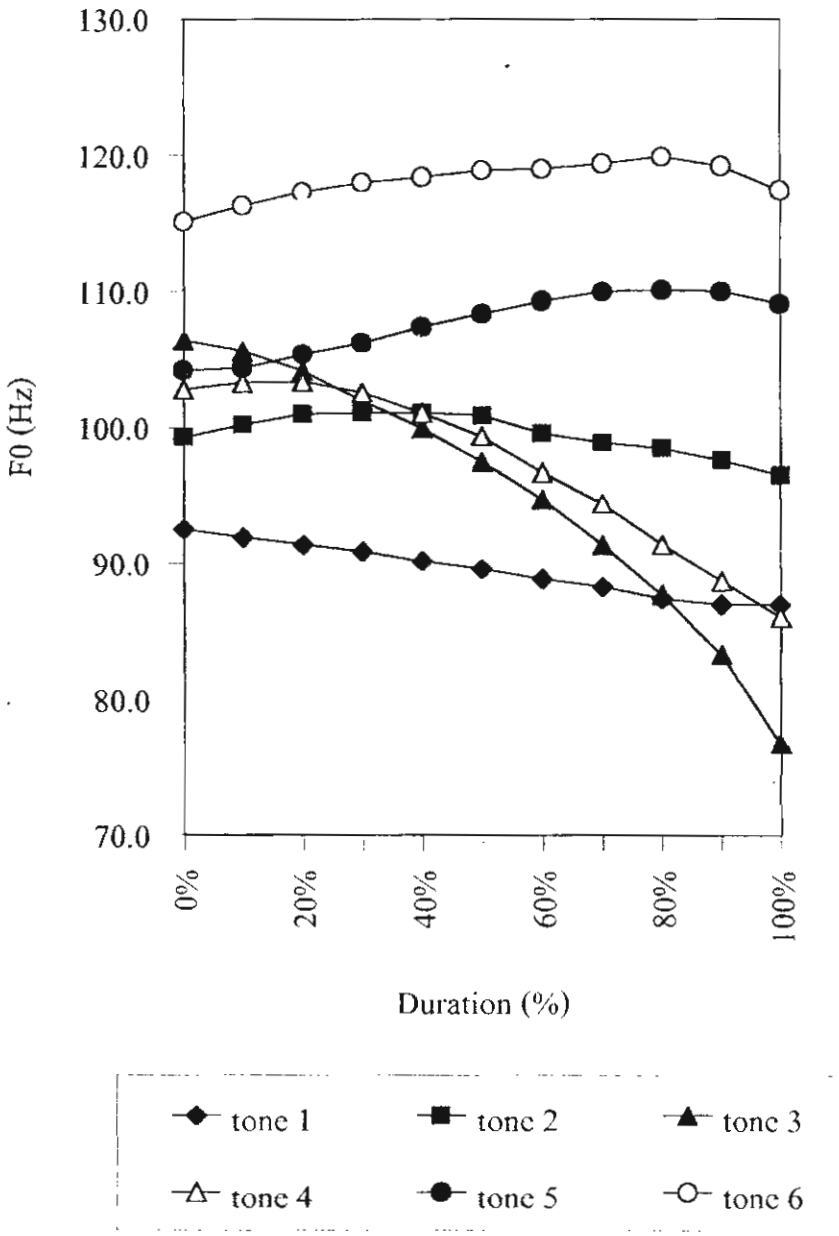


Figure 47 : ***Tone features of Karen pronounced by the native speaker***

CHAPTER V

TONAL SYSTEMS AND TONE FEATURES OF CHIANGRAI'S NORTHERN THAI DIALECT PRONOUNCED BY THE LAHU, AKHA, AND KAREN PEOPLE

The results of the analysis indicate that Chiangrai's Northern Thai dialect in citation form, Lahu and Akha have 4 tones, whereas Karen has 6 tones.

In connected speech, Lahu has 5 tones, Akha has 4 tones, and Karen has 6 tones as follows:

5.1 Tonal System and Tone Features of Chiangrai's Northern Thai Dialect Pronounced by Lahu

5.1.1 Tonal system in citation form

Regarding the number of tones, Chiangrai's Northern Thai dialect pronounced by the eight Lahu speakers have a 4 tone system. Note that they pronounce the DS4 tone as a rising tone, whereas the two Lahu speakers (Chiakue and Chachor) pronounce this tone as a falling tone in the same way as the native Chiangrai's Northern Thai speakers. It can be speculated that these two Lahu speakers speak Chiangrai's Northern Thai dialect better than the eight Lahu speakers. In calculating the average of fundamental frequency, it is necessary that the falling tone pronounced by these two Lahu speakers have to be excluded. The pattern of split and coalescence of the eight Lahu speakers may be shown as follows:

Table 17 : ***Pattern of tones in citation form of Chiangrai's Northern Thai dialect pronounced by Lahu***

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 4*	*Tone 3*	*Tone 2*
Tone 2				

Following table 17, it is interesting to note that

(i) Tone *A* reflects the glottalization split, Tones *B* and *DL* reflect the voiced and voiceless split, whereas Tones *C* and *DS* have no split in their columns.

(ii) Tone *C* merges with Tones *B4* and *DL4*.

5.1.2 Tone features in citation form

1.) Tone 1 : Low - falling - rising tone [212]

The pitch pattern of this tone starts at 107.6 and glides down to about 97.6 Hz, then rises quickly to about 115.1 Hz (see figures 48 and 53).

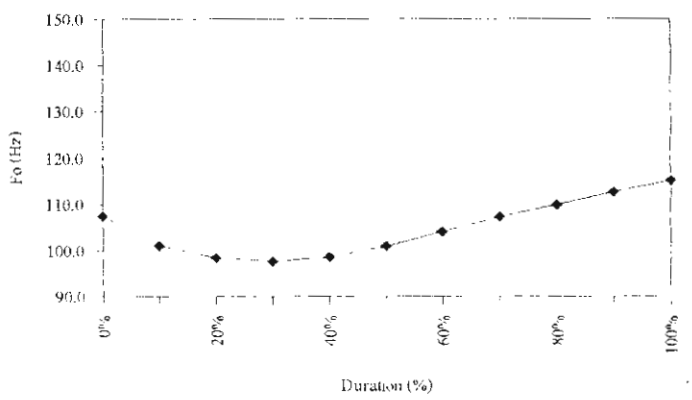


Figure 48 : ***Tone 1 in citation form of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[hu:^{212}]	'ear'
	[k^{h}a:^{212}]	'leg'
	[pi:^{212}]	'year'
	[kin^{212}]	'to eat'

2.) Tone 2 has 2 allotones which are in complementary distribution as follows:

2.1) Mid - rising tone (occurs with smooth syllables) [34]

The pitch pattern of this tone starts at 119.2 Hz and glides up to about 129.9 Hz (see figures 49 and 53).

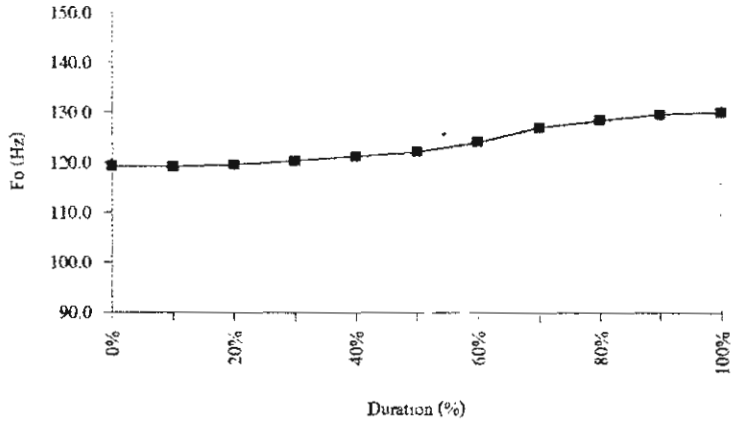


Figure 49 : ***Tone 2 on smooth syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[bin^{34}]	'to fly'
	[dæːŋ^{34}]	'red'
	[miː^{34}]	'hand'
	[nɔːn^{34}]	'to lie down'

2.2) High - rising tone (occurs with checked syllables) [45]

The pitch pattern of this tone starts at 133.9 Hz and glides up to about 146.2 Hz. The glottal stop is heard at the end of the tone (see figures 50 and 53).

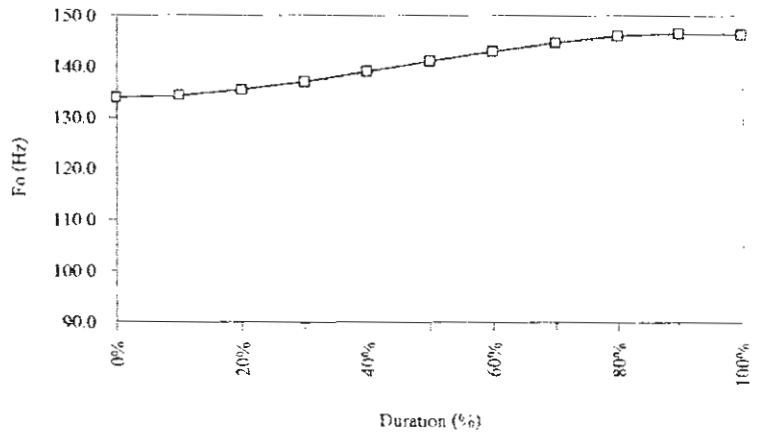


Figure 50 : ***Tone 2 on checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[$p^ha^{45?}$]	'vegetable'
	[$to^{45?}$]	'to fall'
	[$?o^{45?}$]	'chest'
	[$mo^{45?}$]	'ant'

3.) Tone 3 : Low - falling tone [21]

The pitch pattern of this tone starts at 114.6 Hz on smooth syllables and 116.8 Hz on checked syllables, then glides down to about 102.5 Hz on smooth syllables and 103.9 Hz on checked syllables. The glottal stop is heard at the end of the tone on checked syllables (see figures 51 and 53).

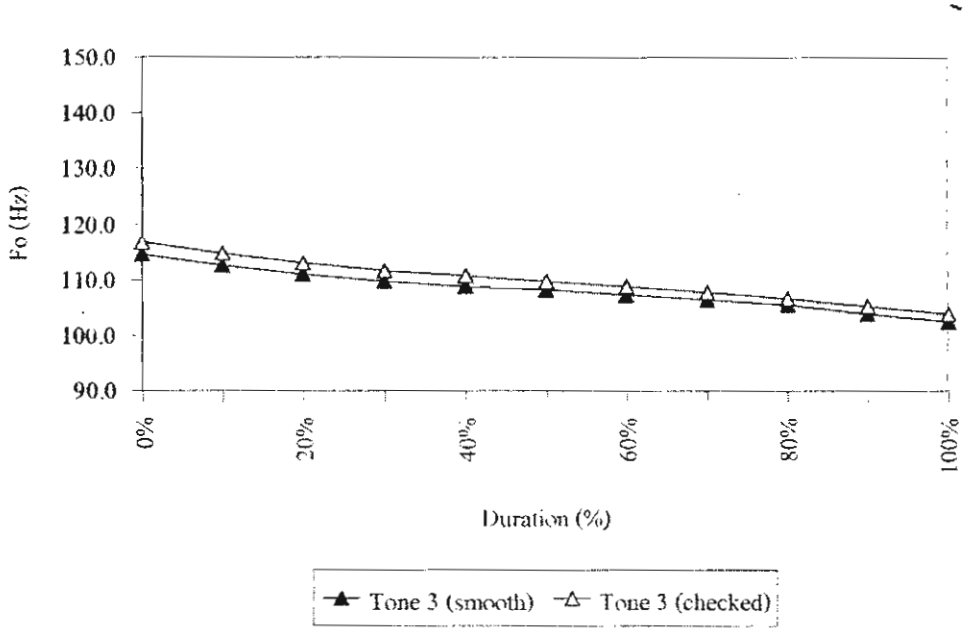


Figure 51 : ***Tone 3 on smooth and checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[$si:^{21}$]	'four'
	[taw^{21}]	'turtle'
	[$bæŋ^{21}$]	'to divide'
	[$k^ha^{21?}$]	'to be torn'
	[$kɔ^{21?}$]	'to embrace'
	[$bɔ^{21?}$]	'blind'

4.) Tone 4 : High - falling tone [52,42]

The pitch pattern of this tone starts at 144.3 Hz on smooth syllables and 131.3 Hz on checked syllables, then falls quickly to about 114.8 Hz on smooth syllables and 107.4 Hz on checked syllables. The glottal stop is heard at the end of the tone on checked syllables (see figures 52 and 53).

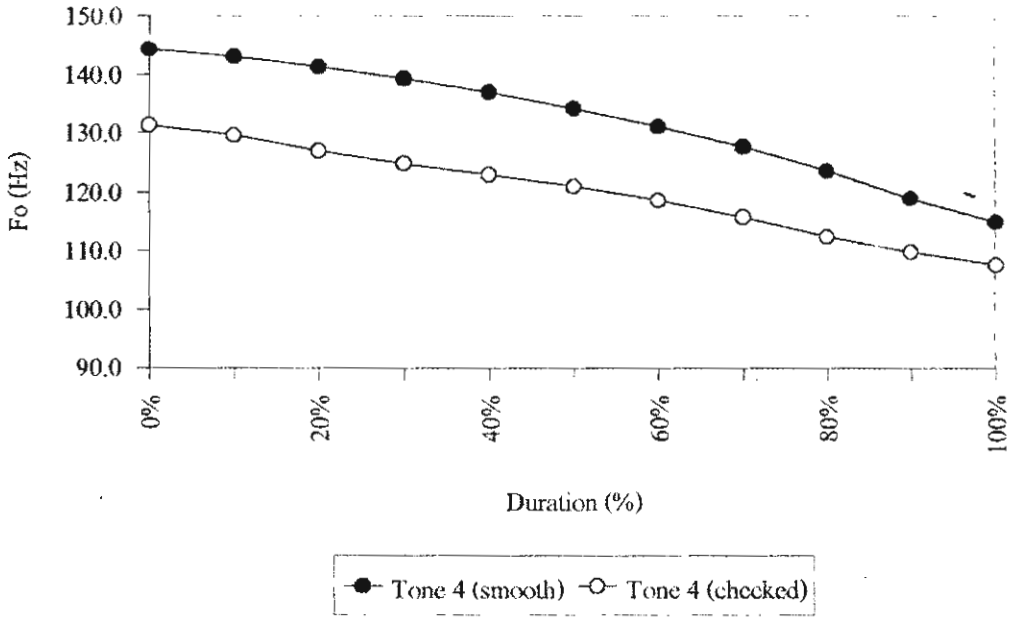


Figure 52 : ***Tone 4 on smooth and checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[pɔ:^{52}]	'father'
	[ya:^{52}]	'grass'
	[tom^{52}]	'to boil'
	[da:y^{52}]	'cord'
	[na:m^{52}]	'water'
	[lɨə^{42ʔ}]	'blood'
	[ha^{42ʔ}]	'root'

All the tones on smooth and checked syllables are put into the same diagram as follows:

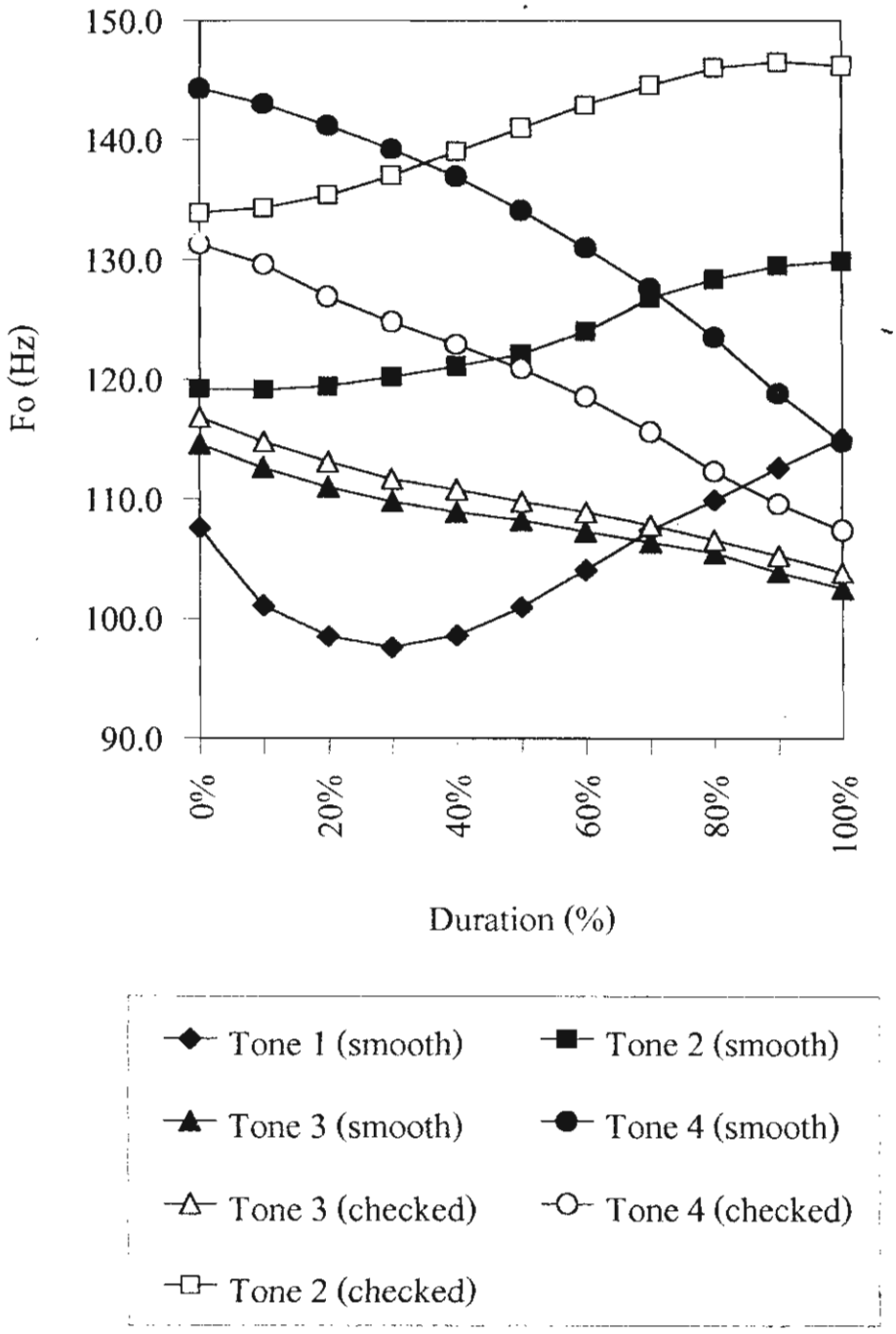


Figure 53 : ***Tone features in citation form of Chiangrai's Northern Thai dialect pronounced by Lahu***

5.1.3 Tonal system in connected speech

Regarding the number of tones, Chiangrai's Northern Thai dialect pronounced by the nine Lahu speakers have a 5 tone system. Note that they pronounce the DS1-2-3 tone as a rising tone in the same way as the native Chiangrai's Northern Thai speakers, whereas only one Lahu speaker (Chakue) pronounces this tone as a falling tone. In calculating the average of fundamental frequency, it is necessary that the falling tone pronounced by this Lahu speaker have to be excluded. The pattern of split and coalescence of the nine Lahu speakers may be shown as follows :

Table 18 : ***Pattern of tones in connected speech of Chiangrai's Northern Thai dialect pronounced by Lahu***

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 5*	*Tone 3*	*Tone 2*
Tone 2	*Tone 4*		*Tone 4*	*Tone 5*

Following table 18, it is interesting to note that tone ***A*** reflects the glottalization split, Tones ***B***, ***DL*** and ***DS*** reflect the voiced and voiceless split, whereas Tone ***C*** has no split in its column.

5.1.4 Tone features in connected speech

1.) Tone 1 : Low - falling - rising tone [212]

The pitch pattern of this tone starts at 116.7 and glides down to about 106.1 Hz, then rises to about 124.8 Hz (see figures 54 and 61).

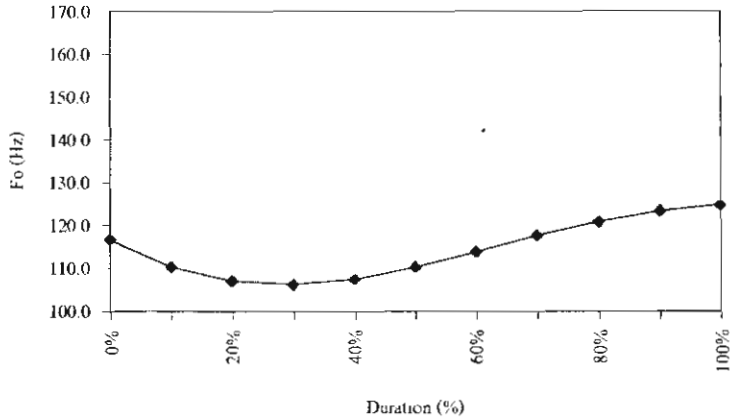


Figure 54 : ***Tone 1 in connected speech of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[hu:^{212}]	'ear'
	[k^{h}a:^{212}]	'leg'
	[pi:^{212}]	'year'
	[kin^{212}]	'to eat'

2.) Tone 2 has 2 allotones which are in complementary distribution as follows:

2.1) Mid - rising tone (occurs with smooth syllables) |34|

The pitch pattern of this tone starts at 132.7 Hz and glides up to about 145.5 Hz (see figures 55 and 61).

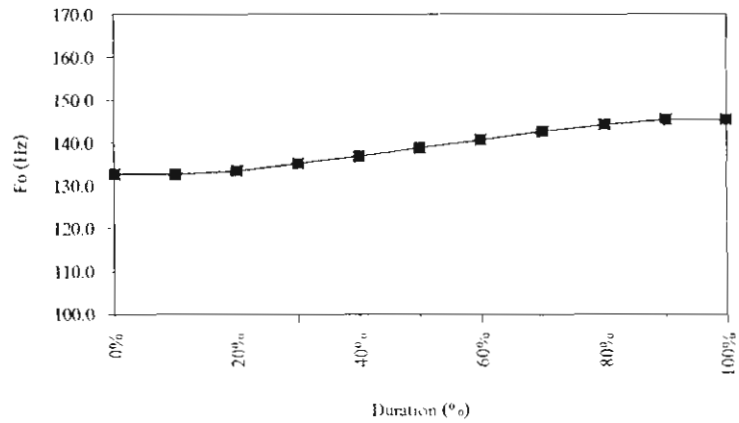


Figure 55 : ***Tone 2 on smooth syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[bin^{34}]	'to fly'
	[dæːŋ^{34}]	'red'
	[miː^{34}]	'hand'
	[nɔːn^{34}]	'to lie down'

2.2) High - rising tone (occurs with checked syllables) [45]

The pitch pattern of this tone starts at 149.7 Hz and glides up to about 163.6 Hz. The glottal stop is heard at the end of the tone (see figures 56 and 61)

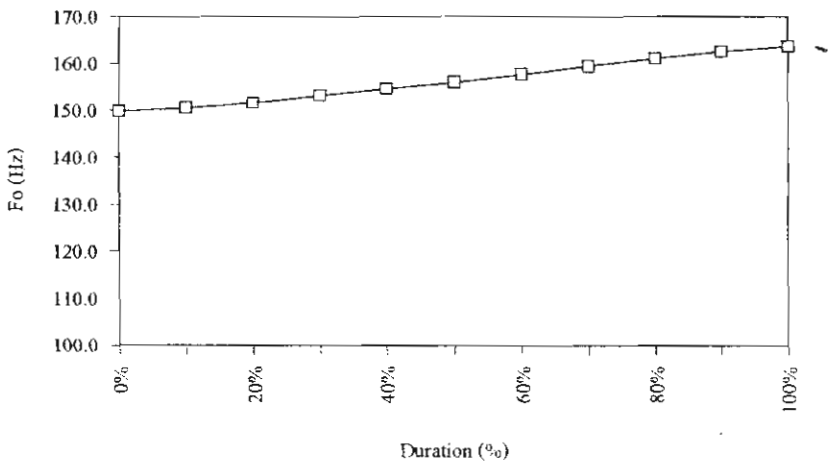


Figure 56 : ***Tone 2 on checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[pʰa^{45ʔ}]	'vegetable'
	[to^{45ʔ}]	'to fall'
	[ʔo^{45ʔ}]	'chest'

3.) Tone 3 : Low - falling tone [21]

The pitch pattern of this tone starts at 122.0 Hz on smooth syllables and 125.2 Hz on checked syllables, then glides down to about 105.4 Hz on smooth syllables and 109.1 Hz on checked syllables. The glottal stop is heard at the end of the tone on checked syllables (see figures 57 and 61).

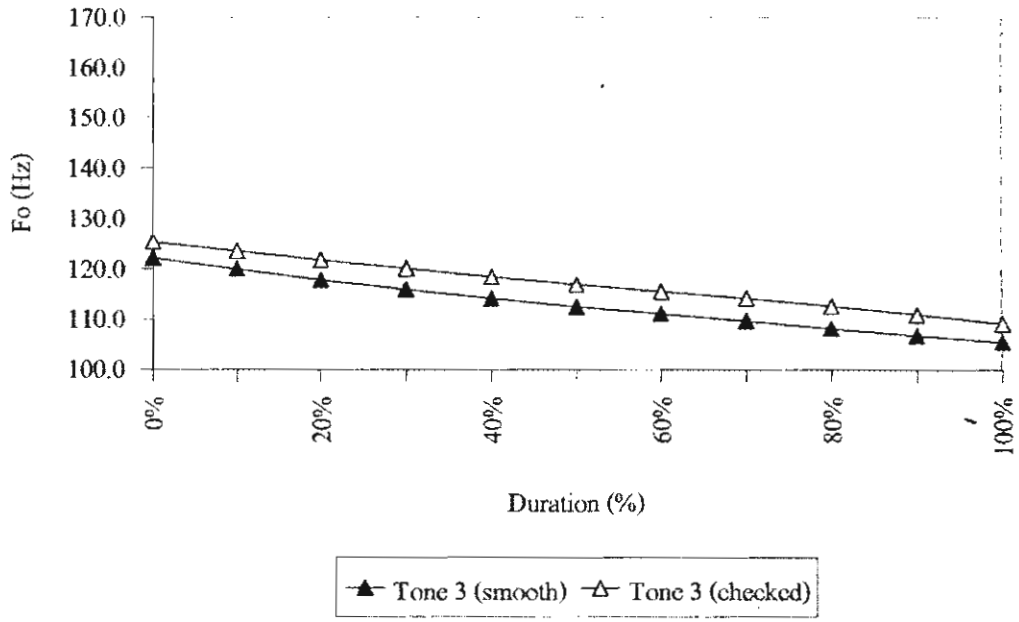


Figure 57 : ***Tone 3 on smooth and checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[si:^{21}]	'four'
	[taw^{21}]	'turtle'
	[bæŋ^{21}]	'to divide'
	[k^{h}a^{21ʔ}]	'to be torn'
	[kɔ^{21ʔ}]	'to embrace'
	[bɔ^{21ʔ}]	'blind'

4.) Tone 4 : Mid - falling tone [31]

The pitch pattern of this tone starts at 139.5 Hz on smooth syllables and 138.8 Hz on checked syllables, then falls to about 115.3 Hz on smooth syllables and 111.1 Hz on checked syllables. The glottal stop is heard at the end of the tone on checked syllables (see figures 58 and 61).

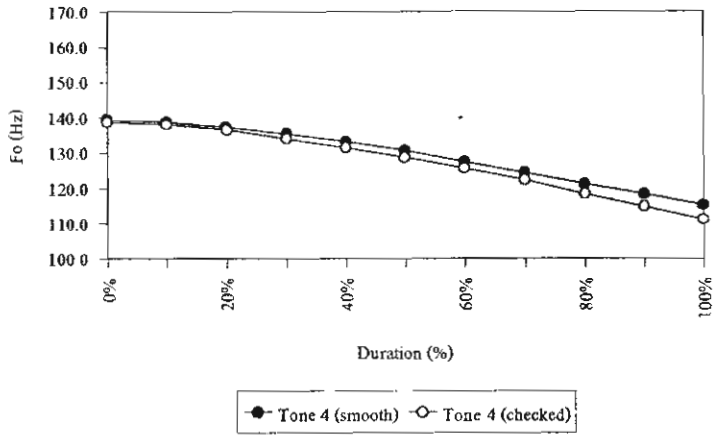


Figure 58 : ***Tone 4 on smooth and checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[pɔː^{31}]	'father'
	[hay^{31}]	'plantation'
	[liə^{31ʔ}]	'blood'
	[ha^{31ʔ}]	'root'

5.) Tone 5 has 2 allotones which are in complementary distribution as follows:

5.1) High - low - falling tone (occurs with smooth syllables) [42]

The pitch pattern of this tone starts at 147.0 Hz and falls quickly to about 128.5 Hz (see figures 59 and 61).

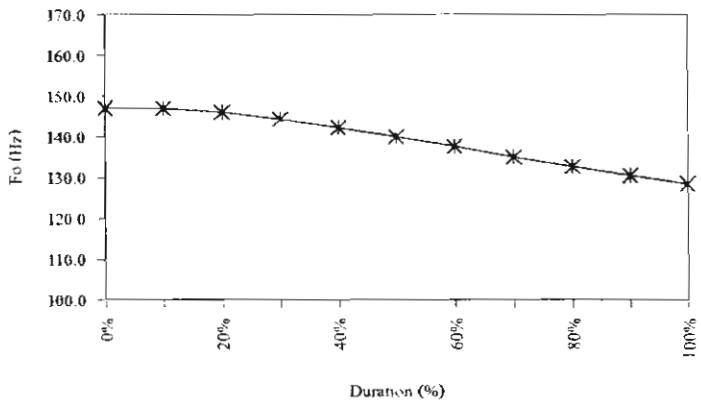


Figure 59 : ***Tone 5 on smooth syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[ya:^{42}]	'grass'
	[tom^{42}]	'to boil'
	[da:y^{42}]	'cord'
	[ma:^{42}]	'horse'

5.2) High-high-falling tone (occurs with checked syllables) [54]

The pitch pattern of this tone starts at 157.4 Hz and glides down to about 147.0 Hz. The glottal stop is heard at the end of the tone (see figures 60 and 61).

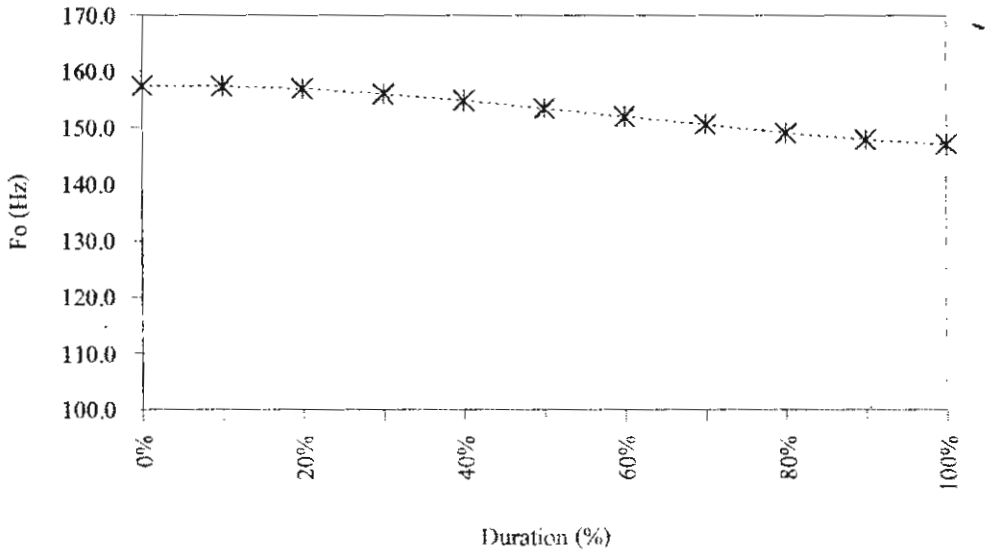


Figure 60 : ***Tone 5 on checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Lahu***

Ex.	[ha$^{54?}$]	'to love'
	[no$^{54?}$]	'bird'
	[wa$^{54?}$]	'temple'
	[k^{h}a$^{54?}$]	'to select'
	[le$^{54?}$]	'nail'
	[mo$^{54?}$]	'ant'

All the tones on smooth and checked syllables are put into the same diagram as follows:

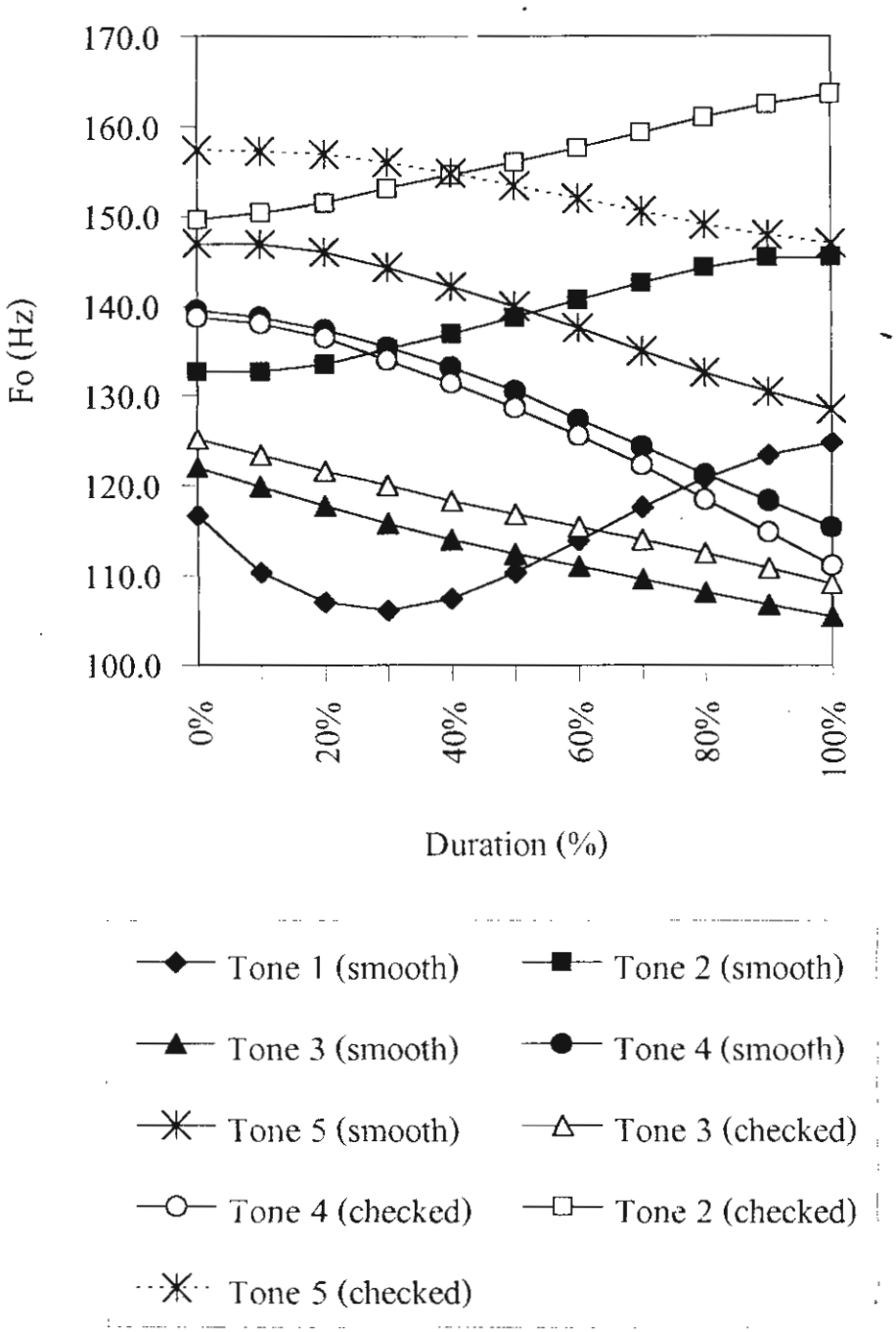


Figure 61 : ***Tone features in connected speech of Chiangrai's Northern Thai dialect pronounced by Lahu***

5.1.5 Comparison of tonal systems and tone features between citation form and connected speech

1.) Tonal system

Table 19 : ***Comparison of tonal systems between citation form and connected speech of Chiangrai's Northern Thai dialect pronounced by Lahu***

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 4*	*Tone 3*	*Tone 2*
Tone 2				

Citation form

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 5*	*Tone 3*	*Tone 2*
Tone 2	*Tone 4*		*Tone 4*	*Tone 5*

Connected speech

Table 19 indicates that the tonal system in citation form differs from connected speech as follows:

(i) Chiangrai's Northern Thai Dialect pronounced by Lahu, in citation form, has a 4 tone system but it has a 5 tone system in connected speech.

(ii) tone ***C***, in citation form, merges with Tones ***B4*** and ***DL4*** but in connected speech tone ***C*** does not.

(iii) tone ***DS***, in connected speech, reflects the voiced-voiceless split whereas in citation form there is no split in ***DS*** column.

2.) Tone features

Table 20 : ***Comparison of tone features between citation form and connected speech of Chiangrai's Northern Thai dialect pronounced by Lahu***

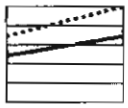
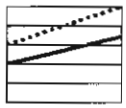
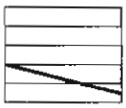
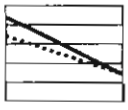
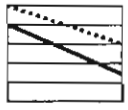
Form of Speech / Tone	**Citation form**	**Connected speech**
Tone 1	Low - falling - rising tone [212] 107.6 Hz - 97.6 Hz - 115.1 Hz 	Low - falling - rising tone [212] 116.7 Hz - 106.1 Hz - 124.8 Hz 
Tone 2	Mid - rising tone [34] (smooth) 119.2 Hz - 129.9 Hz High - rising tone [45] (checked) 133.9 Hz - 146.2 Hz 	Mid - rising tone [34] (smooth) 132.7 Hz - 145.5 Hz High - rising tone [45] (checked) 149.7 Hz - 163.6 Hz 
Tone 3	Low - falling tone [21] 114.6 Hz - 102.5 Hz (smooth) 116.8 Hz - 103.9 Hz (checked) 	Low - falling tone [21] 122.0 Hz - 105.4 Hz (smooth) 125.2 Hz - 109.1 Hz (checked) 
Tone 4	-	Mid - falling tone [31] 139.5 Hz - 115.3 Hz (smooth) 138.8 Hz - 111.1 Hz (checked) 
Tone 5	High - falling tone [52] 144.3 Hz -114.8 Hz (smooth) High - falling tone [42] 131.3 Hz - 107.4 Hz (checked) 	High - low - falling tone [42] 147.0 Hz - 128.5 Hz (smooth) High - high - falling tone [54] 157.4 Hz - 147.0 Hz (checked) 

Table 20 indicates that the tone features in citation form are different from connected speech as follows:

(i) Tone 5 in connected speech has two allotones which are in complementary distribution but in citation form, tone 5 has no allotone.

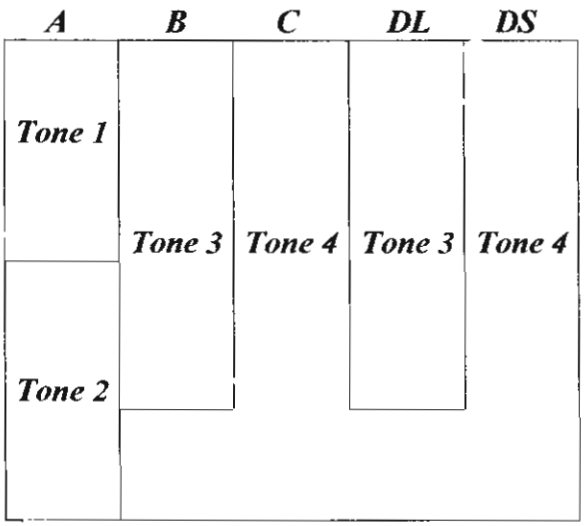
(ii) The fundamental frequencies of each tone in citation form are lower than in connected speech.

5.2 Tonal System and Tone Features of Chiangrai's Northern Thai Dialect Pronounced by Akha

5.2.1 Tonal system in citation form

Regarding the number of tones, Chiangrai's Northern Thai dialect pronounced by the seven Akha speakers have a 4 tone system. Note that they pronounce the DS1-2-3 tone as a falling tone, whereas the three Akha speakers (Akor, Acha, and Lopha) pronounce this tone as a rising tone in the same way as the native Chiangrai's Northern Thai speakers. It can be speculated that these three Akha speakers speak Chiangrai's Northern Thai dialect better than the seven Akha speakers. In calculating the average of fundamental frequency, it is necessary that the rising tone pronounced by these three Akha speakers have to be excluded. The pattern of split and coalescence of the seven Akha speakers may be shown as follows:

Table 21 : ***Pattern of tones in citation form of Chiangrai's Northern Thai dialect pronounced by Akha***



Following table 21, it is interesting to note that

(i) Tone ***A*** reflects the glottalization split. Tones ***B*** and ***DL*** reflect the voiced and voiceless split, whereas Tones ***C*** and ***DS*** have no split in their columns.

(ii) Tone ***C*** merges with Tones ***B4***, ***DL4***, and ***DS***.

5.2.2 Tone features in citation form

1.) Tone 1 : Low - falling - rising tone [212]

The pitch pattern of this tone starts at 125.9 Hz and glides down to about 116.2 Hz, then rises quickly to about 130.5 Hz (see figures 62 and 67).

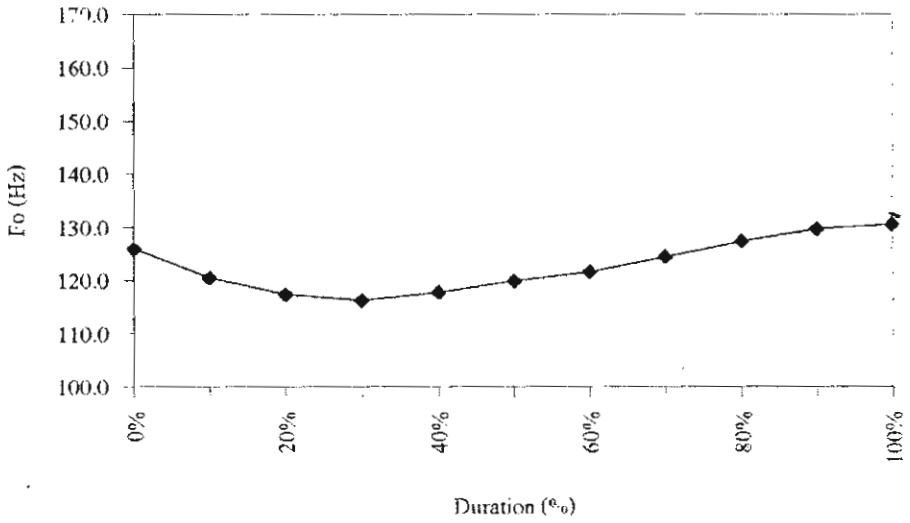


Figure 62 : ***Tone 1 in citation form of Chiangrai's Northern Thai dialect pronounced by Akha***

Ex.	[hu:^{212}]	'ear'
	[k^{h}a:^{212}]	'leg'
	[pi:^{212}]	'year'
	[kin^{212}]	'to eat'

2.) Tone 2 : Low - rising tone [23]

The pitch pattern of this tone starts at 126.5 Hz and glides up to about 137.3 Hz (see figures 63 and 67).

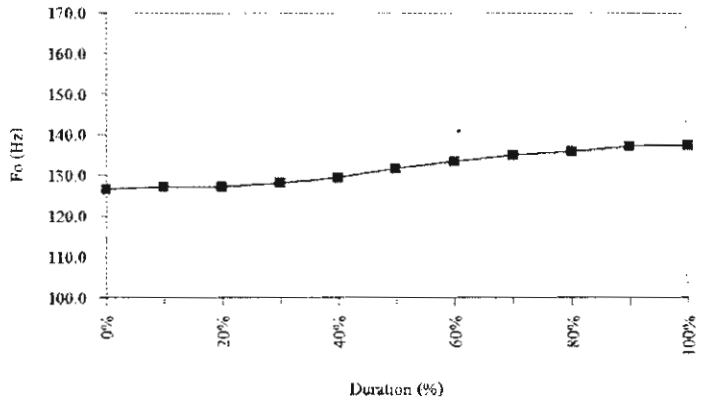


Figure 63 : ***Tone 2 in citation form of Chiangrai's Northern Thai dialect pronounced by Akha***

Ex.	[bin^{23}]	'to fly'
	[dæːŋ^{23}]	'red'
	[miː^{23}]	'hand'
	[nɔːn^{23}]	'to lie down'

3.) Tone 3 : Low - falling tone [21]

The pitch pattern of this tone starts at 130.5 Hz on smooth syllables and 131.7 Hz on checked syllables, then glides down to about 115.9 Hz on smooth syllables and 117.5 Hz on checked syllables. The glottal stop is heard at the end of the tone on checked syllables (see figures 64 and 67).

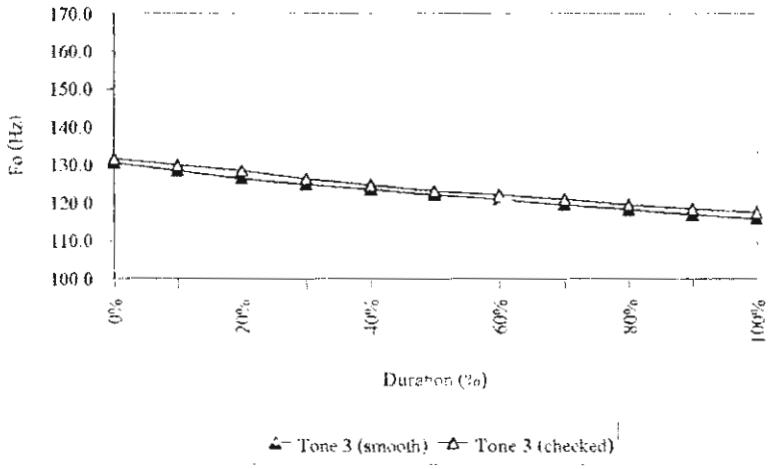


Figure 64 : ***Tone 3 on smooth and checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Akha***

Ex.	[si:^{21}]	'four'
	[taw^{21}]	'turtle'
	[bæŋ^{21}]	'to divide'
	[k^{h}a^{21ʔ}]	'to be torn'
	[kɔ^{21ʔ}]	'to embrace'
	[bɔ^{21ʔ}]	'blind'

4.) Tone 4 has 2 allotones which are in complementary distribution as follows:

4.1) High-low-falling tone (occurs with smooth and long-checked syllable) [52, 51]

The pitch pattern of this tone starts at 154.4 Hz on smooth syllables and 155.5 Hz on long-checked syllables, then falls quickly to about 128.3 Hz on smooth syllables and 121.3 Hz on long-checked syllables. The glottal stop is heard at the end of the tone on long checked syllables (see figures 65 and 67).

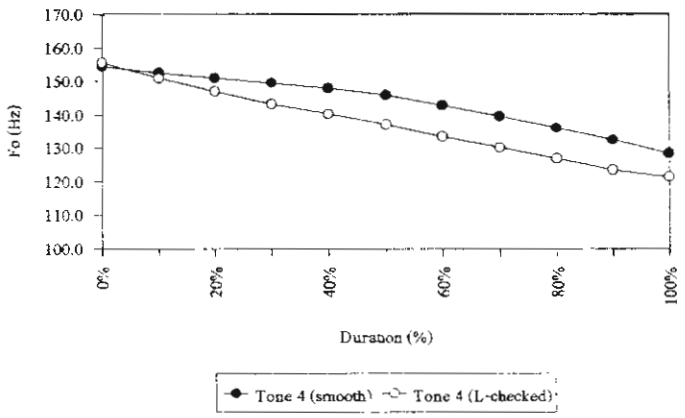


Figure 65 : ***Tone 4 on smooth and long - checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Akha***

Ex.	[pɔ:^{52}]	'father'
	[ya:^{52}]	'grass'
	[tom^{52}]	'to boil'
	[da:y^{52}]	'cord'
	[na:m^{52}]	'water'
	[liə^{51ʔ}]	'blood'
	[ha^{51ʔ}]	'root'

4.2) High-high-falling tone (occurs with short-checked syllable) |54|

The pitch pattern of this tone starts at 161.1 Hz and glides down to about 142.1 Hz. The glottal stop is heard at the end of the tone (see figures 66 and 67).

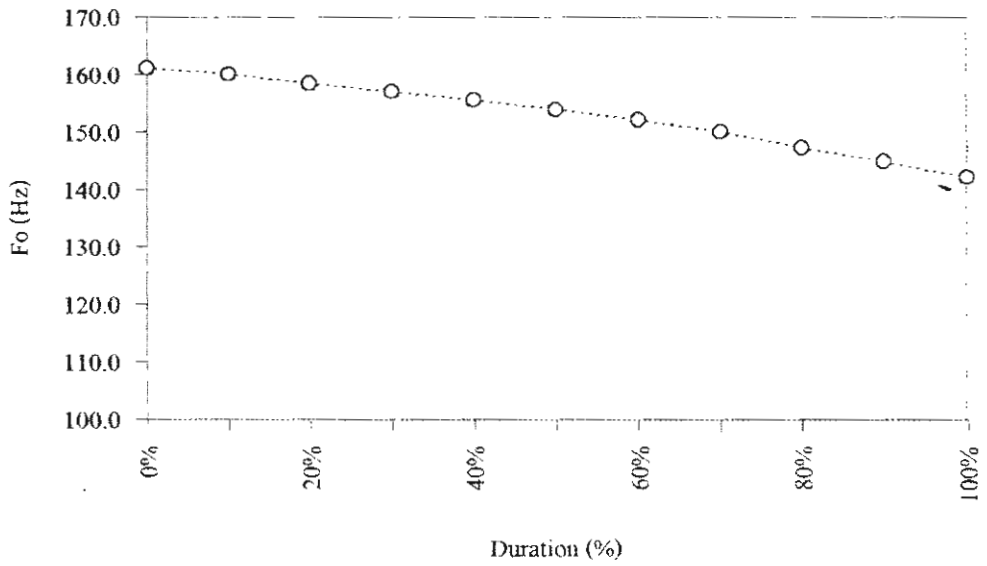


Figure 66 : ***Tone 4 on short - checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Akha***

Ex.	[$p^ha^{54?}$]	'vegetable'
	[$to^{54?}$]	'to fall'
	[$?o^{54?}$]	'chest'
	[$mo^{54?}$]	'ant'

All the tones on smooth and checked syllables are put into the same diagram as follows:

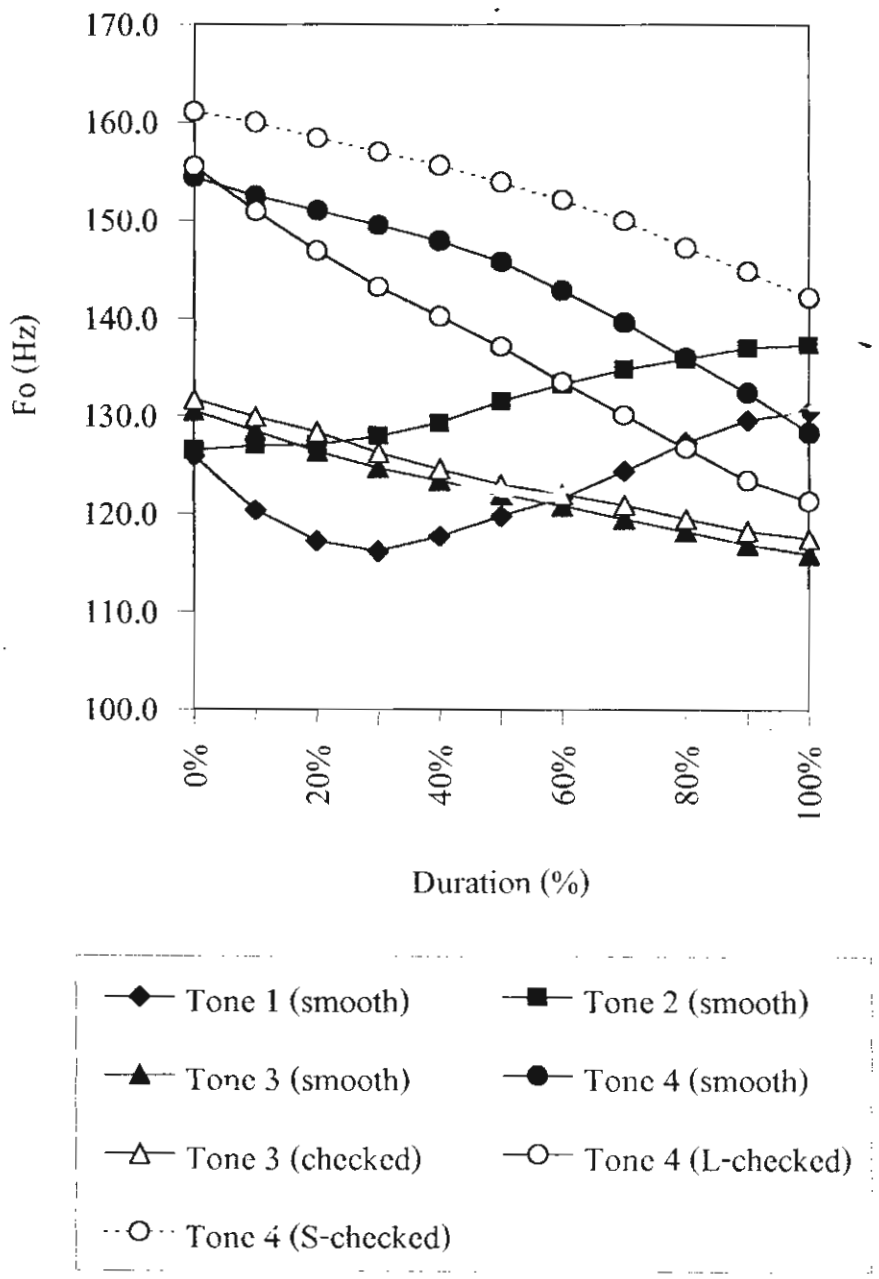


Figure 67 : ***Tone features in citation form of Chiangrai's Northern Thai dialect pronounced by Akha***

5.2.3 Tonal system in connected speech

Regarding the number of tones, Chiangrai's Northern Thai dialect pronounced by the nine Akha speakers have a 4 tone system. Note that they pronounce the DS1-2-3 tone as a falling tone, whereas only one Akha speaker (Akor) pronounces this tone as rising tone in the same way as the native Chiangrai's Northern Thai speakers. In calculating the average of fundamental frequency, it is necessary that the rising tone pronounced by this Akha speaker have to be excluded. The pattern of split and coalescence of the nine Akha speakers may be shown as follows:

Table 22 : ***Pattern of tones in connected speech of Chiangrai's Northern Thai dialect pronounced by Akha***

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 4*	*Tone 3*	*Tone 4*
Tone 2				

Following table 22, it is interesting to note that

(i) Tone ***A*** reflects the glottalization split. Tones ***B*** and ***DL*** reflect the voiced and voiceless split, whereas Tones ***C*** and ***DS*** have no split in their columns.

(ii) Tone ***C*** merges with Tones ***R4***, ***DL4***, and ***DS***.

5.2.4 Tone features in connected speech

1.) Tone 1 : Low - falling - rising tone [212]

The pitch pattern of this tone starts at 120.0 Hz and glides down to about 109.0 Hz, then rises quickly to about 130.3 Hz (see figures 68 and 73).

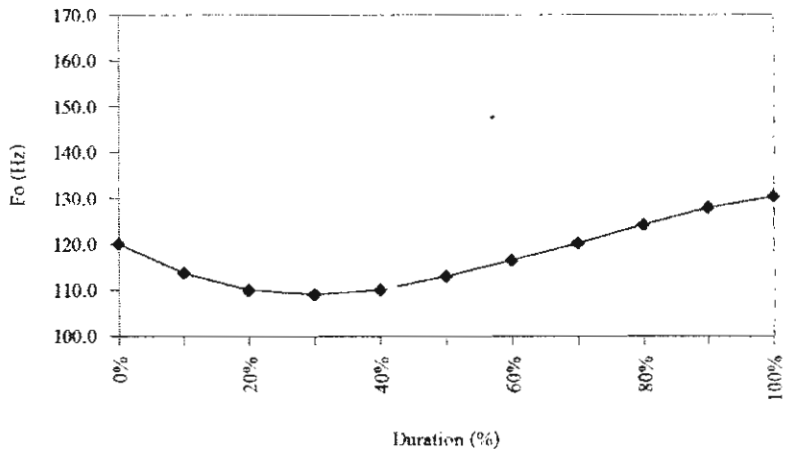


Figure 68 : ***Tone 1 in connected speech of Chiangrai's Northern Thai dialect pronounced by Akha***

Ex.	[hu:^{212}]	'ear'
	[k^{h}a:^{212}]	'leg'
	[pi:^{212}]	'year'
	[kin^{212}]	'to eat'

2.) Tone 2 : Mid - rising tone [34]

The pitch pattern of this tone starts at 141.5 Hz and glides up to about 156.1 Hz (see figures 69 and 73).

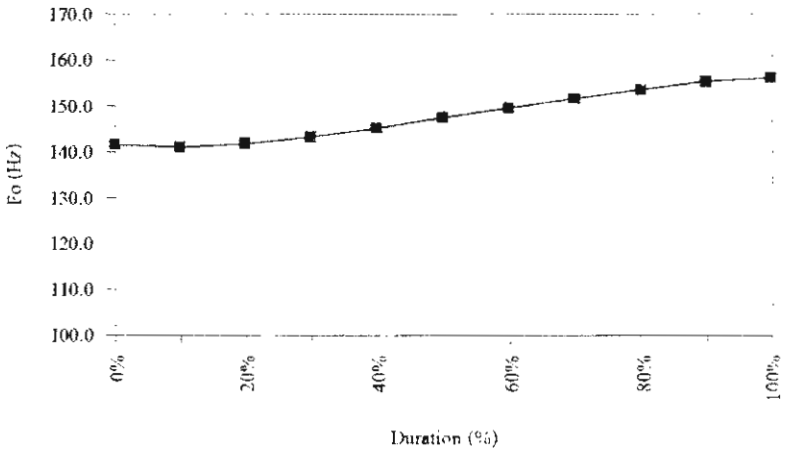


Figure 69 : ***Tone 2 in connected speech of Chiangrai's Northern Thai dialect pronounced by Akha***

Ex.	[bin^{34}]	'to fly'
	[dæːŋ^{34}]	'red'
	[miː^{34}]	'hand'
	[nɔːn^{34}]	'to lie down'

3.) Tone 3 : Low - falling tone [21]

The pitch pattern of this tone starts at 127.9 Hz on smooth syllables and 129.7 Hz on checked syllables, then glides down to about 114.1 Hz on smooth syllables and 114.2 Hz on checked syllables. The glottal stop is heard at the end of the tone on checked syllables (see figures 70 and 73).

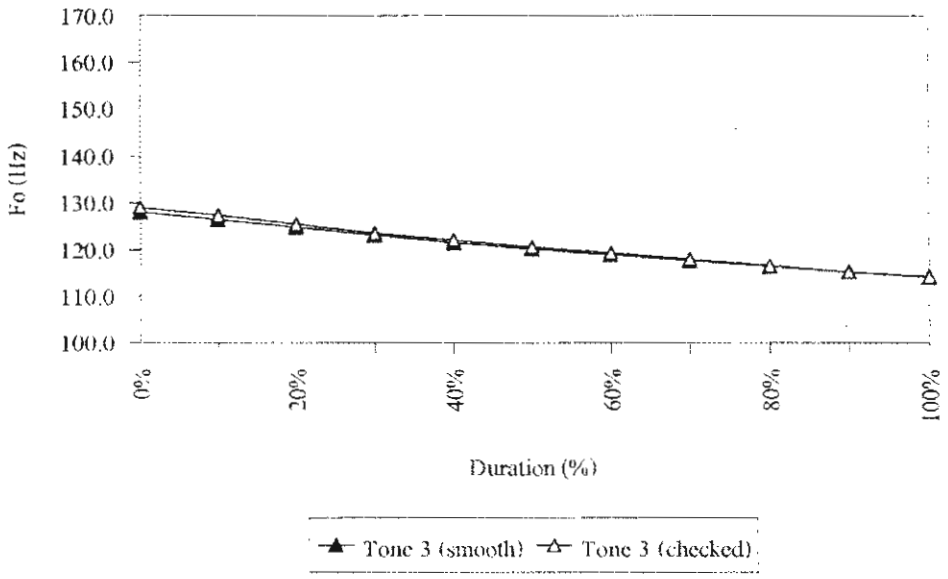


Figure 70 : ***Tone 3 on smooth and checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Akha***

Ex.	[siː^{21}]	'four'
	[taw^{21}]	'turtle'
	[bæŋ^{21}]	'to divide'
	[kʰa^{21ʔ}]	'to be torn'
	[kɔ^{21ʔ}]	'to embrace'
	[bɔ^{21ʔ}]	'blind'

4.) Tone 4 has 2 allotones which are in complementary distribution as follows:

4.1) High-low-falling tone (occurs with smooth and long-checked syllable) [42]

The pitch pattern of this tone starts at 147.7 Hz on smooth syllables and 144.1 Hz on long-checked syllables, then falls quickly to about 129.4 Hz on smooth syllables and 123.6 Hz on long-checked syllables. The glottal stop is heard at the end of the tone on long-checked syllables (see figures 71 and 73).

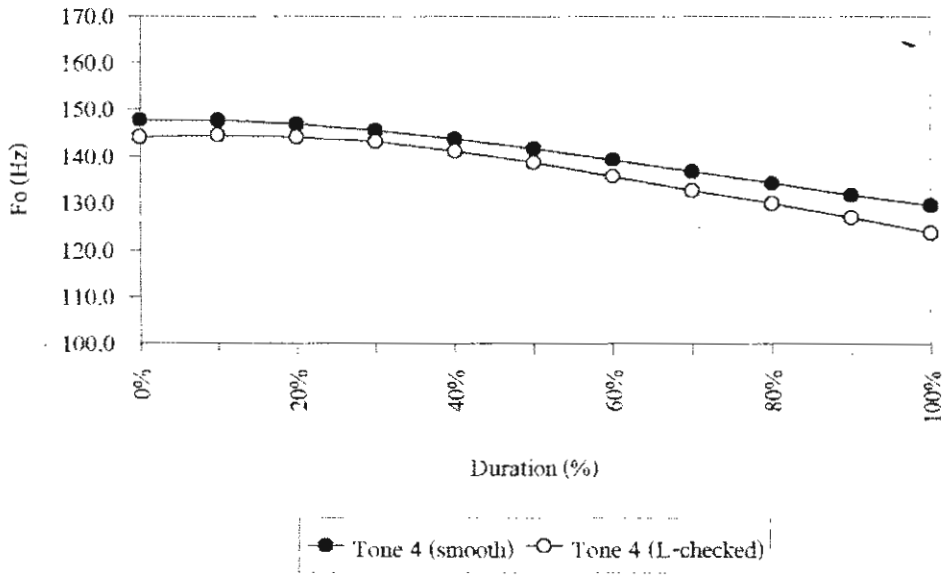


Figure 71 : ***Tone 4 on smooth and long-checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Akha***

Ex.	[pɔ:^{42}]	'father'
	[ya:^{42}]	'grass'
	[tom^{42}]	'to boil'
	[da:y^{42}]	'cord'
	[na:ɪn^{42}]	'water'
	[liə^{42ʔ}]	'blood'
	[ha^{42ʔ}]	'root'

4.2) High-high-falling tone (occurs with short-checked syllable) |54|

The pitch pattern of this tone starts at 170.3 Hz and glides down to about 155.1 Hz. The glottal stop is heard at the end of the tone (see figures 72 and 73).

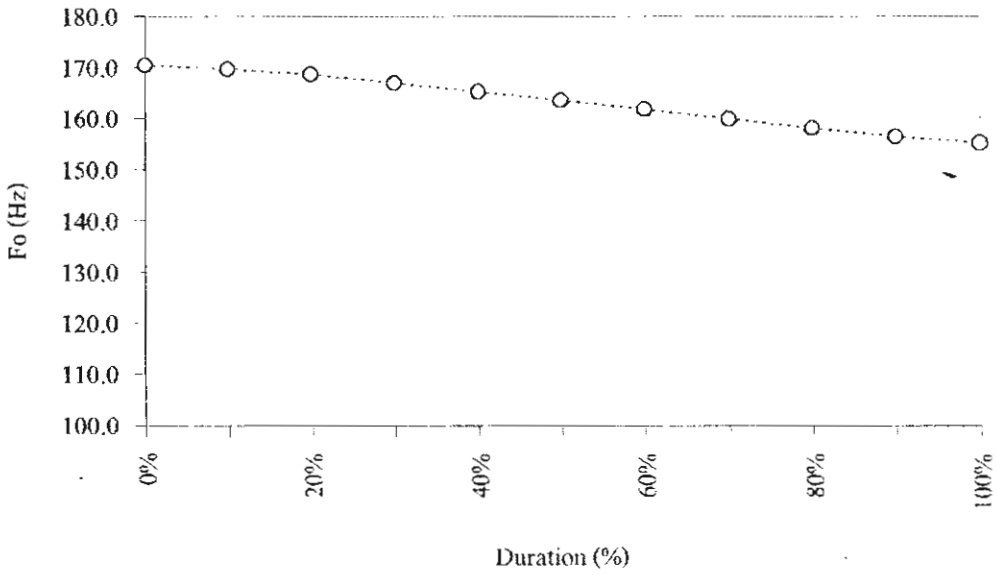


Figure 72 : ***Tone 4 on short - checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Akha***

Ex.	[$p^ha^{54ʔ}$]	'vegetable'
	[$to^{54ʔ}$]	'to fall'
	[$ʔo^{54ʔ}$]	'chest'
	[$mo^{54ʔ}$]	'ant'

All the tones on smooth and checked syllables are put into the same diagram as follows:

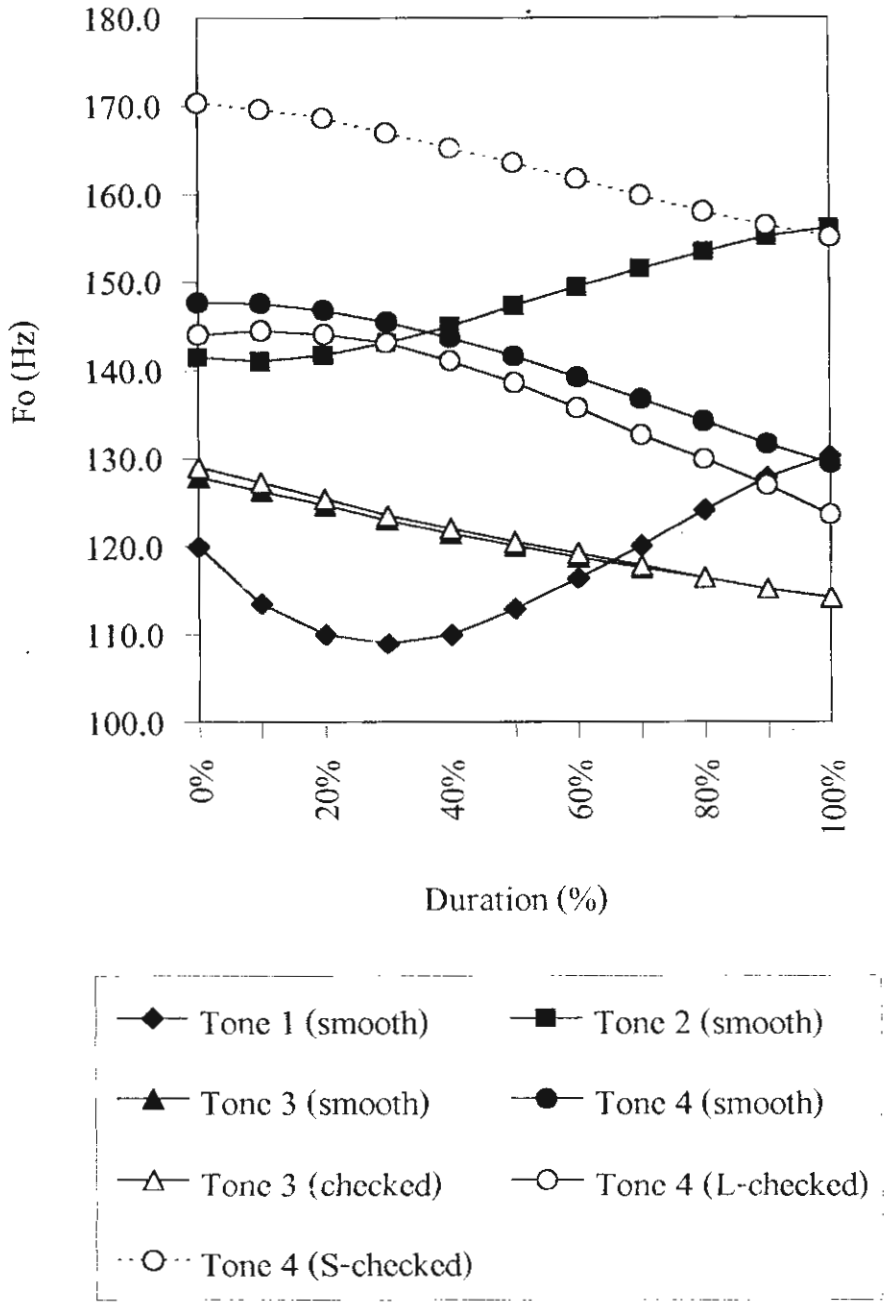


Figure 73 : ***Tone features in connected speech of Chiangrai's Northern Thai dialect pronounced by Akha***

5.2.5 Comparison of tonal systems and tone features between citation form and connected speech

1.) Tonal system

Table 23 : ***Comparison of tonal systems between citation form and connected speech of Chiangrai's Northern Thai dialect pronounced by Akha***

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 4*	*Tone 3*	*Tone 4*
Tone 2				

Citation form

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 4*	*Tone 3*	*Tone 4*
Tone 2				

Connected speech

Table 23 indicates that the tonal system in citation form and connected speech are the same as follows:

(i) Tone *A* reflects the glottalization split. Tones ***B*** and ***DL*** reflect the voiced-voiceless split, whereas Tones ***C*** and ***DS*** have no split in their columns.

(ii) Tone *C* merges with Tones ***B4***, ***DL4***, and ***DS***.

2.) Tone features

Table 24 : ***Comparison of tone features between citation form and connected speech of Chiangrai's Northern Thai dialect pronounced by Akha***

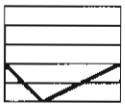
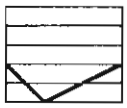
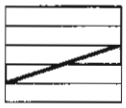
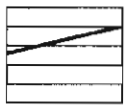
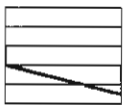
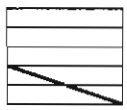
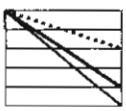
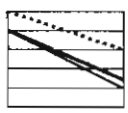
Form of Speech / Tone	**Citation form**	**Connected speech**
Tone 1	Low - falling - rising tone [212] 125.9 Hz - 116.2 Hz 130.5 Hz 	Low - falling - rising tone [212] 120.0 Hz - 109.0 Hz - 130.3 Hz 
Tone 2	Low - rising tone [23] 126.5 Hz -137.3 Hz 	Mid - rising tone [34] 141.5 Hz - 156.1 Hz 
Tone 3	Low - falling tone [21] 130.5 Hz -115.9 Hz (smooth) 131.7 Hz - 117.5 Hz (checked) 	Low - falling tone [21] 127.9 Hz - 114.1 Hz (smooth) 129.0 Hz - 114.2 Hz (checked) 
Tone 4	High - low - falling tone [52] 154.4 Hz - 128.3 Hz (smooth) High - low - falling tone [51] 155.5 Hz - 121.3 Hz (L-checked) High - high - falling tone [54] 161.1 Hz - 142.1 Hz (S-checked) 	High - low - falling tone [42] 147.7 Hz - 129.4 Hz (smooth) 144.1 Hz - 123.6 Hz (L-checked) High - high - falling tone [54] 170.3 Hz - 155.1 Hz (S-checked) 

Table 24 indicates that the tone features in citation form are different from connected speech as follows:

(i) Tone 2, in citation form, is low-rising tone, but in connected speech, it is mid - rising tone.

(ii) The pitch pattern of tone 4 on smooth and long-checked syllables, in citation form, starts at the fifth section of the voice range, but in connected speech, it starts at the fourth section.

5.3 Tonal System and Tone Features of Chiangrai's Northern Thai Dialect Pronounced by Karen

5.3.1 Tonal system in citation form

Regarding the number of tones, Chiangrai's Northern Thai dialect pronounced by eight Karen speakers have a 6 tone system. Note that they pronounce the DS1-2-3 tone as a rising tone in the same way as the native Chiangrai's Northern Thai speakers, whereas two Karen speakers (Dikuhae and Kampan) pronounce this tone as a falling tone. In calculating the average of fundamental frequency, it is necessary that the falling tone pronounced by these two Karen speakers have to be excluded. The pattern of split and coalescence of the eight Karen speakers may be shown as follows:

Table 25 : ***Pattern of tones in citation form of Chiangrai's Northern Thai dialect pronounced by Karen***

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 5*	*Tone 3*	*Tone 2*
Tone 2	*Tone 4*	*Tone 6*	*Tone 4*	*Tone 5*

Following table 25, the tonal system, it is interesting to note that tone ***A*** reflects the glottalization split and the tones in other columns, ***B***, ***C***, ***DL***, and ***DS***, always reflect the voiced-voiceless split.

5.3.2 Tone features in citation form

1) Tone 1 : Low - falling - rising tone [212]

The pitch pattern of this tone starts at 105.0 Hz and glides down to about 92.2 Hz, then rises quickly to about 107.5 Hz (see figures 74 and 82).

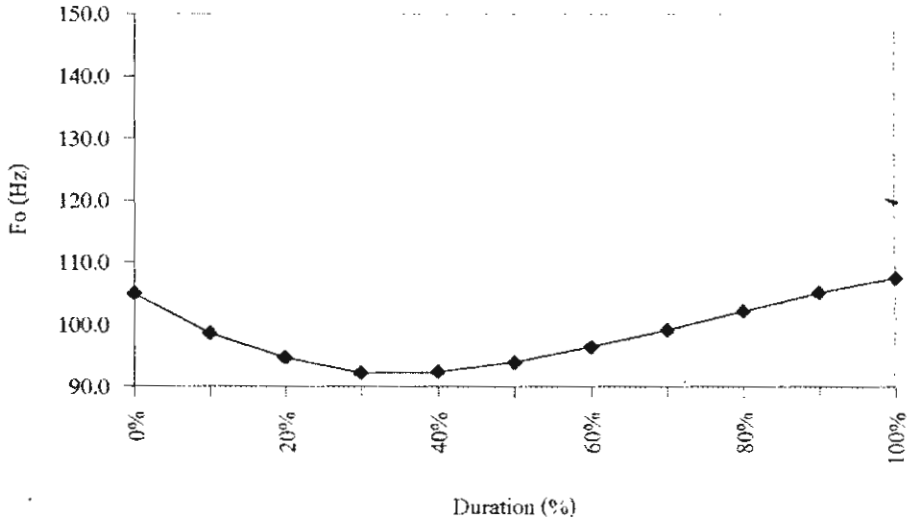


Figure 74 : ***Tone 1 in citation form of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[hu:^{212}]	'ear'
	[k^{h}a:^{212}]	'leg'
	[pi:^{212}]	'year'
	[kin^{212}]	'to eat'

2.) Tone 2 has 2 allotones which are in complementary distribution as follows:

2.1) Low - rising tone (occurs with smooth syllables) [24]

The pitch pattern of this tone starts at 112.1 Hz and glides up to about 124.8 Hz (see figures 75 and 82).

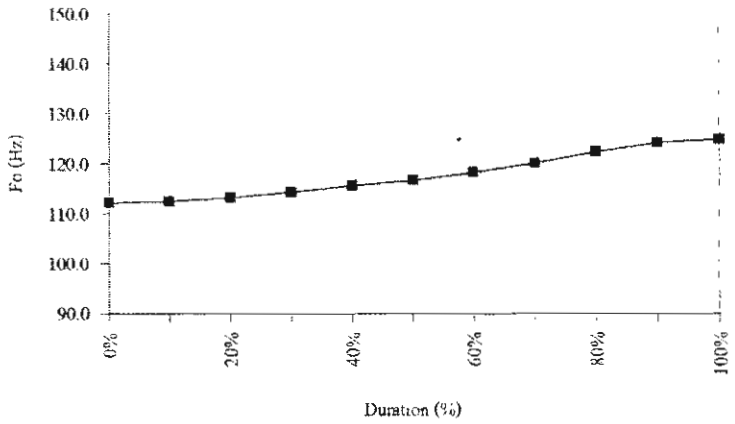


Figure 75 : ***Tone 2 on smooth syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[bin^{24}]	'to fly'
	[dæːŋ^{24}]	'red'
	[miː^{24}]	'hand'
	[nɔːn^{24}]	'to lie down'

2.2) Mid - rising tone (occurs with checked syllables) [35]

The pitch pattern of this tone starts at 122.4 Hz and rises to about 135.4 Hz. The glottal stop is heard at the end of the tone (see figures 76 and 82).

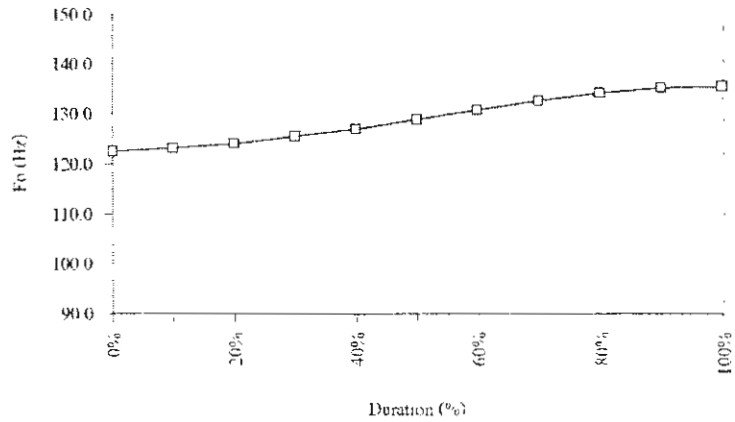


Figure 76 : ***Tone 2 on checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[$p^ha^{35ʔ}$]	'vegetable'
	[$si^{35ʔ}$]	'ten'
	[$to^{35ʔ}$]	'to fall'
	[$ʔo^{35ʔ}$]	'chest'

3.) Tone 3 : Low - falling tone [21]

The pitch pattern of this tone starts at 113.9 Hz on smooth syllables and 113.2 Hz on checked syllables, then glides down a little to about 101.4 Hz on smooth syllables and 101.5 Hz on checked syllables. The glottal stop is heard at the end of the tone on checked syllables (see figures 77 and 82).

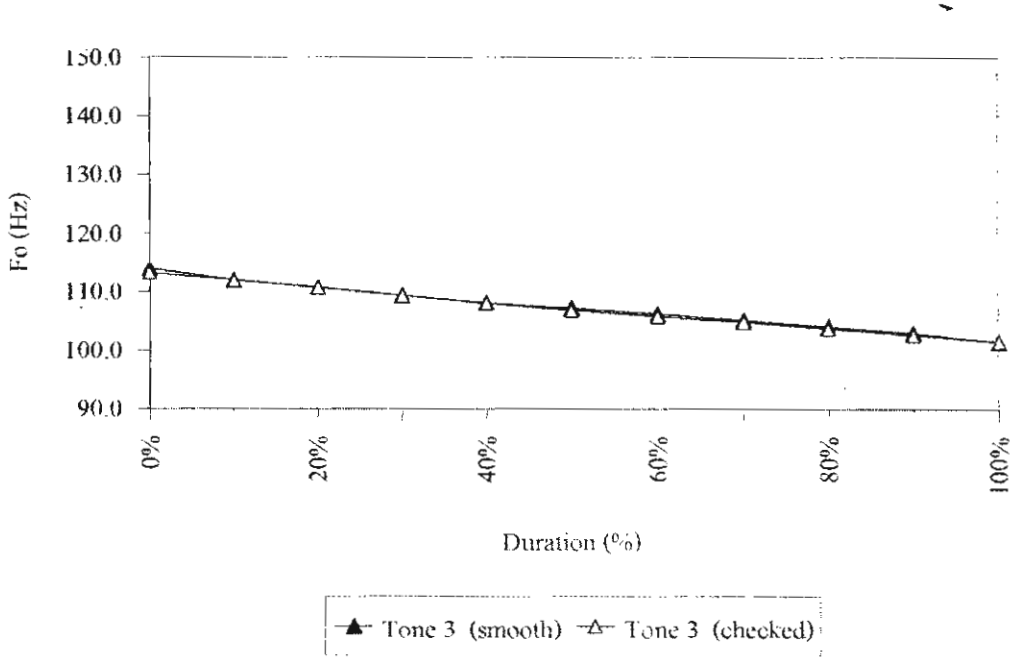


Figure 77 : *Tone 3 on smooth and checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Karen*

Ex.	[$si:^{21}$]	'four'
	[taw^{21}]	'turtle'
	[$bæŋ^{21}$]	'to divide'
	[$k^ha^{21ʔ}$]	'to be torn'
	[$kɔ^{21ʔ}$]	'to embrace'
	[$bɔ^{21ʔ}$]	'blind'

4.) Tone 4 : Mid - falling tone [31]

The pitch pattern of this tone starts at 123.5 Hz on smooth syllables and 124.0 Hz on checked syllables, then falls to about 96.9 Hz on smooth syllables and 101.5 Hz on checked syllables. The glottal stop is heard at the end of the tone on checked syllables (see figures 78 and 82).

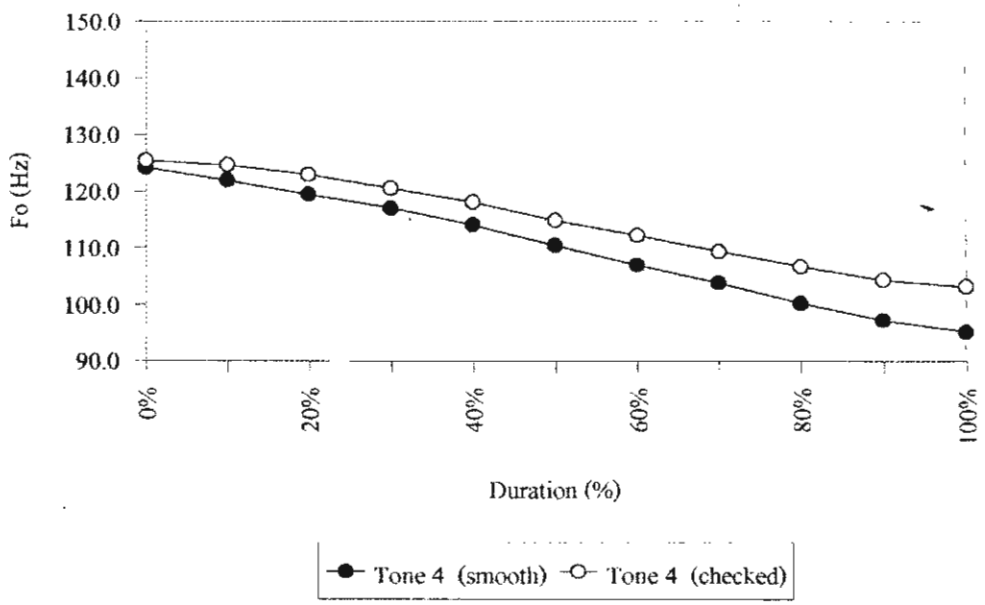


Figure 78 : ***Tone 4 on smooth and checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[pɔː^{31}]	'father'
	[hay^{31}]	'plantation'
	[liə^{31ʔ}]	'blood'
	[ha^{31ʔ}]	'root'

5.) Tone 5 has 2 allotones which are in complementary distribution as follows:

5.1) High-mid-falling tone (occurs with smooth syllables) [43]

The pitch pattern of this tone starts at 129.7 Hz and glides down to about 116.2 Hz (see figures 79 and 82).

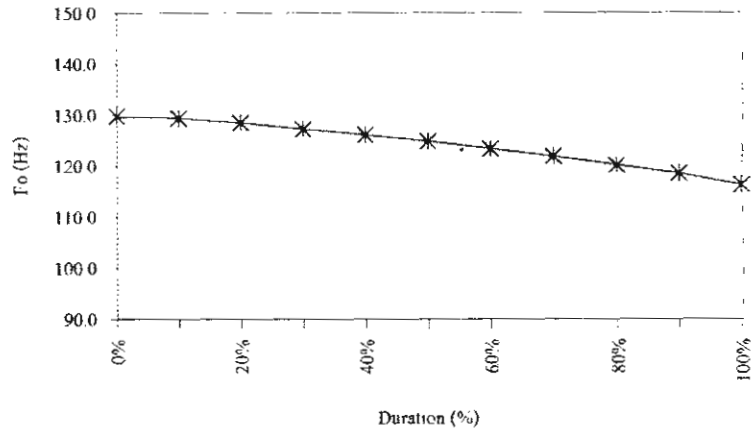


Figure 79 : ***Tone 5 on smooth syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[ya:^{43}]	'grass'
	[ka:w^{43}]	'nine'
	[tom^{43}]	'to boil'
	[da:y^{43}]	'cord'

5.2) High-high-falling tone (occurs with checked syllables) [54]

The pitch pattern of this tone starts at 141.7 Hz and glides down to about 129.7 Hz. The glottal stop is heard at the end of the tone (see figures 80 and 82).

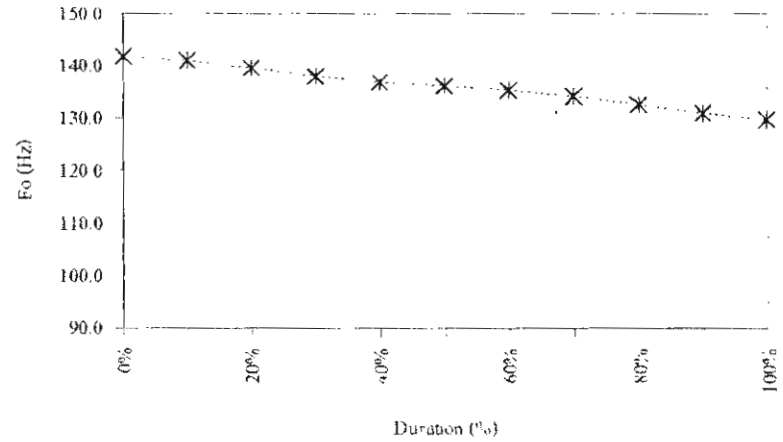


Figure 80 : ***Tone 5 on checked syllables in citation form of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[ha$^{54?}$]	'to love'
	[no$^{54?}$]	'bird'
	[wa$^{54?}$]	'temple'
	[k^{h}a$^{54?}$]	'to select'
	[le$^{54?}$]	'nail'
	[mo$^{54?}$]	'ant'

6.) Tone 6 : High - low falling tone [52]

The pitch pattern of this tone starts at 146.3 Hz and falls quickly to about 104.6 Hz (see figures 81 and 82).

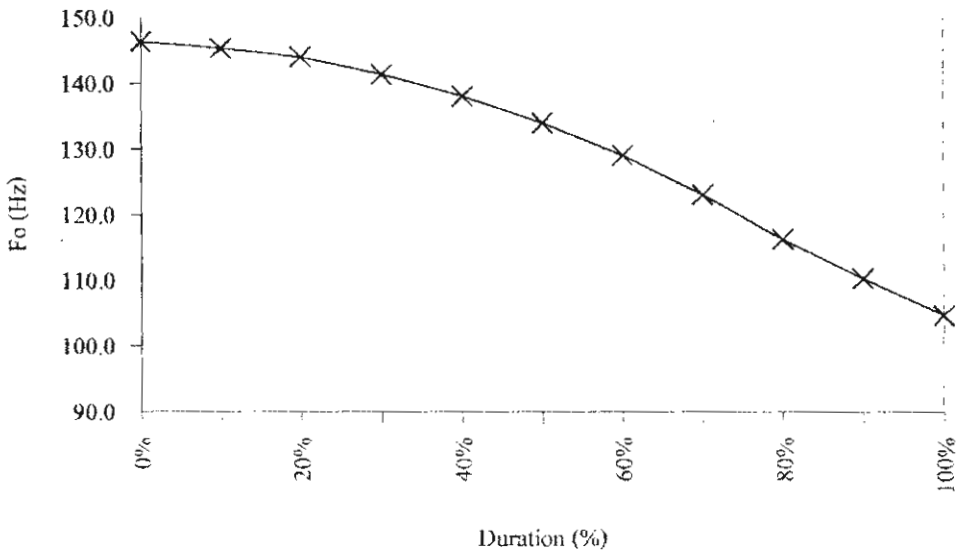


Figure 81 : ***Tone 6 in citation form of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[kiw^{52}]	'eyebrows'
	[tɔːŋ^{52}]	'stomach'
	[naːm^{52}]	'water'
	[lin^{52}]	'tongue'
	[maː^{52}]	'horse'

All the tones on smooth and checked syllables are put into the same diagram as follows:

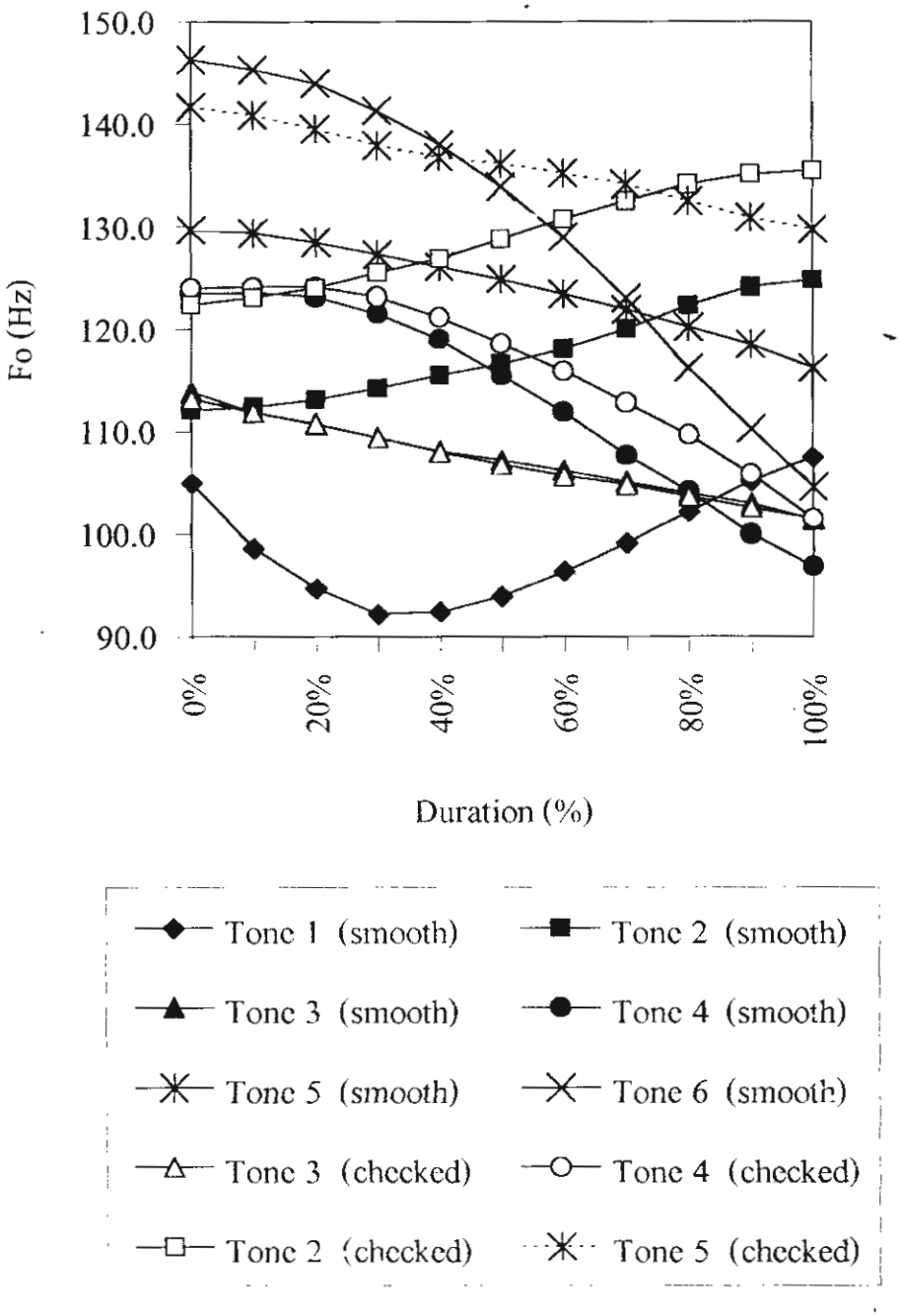


Figure 82 : ***Tone features in citation form of Chiangrai's Northern Thai dialect pronounced by Karen***

5.3.3 Tonal system in connected speech

Regarding the number of tones, Chiangrai's Northern Thai dialect pronounced by ten Karen speakers have a 6 tone system. Its pattern of split and coalescence may be shown as follows:

Table 26 : ***Pattern of tones in connected speech of Chiangrai's Northern Thai dialect pronounced by Karen***

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 5*	*Tone 3*	*Tone 2*
Tone 2	*Tone 4*	*Tone 6*	*Tone 4*	*Tone 5*

Following table 26, the tonal system, it is interesting to note that tone ***A*** reflects the glottalization split and the tones in other columns, ***B***, ***C***, ***DL***, and ***DS***, always reflect the voiced-voiceless split.

5.3.4 Tone features in connected speech

1) Tone 1 : Low-falling-rising tone [212]

The pitch pattern of this tone starts at 101.2 Hz and glides down to about 91.6 Hz, then rises quickly to about 106.7 Hz (see figures 83 and 91).

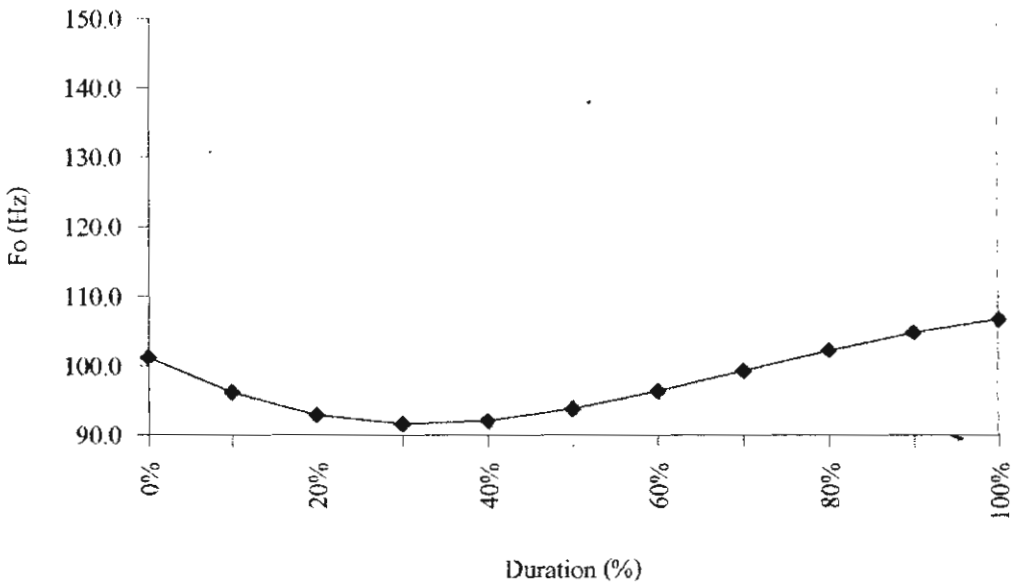


Figure 83 : ***Tone 1 in connected speech of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[hu:^{212}]	'ear'
	[k^{h}a:^{212}]	'leg'
	[pi:^{212}]	'year'
	[kin^{212}]	'to eat'

2.) Tone 2 has 2 allotones which are in complementary distribution as follows:

2.1) Mid - rising tone (occurs with smooth syllables) [34]

The pitch pattern of this tone starts at 114.9 and glides up to about 127.2 Hz (see figures 84 and 91).

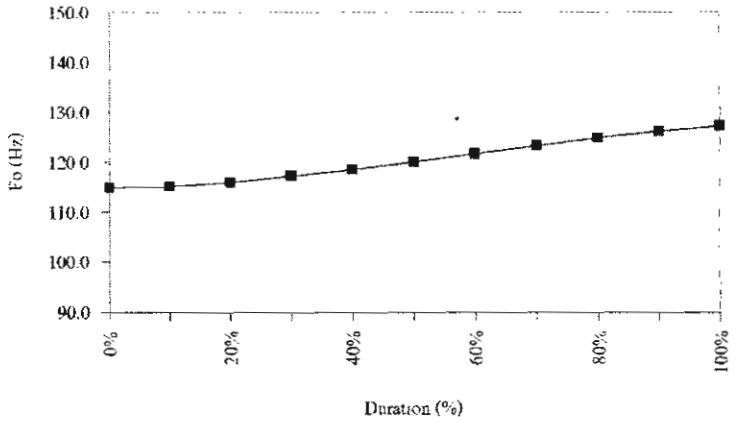


Figure 84 : ***Tone 2 on smooth syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[bin^{34}]	'to fly'
	[dæːŋ^{34}]	'red'
	[miː^{34}]	'hand'
	[nɔːn^{34}]	'to lie down'

2.2) High - rising tone (occurs with checked syllables) [45]

The pitch pattern of this tone starts at 126.4 Hz and glides up to about 139.4 Hz. The glottal stop is heard at the end of the tone (see figures 85 and 91).

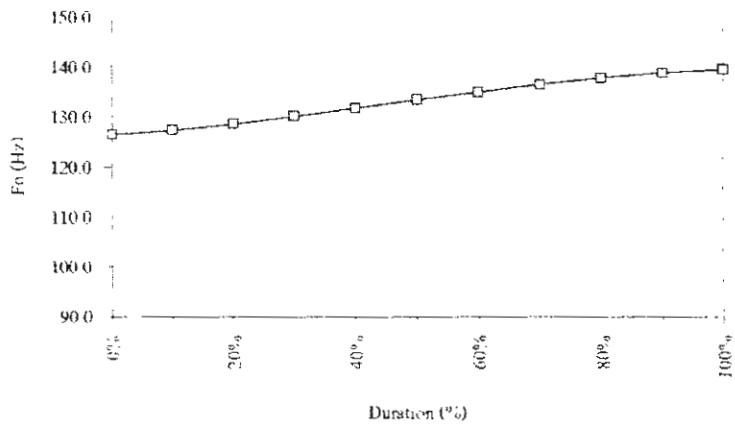


Figure 85 : ***Tone 2 on checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[$p^ha^{45?}$]	'vegetable'
	[$si^{45?}$]	'ten'
	[$to^{45?}$]	'to fall'
	[$?o^{45?}$]	'chest'

3.) Tone 3 : Low - falling tone [21]

The pitch pattern of this tone starts at 105.1 Hz on smooth syllables and 105.0 Hz on checked syllables, then glides down a little to about 93.1 Hz on smooth syllables and 93 Hz on checked syllables. The glottal stop is heard at the end of the tone on checked syllables (see figures 86 and 91).

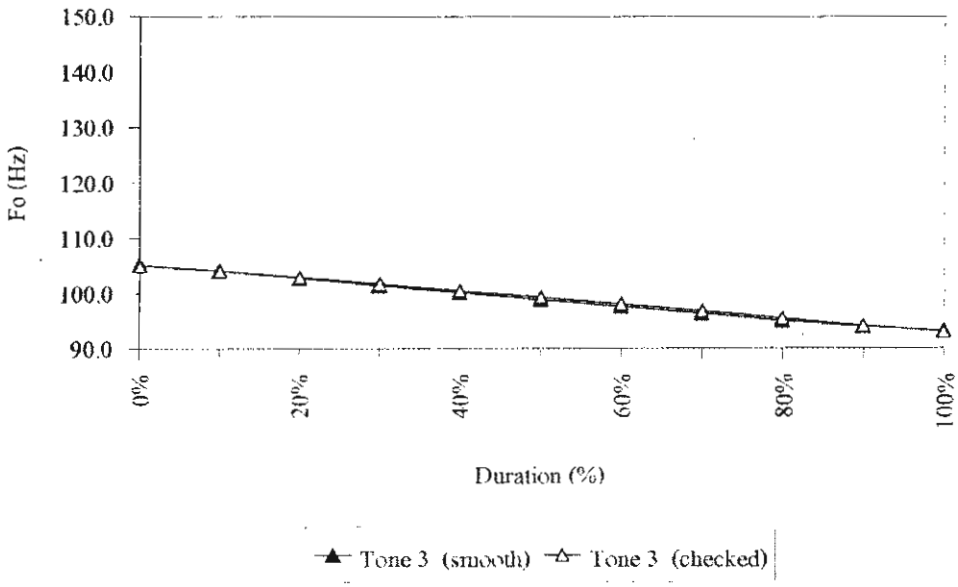


Figure 86 : ***Tone 3 on smooth and checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[$si:^{21}$]	'four'
	[taw^{21}]	'turtle'
	[$bæŋ^{21}$]	'to divide'
	[$k^ha^{21?}$]	'to be torn'
	[$kɔ^{21?}$]	'to embrace'
	[$bɔ^{21?}$]	'blind'

4.) Tone 4 : Mid - falling tone [31]

The pitch pattern of this tone starts at 117.0 Hz on smooth syllables and 115.8 Hz on checked syllables, then falls to about 94.7 Hz on smooth syllables and 93.0 Hz on checked syllables. The glottal stop is heard at the end of the tone on checked syllables (see figures 87 and 91).

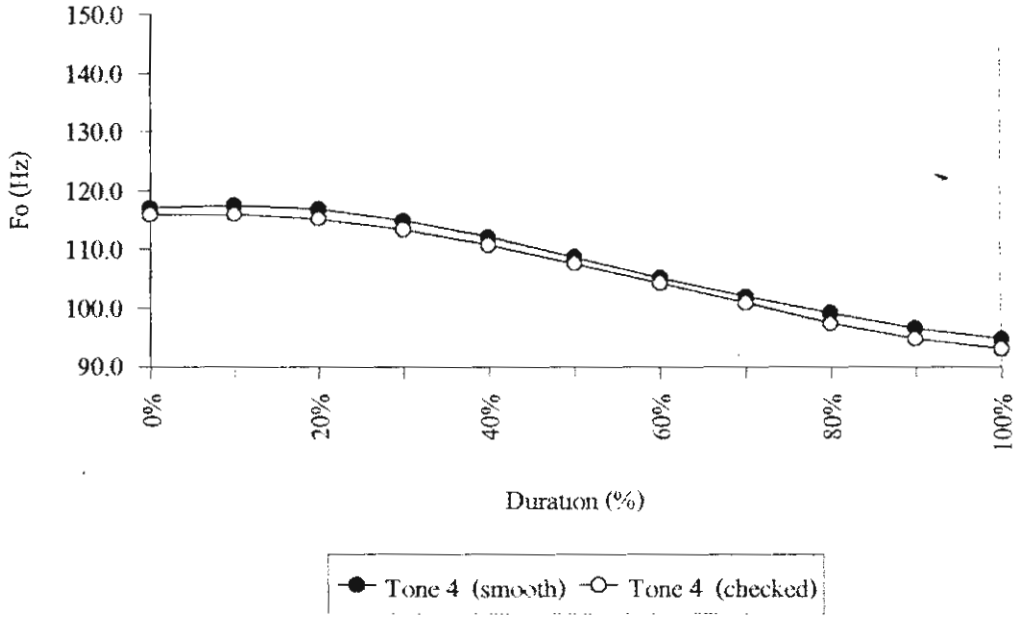


Figure 87 : ***Tone 4 on smooth and checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[pɔ:^{31}]	'father'
	[hay^{31}]	'plantation'
	[l̥ɨə^{31ʔ}]	'blood'
	[ha^{31ʔ}]	'root'

5.) Tone 5 has 2 allotones which are in complementary distribution as follows:

5.1) High-mid-falling tone (occurs with smooth syllables) [43]

The pitch pattern of this tone starts at 127.8 Hz and glides down to about 115.0 Hz (see figures 88 and 91).

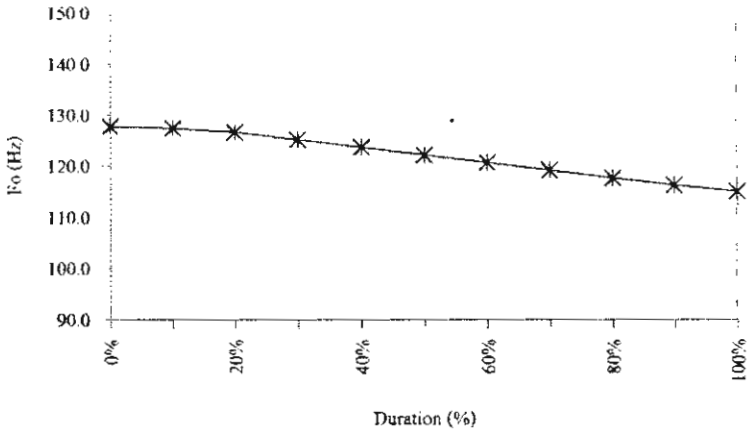


Figure 88 : ***Tone 5 on smooth syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[ya:^{43}]	'grass'
	[ka:w^{43}]	'nine'
	[tom^{43}]	'to boil'
	[da:y^{43}]	'cord'

5.2) High-high-falling tone (occurs with checked syllables) [54]

The pitch pattern of this tone starts at 141.5 Hz and glides down to about 131.0 Hz. The glottal stop is heard at the end of the tone (see figures 89 and 91).

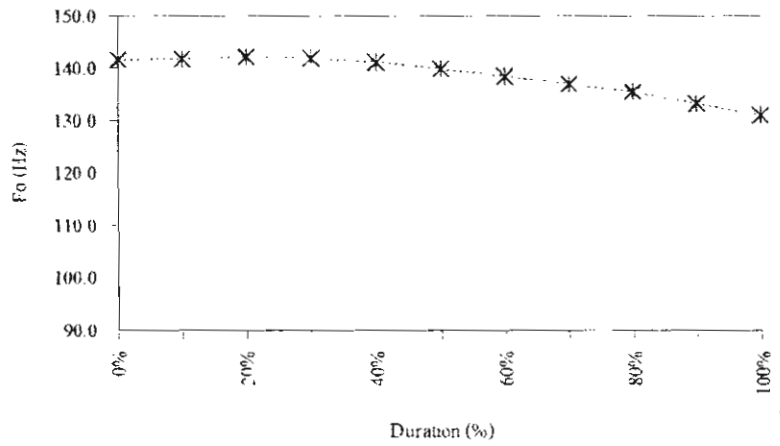


Figure 89 : ***Tone 5 on checked syllables in connected speech of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[ha^{542}]	'to love'
	[no^{542}]	'bird'
	[wa^{542}]	'temple'
	[k^{h}a^{542}]	'to select'
	[le^{542}]	'nail'
	[mo^{542}]	'ant'

6.) Tone 6 : High - low falling tone [51]

The pitch pattern of this tone starts at 138.0 Hz and falls quickly to about 94.8 Hz (see figures 90 and 91).

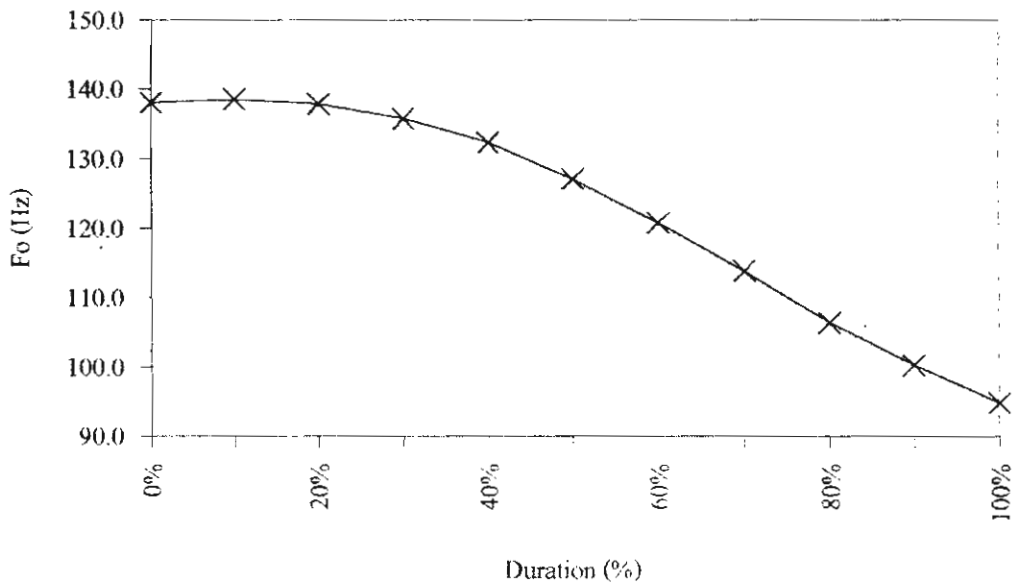


Figure 90 : ***Tone 6 in connected speech of Chiangrai's Northern Thai dialect pronounced by Karen***

Ex.	[kiw^{51}]	'eyebrows'
	[tɔ:ŋ^{51}]	'stomach'
	[na:m^{51}]	'water'
	[lin^{51}]	'tongue'
	[ma:^{51}]	'horse'

All the tones on smooth and checked syllables are put into the same diagram as follows:

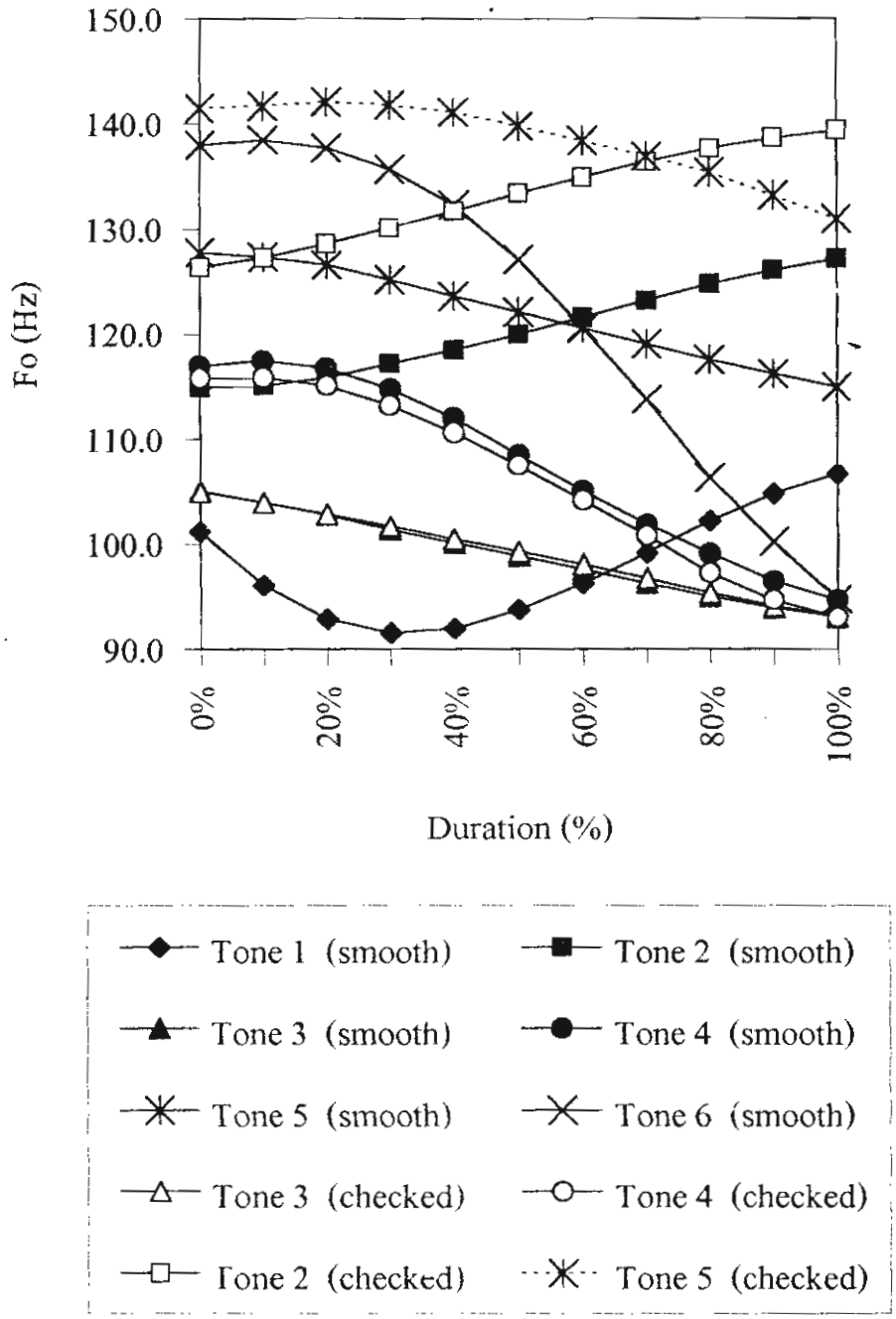


Figure 91 : ***Tone features in connected speech of Chiangrai's Northern Thai dialect pronounced by Karen***

5.3.5 Comparison of tonal systems and tone features between citation form and connected speech

1.) Tonal system

Table 27 : ***Comparison of tonal systems between citation form and connected speech of Chiangrai's Northern Thai dialect pronounced by Karen***

A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 5*	*Tone 3*	*Tone 2*
Tone 2	*Tone 4*	*Tone 6*	*Tone 4*	*Tone 5*

Citation form

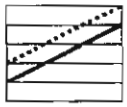
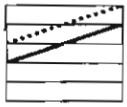
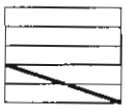
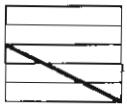
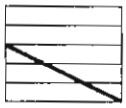
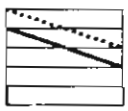
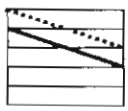
A	*B*	*C*	*DL*	*DS*
Tone 1	*Tone 3*	*Tone 5*	*Tone 3*	*Tone 2*
Tone 2	*Tone 4*	*Tone 6*	*Tone 4*	*Tone 5*

Connected speech

Table 27 indicates that the tonal systems in both citation form and connected speech are not different. That is, tone ***A*** reflects the glottalization split and the tones in other columns, ***B***, ***C***, ***DL***, and ***DS***, always reflect the voiced-voiceless split.

2.) Tone features

Table 28 : ***Comparison of tone features between citation form and connected speech of Chiangrai's Northern Thai dialect pronounced byKaren***

Form of Speech / Tone	**Citation form**	**Connected speech**
Tone 1	Low - falling - rising tone [212] 105.0 Hz - 92.2 Hz - 107.5 Hz 	Low - falling - rising tone [212] 101.2 Hz - 91.6 Hz - 106.7 Hz 
Tone 2	Low - rising tone [24] (smooth) 112.1 Hz - 124.8 Hz Mid - rising tone [35] (checked) 122.4 Hz - 135.4 Hz 	Mid - rising tone [34] (smooth) 114.9 Hz - 127.2 Hz High - rising tone [45] (checked) 126.4 Hz - 139.4 Hz 
Tone 3	Low - falling tone [21] 113.9 Hz - 101.4 Hz (smooth) 113.2 Hz - 101.5 Hz (checked) 	Low - falling tone [21] 105.1 Hz - 93.1 Hz (smooth) 105.0 Hz - 93.0 Hz (checked) 
Tone 4	Mid - falling tone [31] 123.5 Hz - 96.9 Hz (smooth) 124.0 Hz - 101.5 Hz (checked) 	Mid - falling tone [31] 117.0 Hz - 94.7 Hz (smooth) 115.8 Hz - 93.0 Hz (checked) 
Tone 5	High - mid - falling tone [43] 129.7 Hz - 116.2 Hz (smooth) High - high - falling tone [54] 141.7 Hz - 129.7 Hz (checked) 	High - mid - falling tone [43] 127.8 Hz - 115.0 Hz (smooth) High - high - falling tone [54] 141.5 Hz - 131.0 Hz (checked) 

(Table 28)

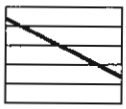
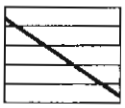
Form of speech / Tone	**Citation form**	**Connected speech**
Tone 6	High - low - falling tone [52] 146.3 Hz - 104.6 Hz 	High - low - falling tone [51] 138.0 Hz - 94.8 Hz 

Table 28 indicates that the tone features in citation form differ from connected speech in tones 2 and 6 as follows:

(i) The pitch pattern of tone 2, in citation form, starts at the second section of the voice range on smooth syllables and the third section on checked syllables but in connected speech, starts at the third section on smooth syllables and the fourth section on checked syllables.

(ii) The end of the point of tone 6, in citation form, is at the second section but in connected speech, is at the first section.

CHAPTER VI

TONAL COMPARISON

In this chapter, the tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen people will be compared in three ways as follows:

(i) To be compared with their native languages in only citation form.

(ii) To be compared with Chiangrai's Northern Thai dialect pronounced by native speakers.

(iii) To be compared with each other.

6.1 Tonal Comparison between Chiangrai's Northern Thai Dialect Pronounced by the Lahu, Akha, and Karen People and Their Native Languages

6.1.1 Comparison of Tonal System

Table 29 : ***Comparison of tonal system between Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen people and their native languages in citation form***

Language / Ethnic group	Chiangrai's Northern Thai dialect	Native languages
Lahu	4 tone system	7 tone system
Akha	4 tone system	5 tone system
Karen	6 tone system	6 tone system

Following table 29, the Lahu has a four tone system in Chiangrai's Northern Thai dialect and a seven tone system in his native language.

The Akha has a four tone system in Chiangrai's Northern Thai dialect and a five tone system in his native language.

The Karen has a six tone system in both Chiangrai's Northern Thai dialect and his native language.

6.1.2 Comparison of Tone Features

6.1.2.1 Lahu

Tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu and the Lahu language pronounced by a native speaker in citation form may be shown as follows:

Chiangrai's Northern Thai dialect pronounced by the Lahu

Tone 1 -------- low - falling - rising tone [212]

Tone 2 <
- mid - rising tone / smooth syllables [34]
- high - rising tone / checked syllables [45]

Tone 3 -------- low - falling tone [21]

Tone 4 -------- high - falling tone [52,42]

The Lahu language pronounced by a native speaker

Tone 1 -------- low - level tone [22]

Tone 2 -------- low - level - glottalized tone [22?]

Tone 3 -------- mid - falling tone [31]

Tone 4 -------- high - falling tone [42]

Tone 5 -------- high - falling - glottalized tone [43?]

Tone 6 -------- high - level tone [55]

Tone 7 -------- high - level - glottalized tone [55?]

Table 30 : *Comparison of tone features between Chiangrai's Northern Thai dialect pronounced by the Lahu and his native language*

Tone	Chiangrai's Northern Thai dialect	Tone	The Lahu language
1	Low – falling - rising tone [212]	-	-
2	2.1 Mid – rising tone (smooth) [34]	6	High - level tone [55]
	2.2 High – rising - glottalized tone (checked) [45?]	7	High - level - glottallized tone [55?]
3	Low – falling tone (smooth)[21]	1	Low - level tone [22]
	Low – falling - glottalized tone (checked) [21?]	2	Low - level - glottallized tone [22?]
4	High – falling tone (smooth) [52]	4	High - falling tone [42]
	High – falling - glottalized tone (checked) [42?]	5	High - falling - glottalized tone [43?]
-	-	3	Mid - falling tone [31]

Following table 30, it is interesting to note that some tones of Chiangrai's Northern Thai dialect pronounced by the Lahu should be interfered with by the native Lahu language, such as pronouncing with glottalized tone.

6.1.2.2 Akha

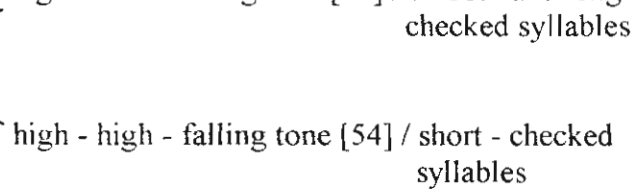
Tone features of Chiangrai's Northern Thai dialect pronounced by the Akha and the Akha language pronounced by a native speaker may be shown as follows:

Chiangrai's Northern Thai dialect pronounced by the Akha

Tone 1 -------- low - falling - rising tone [212]

Tone 2 -------- low - rising tone [23]

Tone 3 -------- low falling tone [21]

Tone 4 

The Akha language pronounced by a native speaker

Tone 1 -------- low - falling tone [21]

Tone 2 -------- low - falling - glottalized tone [21?]

Tone 3 -------- mid - level tone [33]

Tone 4 -------- mid - rising tone [34]

Tone 5 -------- high - level tone [55]

Table 31 : ***Comparison of tone features between Chiangrai's Northern Thai dialect pronounced by the Akha and his native language***

Tone	Chiangrai's Northern Thai dialect	Tone	The Akha language
1	Low - falling - rising tone [212]	-	-
2	Low - rising tone [23]	4	Mid - rising tone [34]
3	Low - falling tone (smooth) [21]	1	Low - falling tone [21]
	Low - falling - glottalized tone (checked) [21?]	2	Low - falling - glottallized tone [21?]
4	4.1 High - low - falling tone (smooth) [52] High - low - falling - glottalized tone (long - checked) [51?] 4.2 High - high - falling - glottalized tone (short - checked) [54?]	-	-
-	-	3	Mid - level tone [33]
-	-	5	High - level tone [55]

Following table 31, it is interesting to note that some tones of Chiangrai's Northern Thai dialect pronounced by the Akha should be interfered with by the Akha language, such as pronouncing with glottalized tone.

6.1.2.3 Karen

Tone features of Chiangrai's Northern Thai dialect pronounced by the Karen and the Karen language pronounced by a native speaker in citation form may be shown as follows:

Chiangrai's Northern Thai dialect pronounced by the Karen

Tone 1 -------- low - falling - rising tone [212]

Tone 2 < low - rising tone [24]
mid - rising tone [35]

Tone 3 ---- --- low - falling tone [21]

Tone 4 -------- mid - falling tone [31]

Tone 5 < high - mid - falling tone [43]
high - high - falling tone [54]

Tone 6 -------- high - low - falling tone [52]

The Karen language pronounced by a native speaker

Tone 1 -------- low - level tone [22]

Tone 2 -------- mid - level tone [33]

Tone 3 -------- high - falling tone [41]

Tone 4 -------- high - falling - glottalized tone [52?]

Tone 5 -------- high - level tone [44]

Tone 6 -------- high - level - glottalized tone [55?]

Table 32 : *Comparison of tone features between Chiangrai's Northern Thai dialect pronounced by the Karen and his native language*

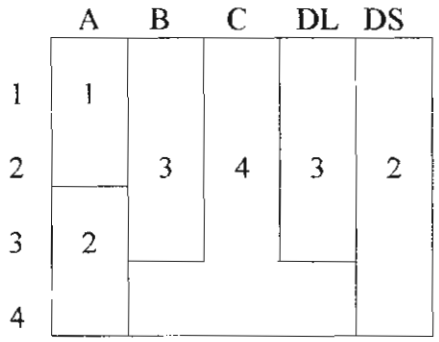
Tone	Chiangrai's Northern Thai dialect	Tone	The Karen language
1	Low - falling - rising tone [212]	-	-
2	2.1 Low – rising tone (smooth) [24]	5	High - level tone [44]
	2.2 Mid – rising - glottalized tone (checked) [35?]	6	High - level - glottallized tone [55?]
3	Low - falling tone (smooth) [21]	1	Low – level tone [22]
	Low - falling - glottalized tone (checked) [21?]		
4	Mid - falling tone (smooth) [31]	-	-
	Mid - falling - glottalized tone (checked) [31?]		
5	5.1 High – mid - falling tone (smooth) [43]	-	-
	5.2 High – nigh - falling – glottalized tone (checked) [54?]		
6	High - low - falling tone [52]	3	High - low - falling tone [41]
-	-	2	Mid – level tone [33]
-	-	4	High - low - falling - glottalized tone [52?]

Following table 32, it is interesting to note that some tones of Chiangrai's Northern Thai dialect pronounced by the Karen should be interfered with by the native Karen language, such as pronouncing with glottalized tone.

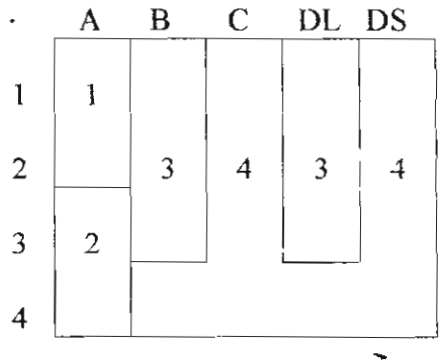
6.2 Tonal Comparison between Chiangrai's Northern Thai Dialect Pronounced by the Lahu, Akha, and Karen People and the Native Speakers

6.2.1 Comparison of Tonal System in Citation Form

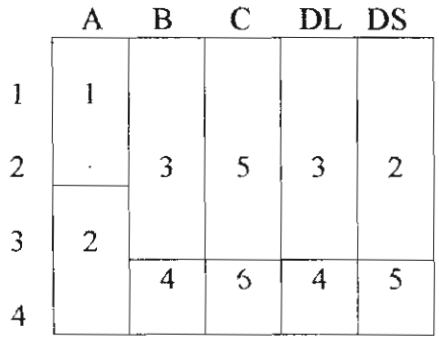
Table 33 : ***Comparison of tonal system in citation form between Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen people and native speakers***



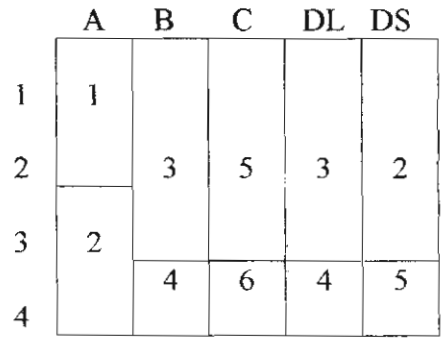
Lahu



Akha



Karen



Native Chiangrai's Northern Thai speakers

Following table 33, it is interesting to note that:

(i) Tone A in every group does not differ from native Chiangrai's Northern Thai speakers. That is, it reflects the glottalization split.

(ii) Tones B and DL in every group do not differ from native Chiangrai's Northern Thai speakers. That is, they reflect the voiced-voiceless split.

(iii) Tones C and DS in the Lahu and Akha groups have no split in their columns but they reflect the voiced-voiceless split in the Karen group in the same way as native Chiangrai's Northern Thai speakers.

(iv) Tone C in the Lahu and Akha groups differs from native Chiangrai's Northern Thai speakers in the pattern of tonal coalescence. That is, tone C in the Lahu merges with tones B4 and DL4, and tone C in the Akha merges with tones B4, DL4, and DS.

6.2.2 Comparison of Tonal System in Connected Speech

Table 34 : ***Comparison of tonal system in connected speech between Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen people and native speakers***

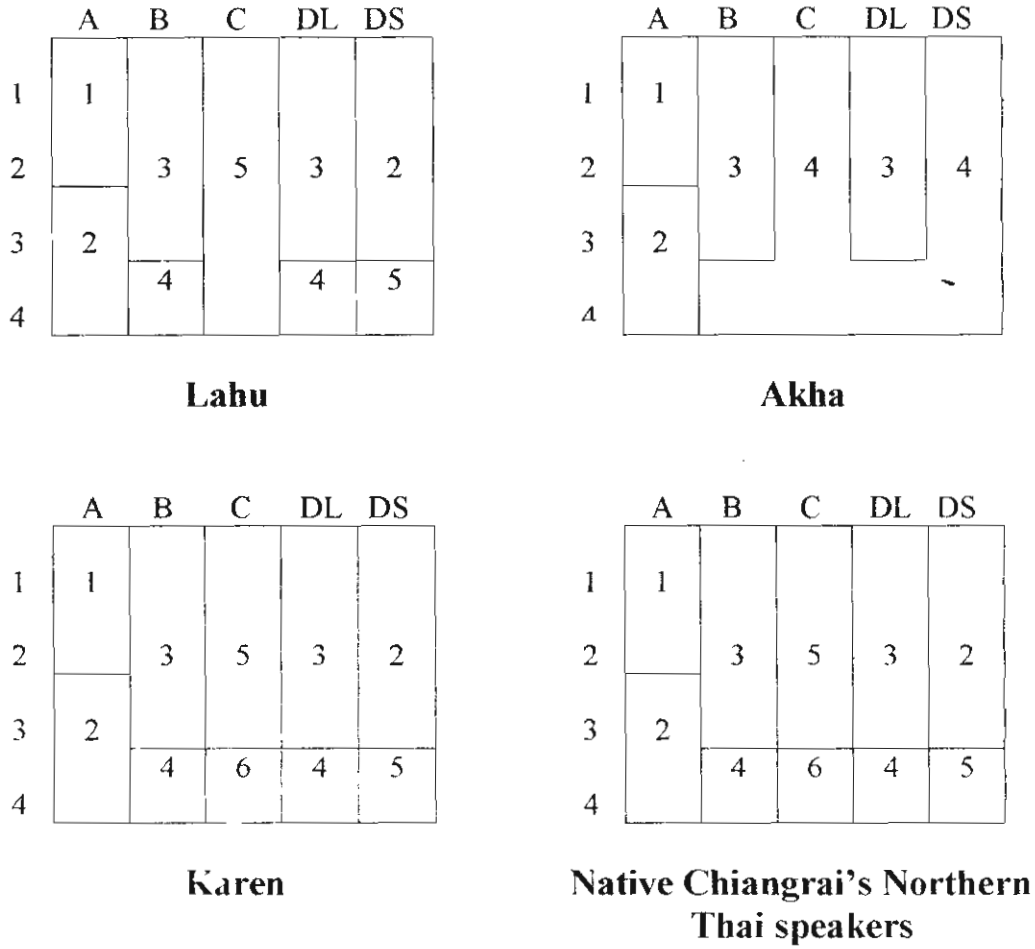
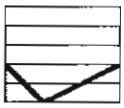
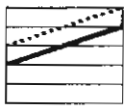
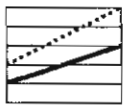
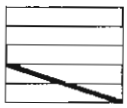
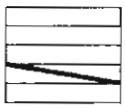
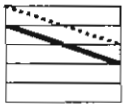


Table 34 shows that the tonal systems of the Akha, Karen, and native Chiangrai's Northern Thai speakers in connected speech are the same as those in citation form except for the Lahu, in which tone C does not merge with tones B4 and DL4 and tone DS reflects the voiced-voiceless split.

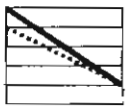
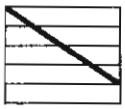
6.2.3 Comparison of Tone Features in Citation Form

6.2.3.1 Lahu

Table 35 : ***Comparison of tone features in citation form between Chiangrai's Northern Thai dialect pronounced by the Lahu and native speakers***

Tone	Chiangrai's Northern Thai dialect pronounced by the Lahu	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
1	Low - falling - rising tone [212] 107.6 Hz - 97.6 Hz - 115.1 Hz 	1	Low – falling - rising tone [212] 105.3 Hz – 98.3 Hz - 107.5 Hz 
2	Mid - rising tone [34] (smooth) 119.2 Hz - 129.9 Hz High - rising tone [45] (checked) 133.9 Hz - 146.2 Hz 	2	Low – rising tone [23] (smooth) 116.5 Hz - 126.6 Hz Mid – rising tone [35] (checked) 127.2 Hz - 146.4 Hz 
3	Low - falling tone [21] 114.6 Hz - 102.5 Hz (smooth) 116.8 Hz - 103.9 Hz (checked) 	3	Low – level tone [22] 120.7 Hz – 110.0 Hz (smooth) 120.3 Hz – 112.4 Hz (checked) 
-	-	4	Mid – falling tone [31] 124.1 Hz – 95.1 Hz (smooth) 125.4 Hz – 103.1 Hz (checked) 
-	-	5	High - mid - falling tone [43] 138.1 Hz –122.6 Hz (smooth) High - high - falling tone [54] 152.9 Hz – 140.2 Hz (checked) 

(Table 35)

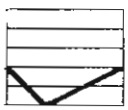
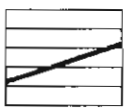
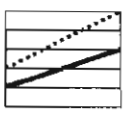
Tone	Chiangrai's Northern Thai dialect pronounced by the Lahu	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
4	High - low -falling tone [52] 144.3 Hz -114.8 Hz (smooth) High - low - falling tone [42] 131.3 Hz - 107.4 Hz (checked) 	6	High - low - falling tone [52] 154.0 Hz - 106.7 Hz 

Following table 35, it is interesting to note that, tones 2 and 3 of Chiangrai's Northern Thai dialect pronounced by the Lahu differ from native speakers in the pattern of tones. That is, tone 2 of the Lahu starts at the third section of the voice range on smooth syllables and the fourth section on checked syllables, whereas tone 2 of native speakers starts at the second section on smooth syllables and the third section on checked syllables.

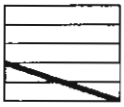
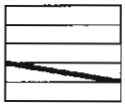
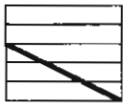
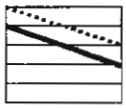
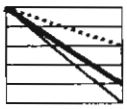
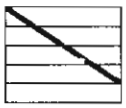
For tone 3, the Lahu pronounces it as a low falling tone but native speakers pronounces it as a low level.

6.2.3.2 Akha

Table 36 : *Comparison of tone features in citation form between Chiangrai's Northern Thai dialect pronounced by the Akha and native speakers*

Tone	Chiangrai's Northern Thai dialect pronounced by the Akha	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
1	Low - falling - rising tone [212] 125.9 Hz - 116.2 Hz - 130.5 Hz 	1	Low – falling - rising tone [212] 105.3 Hz – 98.3 Hz - 107.5 Hz 
2	Low - rising tone [23] 126.5 Hz -137.3 Hz 	2	Low – rising tone [23] (smooth) 116.5 Hz - 126.6 Hz Mid – rising tone [35] (checked) 127.2 Hz - 146.4 Hz 

(Table 36)

Tone	Chiangrai's Northern Thai dialect pronounced by the Akha	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
3	Low - falling tone [21] 130.5 Hz -115.9 Hz (smooth) 131.7 Hz - 117.5 Hz (checked) 	3	Low – level tone [22] 120.7 Hz – 110.0 Hz (smooth) 120.3 Hz – 112.4 Hz (checked) 
-	-	4	Mid – falling tone [31] 124.1 Hz – 95.1 Hz (smooth) 125.4 Hz – 103.1 Hz (checked) 
-	-	5	High - mid - falling tone [43] 138.1 Hz –122.6 Hz (smooth) High - high - falling tone [54] 152.9 Hz – 140.2 Hz (checked) 
4	High - low - falling tone [52] 154.4 Hz - 128.3 Hz (smooth) High - low - falling tone [51] 155.5 Hz - 121.3 Hz (L-checked) High - high - falling tone [54] 161.1 Hz - 142.1 Hz (S-checked) 	6	High - low - falling tone [52] 154.0 Hz - 106.7 Hz 

Following table 36, it is interesting to note that,

(i) Tone 2 of native speakers has two allotones, which are in complementary distribution. but tone 2 of the Akha has not.

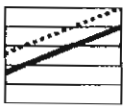
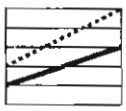
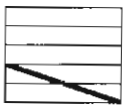
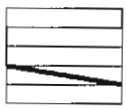
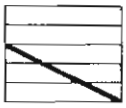
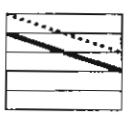
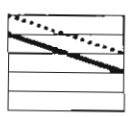
(ii) Tone 3 of the Akha is pronounced as a low falling tone, but native speakers pronounce this tone as a low level.

(iii) Tone 4 of the Akha has two allotones which are in complementary distribution but tone 6 of native speakers has not.

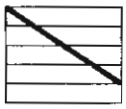
(iv) The beginning point of fundamental frequency curve in each tone of the Akha is higher than native speakers.

6.2.3.3 Karen

Table 37 : *Comparison of tone features in citation form between Chiangrai's Northern Thai dialect pronounced by the Karen and native speakers*

Tone	Chiangrai's Northern Thai dialect pronounced by the Karen	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
1	Low - falling - rising tone [212] 105.0 Hz - 92.2 Hz - 107.5 Hz 	1	Low – falling - rising tone [212] 105.3 Hz – 98.3 Hz - 107.5 Hz 
2	Low - rising tone [24] (smooth) 112.1 Hz - 124.8 Hz Mid - rising tone [35] (checked) 122.4 Hz - 135.4 Hz 	2	Low – rising tone [23] (smooth) 116.5 Hz - 126.6 Hz Mid – rising tone [35] (checked) 127.2 Hz - 146.4 Hz 
3	Low - falling tone [21] 113.9 Hz - 101.4 Hz (smooth) 113.2 Hz - 101.5 Hz (checked) 	3	Low – level tone [22] 120.7 Hz – 110.0 Hz (smooth) 120.3 Hz – 112.4 Hz (checked) 
4	Mid - falling tone [31] 123.5 Hz - 96.9 Hz (smooth) 124.0 Hz - 101.5 Hz (checked) 	4	Mid – falling tone [31] 124.1 Hz – 95.1 Hz (smooth) 125.4 Hz – 103.1 Hz (checked) 
5	High - mid - falling tone [43] 129.7 Hz - 116.2 Hz (smooth) High - high - falling tone [54] 141.7 Hz - 129.7 Hz (checked) 	5	High - mid - falling tone [43] 138.1 Hz –122.6 Hz (smooth) High – high - falling tone [54] 152.9 Hz – 140.2 Hz (checked) 

(Table 37)

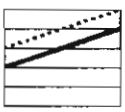
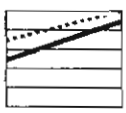
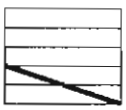
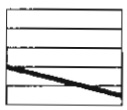
Tone	Chiangrai's Northern Thai dialect pronounced by the Karen	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
6	High - low - falling tone [52] 146.3 Hz - 104.6 Hz 	6	High – low - falling tone [52] 154.0 Hz - 106.7 Hz 

Following table 37, Tone 3 of the Karen is pronounced as a low falling tone but the native speakers pronounce this tone as a low level.

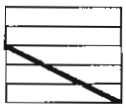
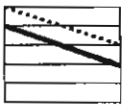
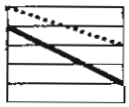
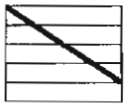
6.2.4 Comparison of Tone Features in Connected Speech

6.2.4.1 Lahu

Table 38 : ***Comparison of tone features in connected speech between Chiangrai's Northern Thai dialect pronounced by the Lahu and native speakers***

Tone	Chiangrai's Northern Thai dialect pronounced by the Lahu	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
1	Low - falling - rising tone [212] 116.7 Hz - 106.1 Hz - 124.8 Hz 	1	Low - falling - rising tone [212] 123.6 Hz – 112.6 Hz -126.9 Hz 
2	Mid - rising tone [34] (smooth) 132.7 Hz - 145.5 Hz High - rising tone [45] (checked) 149.7 Hz - 163.6 Hz 	2	Mid - rising tone [35] (smooth) 134.5 Hz - 158.7 Hz High - rising tone [45] (checked) 153.0 Hz - 169.5 Hz 
3	Low - falling tone [21] 122.0 Hz - 105.4 Hz (smooth) 125.2 Hz - 109.1 Hz (checked) 	3	Low – falling tone [21] 127.4 Hz – 114.2 Hz (smooth) 127.2 Hz – 114.2 Hz (checked) 

(Table 38)

Tone	Chiangrai's Northern Thai dialect pronounced by the Lahu	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
4	Mid - falling tone [31] 139.5 Hz - 115.3 Hz (smooth) 138.8 Hz - 111.1 Hz (checked) 	4	Mid – falling tone [31] 142.9 Hz – 105.3 Hz (smooth) 141.4 Hz – 103.4 Hz (checked) 
-	-	5	High - mid - falling tone [43] 151.5 Hz – 133.1 Hz (smooth) High - high - falling tone [54] 169.6 Hz – 151.7 Hz (checked) 
5	High - low - falling tone [42] 147.0 Hz - 128.5 Hz (smooth) High - high - falling tone [54] 157.4 Hz - 147.0 Hz (checked) 	6	High - low - falling tone [52] 166.4 Hz - 117.7 Hz 

Following table 38, it should be noted that:

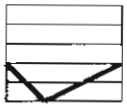
(i) Tone 5 of the Lahu has two allotones which are in complementary distribution but tone 6 of native speakers has not.

(ii) The high-low-falling tone of the lahu starts at the fourth section of the voice range but the tone of native speakers starts at the fifth section.

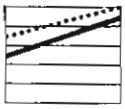
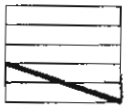
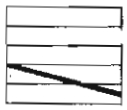
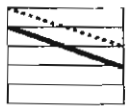
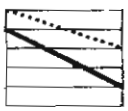
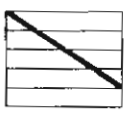
(iii) The ending point of mid-rising tone of the Lahu is at the fourth section of the voice range but the point of native speakers is at the fifth section.

6.2.4.2 Akha

Table 39 : ***Comparison of tone features in connected speech between Chiangrai's Northern Thai dialect pronounced by the Akha and native speakers***

Tone	Chiangrai's Northern Thai dialect pronounced by the Akha	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
1	Low - falling - rising tone [212] 120.0 Hz - 109.0 Hz - 130.3 Hz 	1	Low - falling - rising tone [212] 123.6 Hz – 112.6 Hz – 126.9 Hz 

(Table 39)

Tone	Chiangrai's Northern Thai dialect pronounced by the Akha	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
2	Mid - rising tone [34] 141.5 Hz - 156.1 Hz 	2	Mid - rising tone [35] (smooth) 134.5 Hz - 158.7 Hz High - rising tone [45] (checked) 153.0 Hz - 169.5 Hz 
3	Low - falling tone [21] 127.9 Hz - 114.1 Hz (smooth) 129.0 Hz - 114.2 Hz (checked) 	3	Low - falling tone [21] 127.4 Hz – 114.2 Hz (smooth) 127.2 Hz – 114.2 Hz (checked) 
-	-	4	Mid - falling tone [31] 142.9 Hz - 105.3 Hz (smooth) 141.4 Hz - 103.4 Hz (checked) 
-	-	5	High - mid - falling tone [43] 151.5 Hz - 133.1 Hz (smooth) High - high - falling tone [54] 169.6 Hz – 151.7 Hz (checked) 
4	High - low - falling tone [42] 147.7 Hz - 129.4 Hz (smooth) 144.1 Hz - 123.6 Hz (L-checked) High - high - falling tone [54] 170.3 Hz - 155.1 Hz (S-checked) 	6	High - low - falling tone [52] 166.4 Hz - 117.7 Hz 

Following table 39, it is noted that:

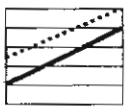
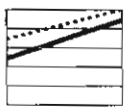
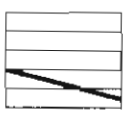
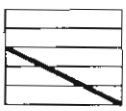
(i) Tone 2 of native speakers has two allotones, which are in complementary distribution, but tone 2 of the Akha has not.

(ii) Tone 4 of the Akha has two allotones, which are in complementary distribution, but tone 6 of native speakers has not.

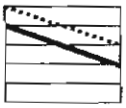
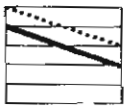
(iii) The ending point of mid-rising tone of the Akha is at the fourth section of the voice range, but the point of native speakers is at the fifth section.

6.2.4.3 Karen

Table 40 : ***Comparison of tone features in connected speech between Chiangrai's Northern Thai dialect pronounced by the Karen and native speakers***

Tone	Chiangrai's Northern Thai dialect pronounced by the Karen	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
1	Low - falling - rising tone [212] 101.2 Hz - 91.6 Hz - 106.7 Hz 	1	Low - falling - rising tone [212] 123.6 Hz - 112.6 Hz – 126.9 Hz 
2	Low - rising tone [24] (smooth) 112.1 Hz - 124.8 Hz Mid - rising tone [35] (checked) 122.4 Hz - 135.4 Hz 	2	Mid - rising tone [35] (smooth) 134.5 Hz - 158.7 Hz High - rising tone [45] (checked) 153.0 Hz - 169.5 Hz 
3	Low - falling tone [21] 113.9 Hz - 101.4 Hz (smooth) 113.2 Hz - 101.5 Hz (checked) 	3	Low - falling tone [21] 127.4 Hz – 114.2 Hz (smooth) 127.2 Hz – 114.2 Hz (checked) 
4	Mid - falling tone [31] 123.5 Hz - 96.9 Hz (smooth) 124.0 Hz - 101.5 Hz (checked) 	4	Mid - falling tone [31] 142.9 Hz - 105.3 Hz (smooth) 141.4 Hz - 103.4 Hz (checked) 

(Table 40)

Tone	Chiangrai's Northern Thai dialect pronounced by the Karen	Tone	Chiangrai's Northern Thai dialect pronounced by native speakers
5	High - mid - falling tone [43] 129.7 Hz - 116.2 Hz (smooth) High - high - falling tone [54] 141.7 Hz - 129.7 Hz (checked) 	5	High - mid - falling tone [43] 151.5 Hz - 133.1 Hz (smooth) High - high - falling tone [54] 169.6 Hz – 151.7 Hz (checked) 
6	High - low - falling tone [52] 146.3 Hz - 104.6 Hz 	6	High - low - falling tone [52] 166.4 Hz - 117.7 Hz 

Following table 40, the tone features of Chiangrai's Northern Thai dialect pronounced by the Karen differ from native speakers in tone 2.That is, the beginning point of tone 2 of the Karen is at the second section of the voice range on smooth syllables and the third section on checked syllables but tone 2 of native speakers starts at the third section on smooth syllables and the fourth section on checked syllables.

6.3 Tonal Comparison among the Ethnic Groups

6.3.1 Comparison of Tonal System in Citation Form

6.3.1.1 Lahu and Akha

Table 41 : ***Comparisons of tonal system in citation form between Chiangrai's Northern Thai dialect pronounced by the Lahu and Akha***

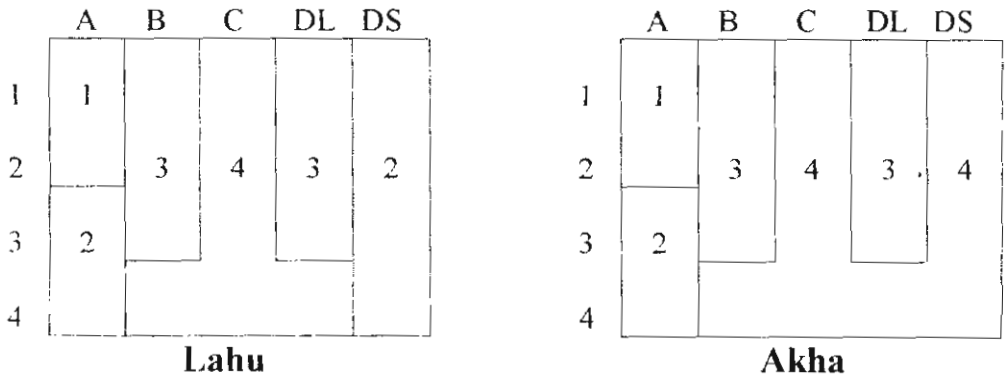


Table 41 shows that:

(i) Tone A in the Lahu group is not different from the Akha. That is, it reflects the glottalization split.

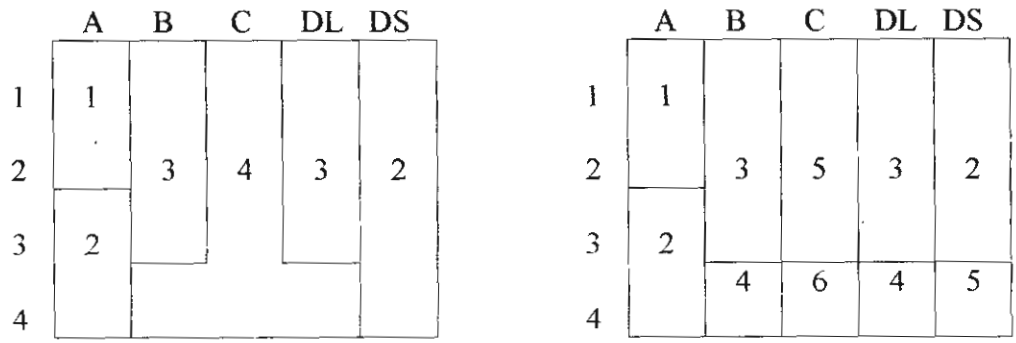
(ii) Tones B and DL in both groups are the same. That is, they reflect the voiced-voiceless split.

(iii) Tones C and DS in both groups have no split in their columns.

(iv) Tone C in the Lahu group differs from Akha in the pattern of tonal coalescence. That is, tone C in the Lahu merges with tones B4 and DL4 but tone C in the Akha merges with tones B4, DL4, and DS.

6.3.1.2 Lahu and Karen

Table 42 : *Comparison of tonal system in citation form between Chiangrai's Northern Thai dialect pronounced by the Lahu and Karen*



Lahu **Karen**

Table 42 shows that:

(i) Tone A in the Lahu group is not different from the Karen. That is, it reflects the glottalization split.

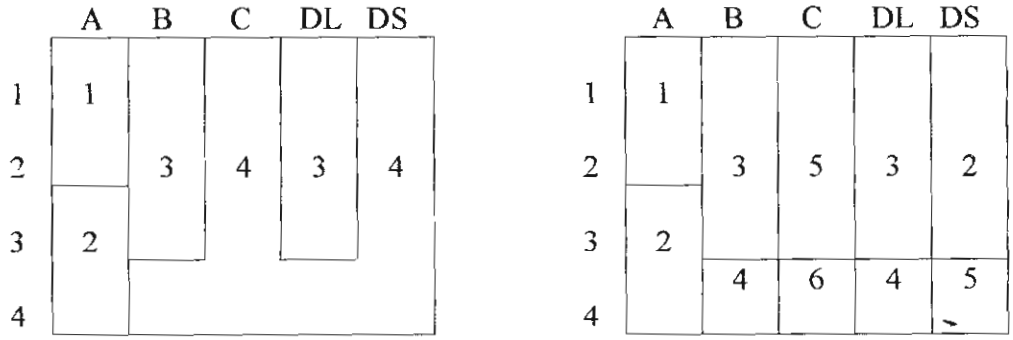
(ii) Tones B and DL in both groups are not different. That is, they reflect the voiced - voiceless split.

(iii) Tones C and DS in the Lahu group have no split in their columns but they reflect the voiced - voiceless split in the Karen group.

(iv) Tones B4 and DL4 in the Lahu group differ from the Karen in the pattern of tonal coalescence. That is, tones B4 and DL4 in the Lahu merge with tone C but tones B4 and DL4 in the Karen do not.

6.3.1.3 Akha and Karen

Table 43 : ***Comparison of tonal system in citation form between Chiangrai's Northern Thai dialect pronounced by the Akha and Karen***



Akha **Karen**

Table 43 shows that:

(i) Tone A in the Akha group is not different from the Karen. That is, it reflects the glottalization split.

(ii) Tones B and DL in both groups are not different. That is, they reflect the voiced-voiceless split

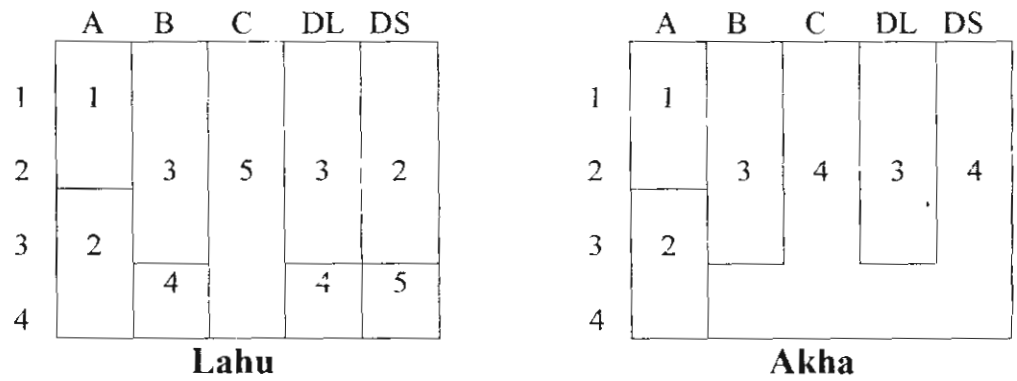
(iii) Tones C and DS in the Akha group have no split in their columns but they reflect the voiced-voiceless split in the Karen group.

(iv) Tones B4 and DL4 in the Akha group differ from the Karen in the pattern of tonal coalescence. That is, tones B4 and DL4 in the Akha merge with tones C and DS but tones B4 and DL4 in the Karen do not.

6.3.2 Comparison of Tonal System in Connected Speech

6.3.2.1 Lahu and Akha

Table 44 : ***Comparison of tonal system in connected speech between Chiangrai's Northern Thai dialect pronounced by the Lahu and Akha***



Lahu **Akha**

Following table 44, it is noted that:

(i) Tone A in the Lahu group is not different from the Akha. That is, it reflects the glottalization split.

(ii) Tones B and DL in both groups are the same. That is, they reflect the voiced and voiceless split.

(iii) Tone C in both groups has no split in its columns.

(iv) Tone DS in the Lahu group reflects the voiced and voiceless split, but tone DS in the Akha has no split in its column.

(v) Tone C in the Lahu group differs from the Akha in the pattern of tonal coalescence. That is, tone C in the Lahu merges with tones B4 and DL4, but tone C in the Akha merges with tones B4, DL4, and DS.

6.3.2.2 Lahu and Karen

Table 45 : ***Comparison of tonal system in connected speech between Chiangrai's Northern Thai dialect pronounced by the Lahu and Karen***

	A	B	C	DL	DS
1	1				
2		3	5	3	2
3	2				
		4		4	5
4					

Lahu

	A	B	C	DL	DS
1	1				
2		3	5	3	2
3	2				
		4	6	4	5
4					

Karen

Table 45 shows that:

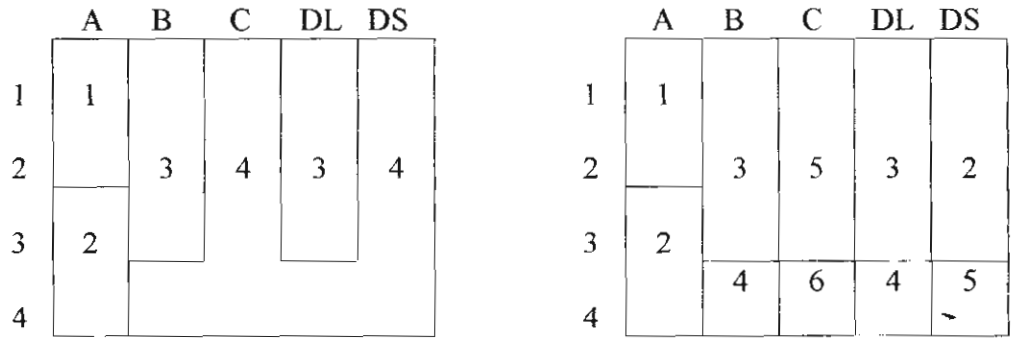
(i) Tone A in the Lahu group is not different from the Karen. That is, it reflects the glottalization split.

(ii) Tones B, DL, and DS in both groups are not different. That is, they reflect the voiced - voiceless split.

(iii) Tone C in the Lahu group has no split in its column but it reflects the voiced - voiceless split in the Karen group.

6.3.2.3 Akha and Karen

Table 46 : ***Comparison of tonal system in connected speech between Chiangrai's Northern Thai dialect pronounced by the Akha and Karen***



Akha **Karen**

Table 46 shows that:

(i) Tone A in the Akha group is not different from the Karen. That is, it reflects the glottalization split.

(ii) Tones B and DL in both groups are not different. That is, they reflect the voiced - voiceless split.

(iii) Tones C and DS in the Akha group have no split in their columns, but they reflect the voiced - voiceless split in the Karen group.

(iv) Tones B4 and DL4 in the Akha group differ from the Karen in the pattern of tonal coalescence. That is, tones B4 and DL4 in the Akha merge with tones C and DS, but tones B4 and DL4 in the Karen do not.

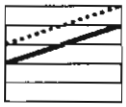
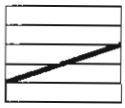
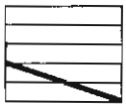
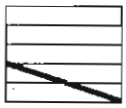
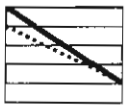
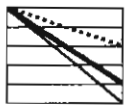
6.3.3 Comparison of Tone Features in Citation Form

6.3.3.1 Lahu and Akha

Table 47 : ***Comparison of tone features in citation form between Chiangrai's Northern Thai dialect pronounced by the Lahu and Akha***

Tone	Chiangrai's Northern Thai dialect pronounced by Lahu	Tone	Chiangrai's Northern Thai dialect pronounced by Akha
1	Low - falling - rising tone [212] 107.6 Hz - 97.6 Hz - 115.1 Hz 	1	Low - falling - rising tone [212] 125.9 Hz - 116.2 Hz - 130.5 Hz 

(Table 47)

Tone	Chiangrai's Northern Thai dialect pronounced by the Lahu	Tone	Chiangrai's Northern Thai dialect pronounced by the Akha
2	Mid - rising tone [34] (smooth) 119.2 Hz - 129.9 Hz High - rising tone [45] (checked) 133.9 Hz - 146.2 Hz 	2	Low - rising tone [23] 126.5 Hz -137.3 Hz 
3	Low - falling tone [21] 114.6 Hz - 102.5 Hz (smooth) 116.8 Hz - 103.9 Hz (checked) 	3	Low - falling tone [21] 127.9 Hz - 114.1 Hz (smooth) 129.0 Hz - 114.2 Hz (checked) 
4	High - low -falling tone [52] 144.3 Hz -114.8 Hz (smooth) High - low - falling tone [42] 131.3 Hz - 107.4 Hz (checked) 	4	High - low - falling tone [52] 154.4 Hz - 128.3 Hz (smooth) High - low - falling tone [51] 155.5 Hz - 121.3 Hz (L-checked) High - high - falling tone [54] 161.1 Hz - 142.1 Hz (S-checked) 

Following table 47, it should be noted that:

(i) Tone 2 of the Lahu has two allotones which are in complementary distribution, but tone 2 of the Akha has not.

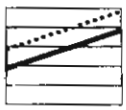
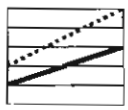
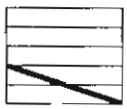
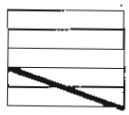
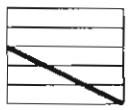
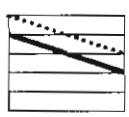
(ii) Tone 4 of the Akha has two allotones which are in complementary distribution, but tone 4 of the Lahu has not.

(iii) The beginning point of tone 2 of the Lahu is at the third section of the voice range, but the point of the Akha is at the second section.

(iv) The ending point of tone 2 of the Lahu is at the fourth section of the voice range, but the point of the Akha is at the third section.

6.3.3.2 Lahu and Karen

Table 48 : ***Comparison of tone features in citation form between Chiangrai's Northern Thai dialect pronounced by the Lahu and Karen***

Tone	Chiangrai's Northern Thai dialect pronounced by the Lahu	Tone	Chiangrai's Northern Thai dialect pronounced by the Karen
1	Low - falling - rising tone [212] 107.6 Hz - 97.6 Hz - 115.1 Hz 	1	Low - falling - rising tone [212] 105.0 Hz - 92.2 Hz - 107.5 Hz 
2	Mid - rising tone [34] (smooth) 119.2 Hz - 129.9 Hz High - rising tone [45] (checked) 133.9 Hz - 146.2 Hz 	2	Low - rising tone [24] (smooth) 112.1 Hz - 124.8 Hz Mid - rising tone [35] (checked) 122.4 Hz - 135.4 Hz 
3	Low - falling tone [21] 114.6 Hz - 102.5 Hz (smooth) 116.8 Hz - 103.9 Hz (checked) 	3	Low - falling tone [21] 113.9 Hz - 101.4 Hz (smooth) 113.2 Hz - 101.5 Hz (checked) 
-	-	4	Mid - falling tone [31] 123.5 Hz - 96.9 Hz (smooth) 124.0 Hz - 101.5 Hz (checked) 
-	-	5	High - mid - falling tone [43] 129.7 Hz - 116.2 Hz (smooth) High - high - falling tone [54] 141.7 Hz - 129.7 Hz (checked) 

(Table 48)

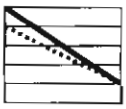
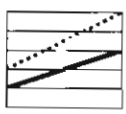
Tone	Chiangrai's Northern Thai dialect pronounced by the Lahu	Tone	Chiangrai's Northern Thai dialect pronounced by the Karen
4	High - low -falling tone [52] 144.3 Hz -114.8 Hz (smooth) High - low - falling tone [42] 131.3 Hz - 107.4 Hz (checked) 	6	High - low - falling tone [52] 146.3 Hz - 104.6 Hz 

Table 48 shows that the tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu differ from the Karen in the beginning of tone. That is, tone 2 of the Lahu starts at the third section of the voice range on smooth syllables and the fourth section on checked syllables whereas tone 2 of the Karen starts at the second section on smooth syllables and the third section on checked syllables.

6.3.3.3 Akha and Karen

Table 49 : *Comparison of tone features in citation form between Chiangrai's Northern Thai dialect pronounced by the Akha and Karen*

Tone	Chiangrai's Northern Thai dialect pronounced by the Akha	Tone	Chiangrai's Northern Thai dialect pronounced by the Karen
1	Low - falling - rising tone [212] 125.9 Hz - 116.2 Hz - 130.5 Hz 	1	Low - falling - rising tone [212] 105.0 Hz - 92.2 Hz - 107.5 Hz 
2	Low - rising tone [23] 126.5 Hz -137.3 Hz 	2	Low - rising tone [24] (smooth) 112.1 Hz - 124.8 Hz Mid - rising tone [35] (checked) 122.4 Hz - 135.4 Hz 

(Table 49)

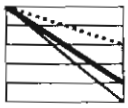
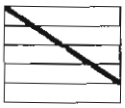
Tone	Chiangrai's Northern Thai dialect pronounced by the Akha	Tone	Chiangrai's Northern Thai dialect pronounced by the Karen
3	Low - falling tone [21] 127.9 Hz - 114.1 Hz (smooth) 129.0 Hz - 114.2 Hz (checked) 	3	Low - falling tone [21] 113.9 Hz - 101.4 Hz (smooth) 113.2 Hz - 101.5 Hz (checked) 
-	-	4	Mid - falling tone [31] 123.5 Hz - 96.9 Hz (smooth) 124.0 Hz - 101.5 Hz (checked) 
-	-	5	High - mid - falling tone [43] 129.7 Hz - 116.2 Hz (smooth) High - high - falling tone [54] 141.7 Hz - 129.7 Hz (checked) 
4	High - low - falling tone [52] 154.4 Hz - 128.3 Hz (smooth) High - low - falling tone [51] 155.5 Hz - 121.3 Hz (L-checked) High - high - falling tone [54] 161.1 Hz - 142.1 Hz (S-checked) 	6	High - low - falling tone [52] 146.3 Hz - 104.6 Hz 

Table 49 shows that:

(i) Tone 2 of the Karen has two allotones which are in complementary distribution, but tone 2 of the Akha has not.

(ii) Tone 4 of the Akha has two allotones which are in complementary distribution, but tone 6 of the Karen has not.

(iii)The beginning point of fundamental frequency curve in each tone of the Akha is higher than the Karen.

6.3.4 Comparison of Tone Features in Connected speech

6.3.4.1 Lahu and Akha

Table 50 : ***Comparison of tone features in connected speech between Chiangrai's Northern Thai dialect pronounced by the Lahu and Akha***

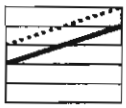
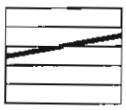
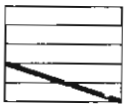
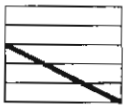
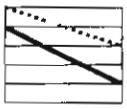
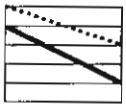
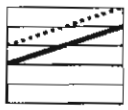
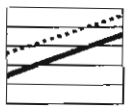
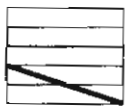
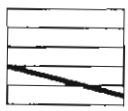
Tone	Chiangrai's Northern Thai dialect pronounced by the Lahu	Tone	Chiangrai's Northern Thai dialect pronounced by the Akha
1	Low - falling - rising tone [212] 116.7 Hz - 106.1 Hz - 124.8 Hz 	1	Low - falling - rising tone [212] 120.0 Hz - 109.0 Hz - 130.3 Hz 
2	Mid - rising tone [34] (smooth) 132.7 Hz - 145.5 Hz High - rising tone [45] (checked) 149.7 Hz - 163.6 Hz 	2	Mid - rising tone [34] 141.5 Hz - 156.1 Hz 
3	Low - falling tone [21] 122.0 Hz - 105.4 Hz (smooth) 125.2 Hz - 109.1 Hz (checked) 	3	Low - falling tone [21] 127.9 Hz - 114.1 Hz (smooth) 129.0 Hz - 114.2 Hz (checked) 
4	Mid - falling tone [31] 139.5 Hz - 115.3 Hz (smooth) 138.8 Hz - 111.1 Hz (checked) 	-	-
5	High - low - falling tone [42] 147.0 Hz - 128.5 Hz (smooth) High - high - falling tone [54] 157.4 Hz - 147.0 Hz (checked) 	4	High - low - falling tone [42] 147.7 Hz - 129.4 Hz (smooth) 144.1 Hz - 123.6 Hz (L-checked) High - high - falling tone [54] 170.3 Hz - 155.1 Hz (S-checked) 

Table 50 shows that tone 2 of the Lahu has two allotones which are in complementary distribution, but tone 2 of the Akha has not.

6.3.4.2 Lahu and Karen

Table 51 : *Comparison of tone features in connected speech between Chiangrai's Northern Thai dialect pronounced by the Lahu and Karen*

Tone	Chiangrai's Northern Thai dialect pronounced by the Lahu	Tone	Chiangrai's Northern Thai dialect pronounced by the Karen
1	Low - falling - rising tone [212] 116.7 Hz - 106.1 Hz - 124.8 Hz 	1	Low - falling - rising tone [212] 101.2 Hz - 91.6 Hz - 106.7 Hz 
2	Mid - rising tone [34] (smooth) 132.7 Hz - 145.5 Hz High - rising tone [45] (checked) 149.7 Hz - 163.6 Hz 	2	Low - rising tone [24] (smooth) 112.1 Hz - 124.8 Hz Mid - rising tone [35] (checked) 122.4 Hz - 135.4 Hz 
3	Low - falling tone [21] 122.0 Hz - 105.4 Hz (smooth) 125.2 Hz - 109.1 Hz (checked) 	3	Low - falling tone [21] 113.9 Hz - 101.4 Hz (smooth) 113.2 Hz - 101.5 Hz (checked) 
4	Mid - falling tone [31] 139.5 Hz - 115.3 Hz (smooth) 138.8 Hz - 111.1 Hz (checked) 	4	Mid - falling tone [31] 123.5 Hz - 96.9 Hz (smooth) 124.0 Hz - 101.5 Hz (checked) 
-	-	5	High - mid - falling tone [43] 129.7 Hz - 116.2 Hz (smooth) High - high - falling tone [54] 141.7 Hz - 129.7 Hz (checked) 

(Table 51)

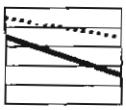
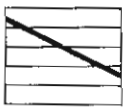
Tone	Chiangrai's Northern Thai dialect pronounced by the Lahu	Tone	Chiangrai's Northern Thai dialect pronounced by the Karen
5	High - low - falling tone [42] 147.0 Hz - 128.5 Hz (smooth) High - high - falling tone [54] 157.4 Hz - 147.0 Hz (checked) 	6	High - low - falling tone [52] 146.3 Hz - 104.6 Hz 

Table 51 shows that:

(i) Tone 5 of the Lahu has two allotones which are in complementary distribution, but tone 6 of the Karen has not.

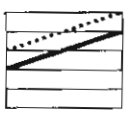
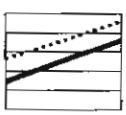
(ii) The high-low-falling tone of the lahu starts at the fourth section of the voice range, but the tone of the Karen starts at the fifth section.

(iii) The beginning point of tone 2 of the Lahu, on smooth syllables, is at the third section of the voice range, but the point of the Karen is at the second section.

(iv) The beginning point of tone 2 of the Lahu, on checked syllables, is at the fourth section of the voice range, but the point of the Karen is at the third section.

6.3.4.2 Akha and Karen

Table 52 : ***Comparison of tone features in connected speech between Chiangrai's Northern Thai dialect pronounced by the Akha and Karen***

Tone	Chiangrai's Northern Thai dialect pronounced by Akha	Tone	Chiangrai's Northern Thai dialect pronounced by Karen
1	Low - falling - rising tone [212] 120.0 Hz - 109.0 Hz - 130.3 Hz 	1	Low - falling - rising tone [212] 101.2 Hz - 91.6 Hz - 106.7 Hz 
2	Mid - rising tone [34] 141.5 Hz - 156.1 Hz 	2	Low - rising tone [24] (smooth) 112.1 Hz - 124.8 Hz Mid - rising tone [35] (checked) 122.4 Hz - 135.4 Hz 

(Table 52)

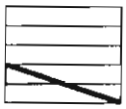
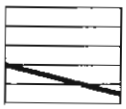
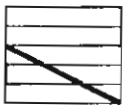
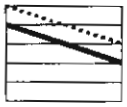
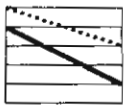
Tone	Chiangrai's Northern Thai dialect pronounced by the Akha	Tone	Chiangrai's Northern Thai dialect pronounced by the Karen
3	Low - falling tone [21] 127.9 Hz - 114.1 Hz (smooth) 129.0 Hz - 114.2 Hz (checked) 	3	Low - falling tone [21] 113.9 Hz - 101.4 Hz (smooth) 113.2 Hz - 101.5 Hz (checked) 
-	-	4	Mid - falling tone [31] 123.5 Hz - 96.9 Hz (smooth) 124.0 Hz - 101.5 Hz (checked) 
-	-	5	High - mid - falling tone [43] 129.7 Hz - 116.2 Hz (smooth) High - high - falling tone [54] 141.7 Hz - 129.7 Hz (checked) 
4	High - low - falling tone [42] 147.7 Hz - 129.4 Hz (smooth) 144.1 Hz - 123.6 Hz (L-checked) High - high - falling tone [54] 170.3 Hz - 155.1 Hz (S-checked) 	6	High - low - falling tone [52] 146.3 Hz - 104.6 Hz 

Table 52 shows that:

(i) Tone 2 of the Karen has two allotones which are in complementary distribution, but tone 2 of the Akha has not.

(ii) Tone 4 of the Akha has two allotones which are in complementary distribution, but tone 6 of the Karen has not.

(iii) The beginning point of tone 2 of the Akha, on smooth syllables, is at the third section of the voice range, but the point of the Karen is at the second section.

CHAPTER VII

CONCLUSION

7.1 Summary

The purpose of the study is, firstly, to analyze the tonal systems and tone features of Chiangrai's Northern Thai dialect and the Lahu, Akha, and Karen languages pronounced by native speakers. Secondly, it is to analyze the tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen people. Thirdly, it is to compare the tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by these minority groups with their native languages, and with those by native Chiangrai's Northern Thai speakers, and then to compare among their groups. Finally, it is to identify the Lahu, Akha, and Karen languages by using tones of Chiangrai's Northern Thai dialect as criteria.

The hypothesis is that the tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by the Lahu, Akha, and Karen would be different according to the tonal systems and tone features of each minority language due to the interference of their native languages. This enables us to identify which speaker is the Lahu, Akha, or Karen when these people speak Chiangrai's Northern Thai dialect.

For the method of gathering data, I selected the speech community of Mae-Yao sub-district, Mueng district, Chiangrai province, a highly cosmopolitan area composed of several ethnic groups, as the source for gathering the data. A total of forty informants were chosen for this study and divided into 4 groups; ten Lahu, ten Akha, ten Karen, and ten Northern Thai. The criteria for the selection of informants were to choose people (i) who were male, between 30-50 years old; (ii) who had lived in their villages more than 30 years; (iii) who used their own language natively in their daily life and used Chiangrai's Northern Thai dialect as a lingua franca for the informants who were not the Chiangrai's Northern Thai people; (iv) who had never been educated in Thai school, except the Chiangrai's Northern Thai people, because the Standard Thai language might have interfered with the Chiangrai's Northern Thai dialect spoken by the Lahu, Akha, and Karen. The materials used in this study are a checklist for determining tones in Northern Thai dialect, a word list of the Lahu, Akha, and Karen languages, pictures, and a cassette recorder. I collected the data by interviewing a total of forty informants and recorded their pronunciation, Chiangrai's Northern Thai dialect and their native languages in both citation form and connected speech, into the cassette recorder.

For data analysis, auditory judgement was used in analyzing the tonal system and a computer software program called "CECIL" was used to analyze the tone features by considering fundamental frequency of each tone.

The results of the analysis indicate that, there are 6 tones in Chiangrai's Northern Thai Dialect, 7 tones in Lahu, 5 tones in Akha, and 6 tones in Karen as follows:

(i) Chiangrai's Northern Thai dialect

	citation form	***connected speech***
Tone 1	low - falling - rising tone	low - falling - rising tone
Tone 2	low - rising tone / *smooth* mid - rising tone / *checked*	mid - rising tone / *smooth* high - rising tone / *checked*
Tone 3	low - level tone	low - falling tone
Tone 4	mid - falling tone	mid - falling tone
Tone 5	high - mid - falling tone / *smooth* high - high - falling tone / *checked*	high - mid - falling tone / *smooth* high - high - falling tone / *checked*
Tone 6	high - low - falling tone	high - low - falling tone

(ii) Lahu

Tone 1	low - level tone
Tone 2	low - level - glottalized tone
Tone 3	mid - falling tone
Tone 4	high - falling tone
Tone 5	high - falling - glottalized tone
Tone 6	high - level tone
Tone 7	high - level - glottalized tone

(iii) Akha

Tone 1	low - falling tone
Tone 2	low - falling - glottalized tone
Tone 3	mid - level tone
Tone 4	mid - rising tone
Tone 5	high - level tone

(iv) Karen

Tone 1	low - level tone
Tone 2	mid - level tone
Tone 3	high - falling tone
Tone 4	high - falling - glottalized tone
Tone 5	high - level tone
Tone 6	high - level - glottalized tone

For the tonal systems and tone features of Chiangrai's Northern Thai dialect pronounced by the minority groups, the results were found that, in citation form, Lahu and Akha have 4 tones, whereas Karen has 6 tones. In connected speech, Lahu has 5 tones, Akha has 4 tones, and Karen has 6 tones. The tone features of Akha and Karen in citation form are the same as in connected speech, but Lahu has an extra mid-falling tone in connected speech.

(i) Lahu

citation form	***connected speech***
Tone 1 low - falling - rising tone	Tone 1 low - falling - rising tone
Tone 2 mid - rising tone / *smooth*	Tone 2 mid - rising tone / *smooth*
high - rising tone / *checked*	high - rising tone / *checked*
Tone 3 low - falling tone	Tone 3 low - falling tone
	Tone 4 mid - falling tone
Tone 4 high - falling tone	Tone 5 high - low - falling tone / *smooth*
	high - high - falling tone / *checked*

(ii) Akha

citation form	***connected speech***
Tone 1 low - falling - rising tone	Tone 1 low - falling - rising tone
Tone 2 low - rising tone	Tone 2 mid - rising tone
Tone 3 low - falling tone	Tone 3 low - falling tone
Tone 4 high - low - falling tone / *smooth and long - checked*	Tone 4 high - low - falling tone / *smooth and long - checked*
high - high - falling tone / *short - checked*	high - high - falling tone / *short - checked*

(iii) Karen

	citation form	***connected speech***
Tone 1	low - falling - rising tone	low - falling - rising tone
Tone 2	low - rising tone / *smooth* mid - rising tone / *checked*	mid - rising tone / *smooth* high - rising tone / *checked*
Tone 3	low - falling tone	low - falling tone
Tone 4	mid - falling tone	mid - falling tone
Tone 5	high - mid - falling tone / *smooth* high - high - falling tone / *checked*	high - mid - falling tone / *smooth* high - high - falling tone / *checked*
Tone 6	high - low - falling tone	high - low - falling tone

For comparisons of the tonal systems and tone features, the results indicate that, in citation form,

(i) Tone A in every group does not differ from the native speakers. That is, it reflects the glottalization split.

(ii) Tones B and DL in every group do not differ from native speakers. That is, they reflect the voiced and voiceless split.

(iii) Tones C and DS in the Lahu and Akha groups have no split in their columns, but they reflect the voiced and voiceless split in the Karen group in the same way as native speakers.

(iv) Tone C in the Lahu and Akha groups differs from native speakers in the pattern of tonal coalescence. That is, tone C in Lahu merges with tones B4 and DL4, and tone C in Akha merges with tones B4, DL4, and DS.

(v) The minority groups pronounce Chiangrai's Northern Thai dialect with the glottalized tone on checked syllables, but native speakers do not.

And in connected speech,

(i) Tone A in every groups does not differ from native speakers. That is, it reflects the glottalization split.

(ii) Tones B and DL in every group do not differ from native speakers. That is, they reflect the voiced and voiceless split.

(iii) Tone C in the Lahu and Akha groups has no split in its column, but it reflects the voiced and voiceless split in the Karen group in the same way as native speakers.

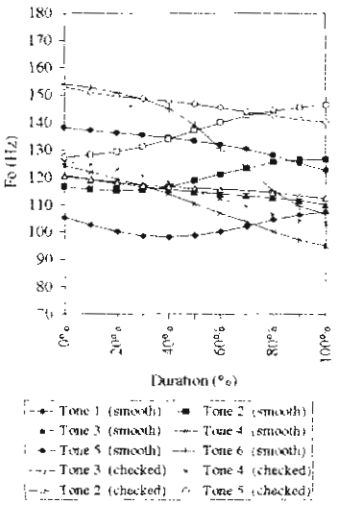
(iv) Tone C in the Akha group differs from native speakers in the pattern of tonal coalescence. That is, it merges with tones B4, DL4, and DS.

(v) Tone DS in the Akha group has no split in its column, but it reflects the voiced and voiceless split in the Lahu and Karen groups in the same way as native speakers.

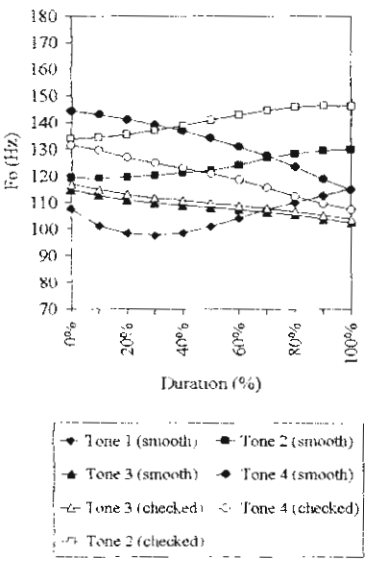
(vi) The minority groups pronounce Chiangrai's Northern Thai dialect with the glottalized tone on checked syllables, but native speakers do not.

All the tones in citation form of Chiangrai's Northern Thai dialect (CNTD) and the Lahu, Akha, and Karen languages pronounced by native speakers and CNTD pronounced by the Lahu, Akha, and Karen are put into the figure below to compare the tone features among the ethnic groups as follows:

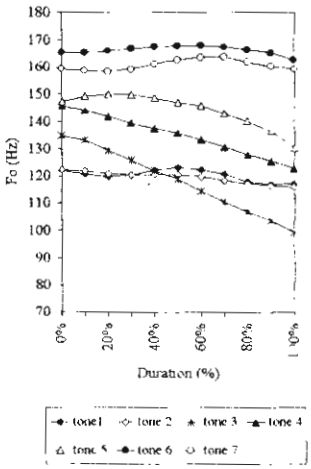
Chiangrai's Northern Thai dialect pronounced by native speakers



Chiangrai's Northern Thai dialect pronounced by the Lahu



The Lahu language pronounced by native speaker



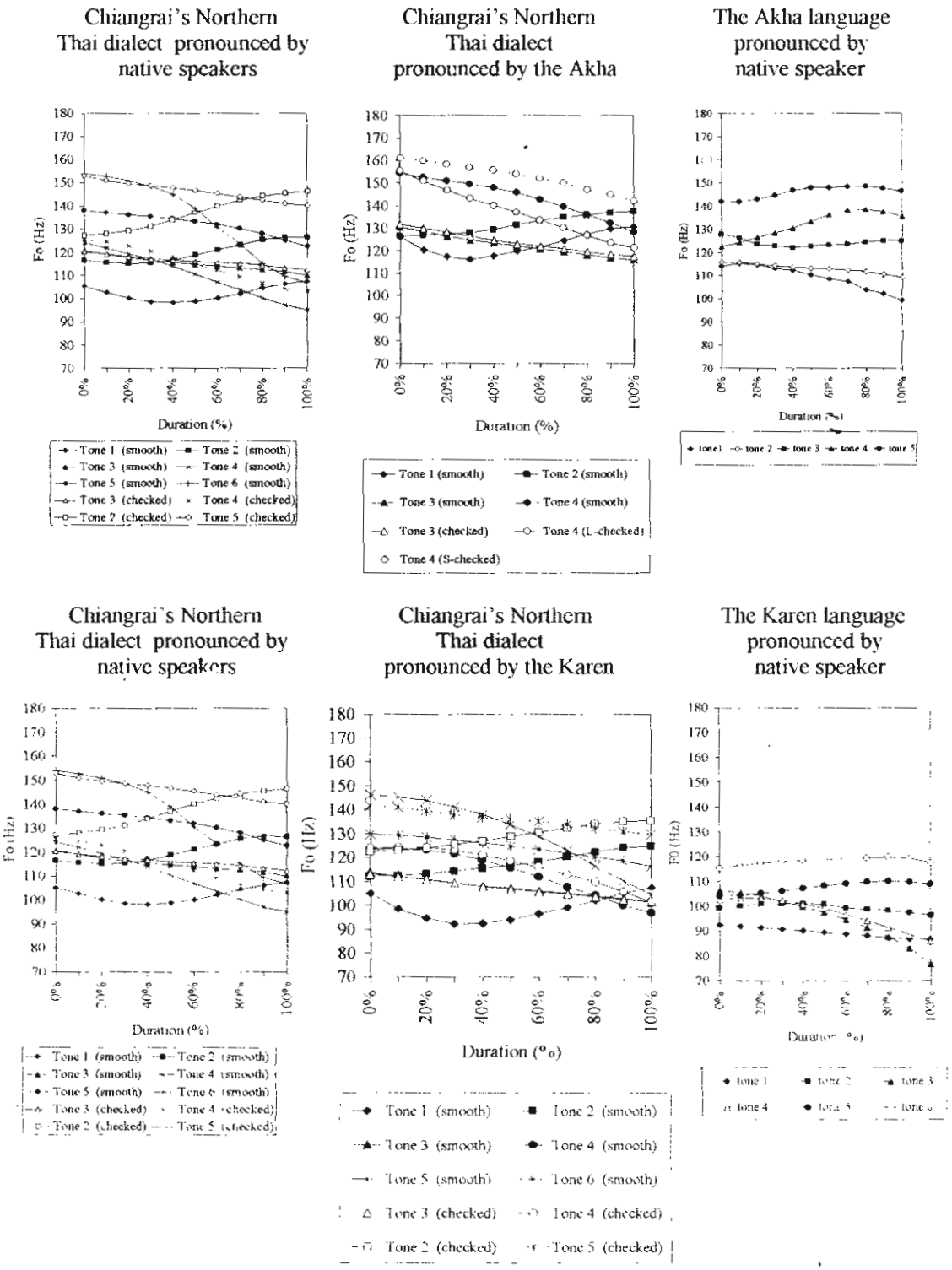


Figure 92 : ***Comparison of the tone features in citation form***

For connected speech, there is only Chiangrai's Northern Thai dialect pronounced by the lahu, Akha, Karen, and native speakers. All the tones of the dialect in each group are put into figure 93 as follows:

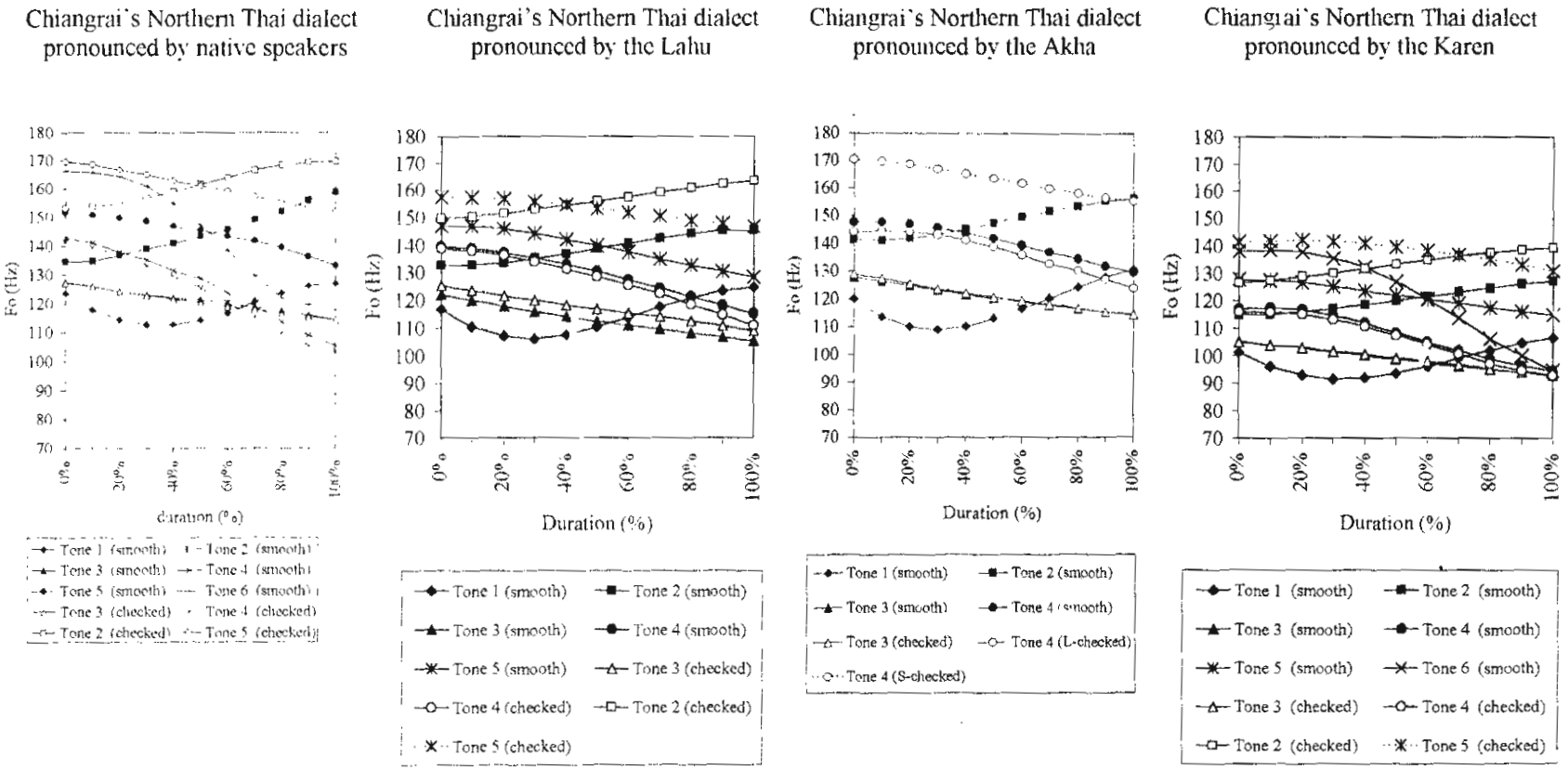


Figure 93 : ***Comparison of the tone features in connected speech***

Following figures 92 and 93, they should be noted that:

In citation form, CNT dialect pronounced by native speakers and Karen have 3 rising and falling tones and CNT dialect pronounced by the Lahu and Akha have 2 rising and falling tones.

In connected speech, CNT dialect pronounced by native speakers, Karen, and Akha are the same as those in citation form, whereas CNT dialect pronounced by the Lahu are not. The figure 93 shows that the Lahu has 2 rising and 3 falling tones.

Considering the phonetic realizations in each tone of CNT dialect, it can be conclude in the following table:

Table 53 : ***Comparison of the tone features among 4 ethnic groups****

Speech Form / Tone	Citation Form								Connected Speech							
	Smooth Syllable				Checked Syllable				Smooth Syllable				Checked Syllable			
	CNT	L	A	K	CNT	L	A	K	CNT	L	A	K	CNT	L	A	K
1	212	212	212	212	-	-	-	-	212	212	212	212	-	-	-	-
2	23	34	23	24	35	45	54	35	35	34	34	34	45	45	54	45
3	22	21	21	21	22	21	21	21	21	21	21	21	21	21	21	21
4	31	52	52	31	31	42	51	31	31	31	42	31	31	31	42	31
5	43	52	52	43	54	45	54	54	43	42	42	43	54	54	54	54
6	52	52	52	52	-	-	-	-	52	42	42	51	-	-	-	-

*CNT = Native Chiangrai's Northern Thai, L = Lahu, A = Akha, K = Karen

Following table 53, It can be explained as follows:

1. Citation form

Tone 1 Tone 1 in CNT dialect is realized as [212]. It is seen that the Lahu, Akha, and Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do.

Tone 2 On smooth syllables, tone 2 in CNT dialect is realized as [23]. The difference in phonetic detail is found in the Lahu and Karen. In Lahu, this tone is realized as [34] and in Karen, this tone is realized as [24].

On checked syllables, this tone is realized as [35]. It is seen that the Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do, while the Lahu speakers pronounce this tone as [45], and the Akha speakers pronounce this tone as [54].

Tone 3 Tone 3 in CNT dialect is realized as [22] on both smooth and checked syllables, but the Lahu, Akha, and Karen speakers pronounce this tone as [21].

Tone 4 Tone 4 in CNT dialect is realized as [31] on both smooth and checked syllables. It is seen that the Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do, while the Lahu speakers pronounce this tone as [52] on smooth syllables and [42] on checked syllables, and the Akha speakers pronounce this tone as [52] on smooth syllables and [51] on checked syllables.

Tone 5 On smooth syllables, tone 5 in CNT dialect is realized as [43]. It is seen that the Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do, while the Lahu and Akha speakers pronounce this tone as [52].

On checked syllables, this tone is realized as [54]. It is seen that the Akha and Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do, while the Lahu speakers pronounce this tone as [45].

Tone 6 Tone 6 in CNT dialect is realized as [52]. It is seen that the Lahu, Akha, and Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do.

2. Connected speech

Tone 1 Tone 1 in CNT dialect is realized as [212]. It is seen that the Lahu, Akha, and Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do.

Tone 2 On smooth syllables, tone 2 in CNT dialect is realized as [35], but the Lahu, Akha, and Karen speakers pronounce this tone as [34].

On checked syllables, this tone is realized as [45]. It is seen that the Lahu and Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do, while the Akha speakers pronounce this tone as [54].

Tone 3 Tone 3 in CNT dialect is realized as [21] on both smooth and checked syllables. It is seen that the Lahu, Akha, and Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do.

Tone 4 Tone 4 in CNT dialect is realized as [31] on both smooth and checked syllables. It is seen that the Lahu and Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do, while the Akha speakers pronounce this tone as [42] on smooth and checked syllables.

Tone 5 On smooth syllables, tone 5 in CNT dialect is realized as [43]. It is seen that the Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do, while the Lahu and Akha speakers pronounce this tone as [42].

On checked syllables, this tone is realized as [54]. It is seen that the Lahu, Akha, and Karen speakers pronounce this tone just like the native Chiangrai's Northern Thai speakers do.

Tone 6 Tone 6 in CNT dialect is realized as [52], but the Lahu and Akha speakers pronounce this tone as [42], and the Karen speakers pronounce this tone as [51].

7.2 Discussion

The results of the study indicate that Chiangrai's Northern Thai dialect pronounced by the Karen group is most similar to native Chiangrai's Northern Thai speakers.

Results suggest that the Karen group speaks Chiangrai's Northern Thai dialect better than other groups. The main reason for this is because they have the most language contact with the Chiangrai's Northern Thai people. Lahu and Akha are isolated from the Chiangrai's Northern Thai people, and come into contact with the Chiangrai's Northern Thai people when they are hired by them. Therefore, they have less opportunity to use Chiangrai's Northern Thai dialect than the Karen group, which results in the observed differences between these two groups.

It is true that the pronunciation of the Karen and native speakers are the same, they are different in the way that Karen tend to pronounce the tones on checked syllables with the glottalized tones, whereas native Chiangrai's Northern Thai speakers do not. This enable us to identify which speakers is the Lahu, Akha, or Karen. Tonal systems and tone features of Chiangrai's Northern Thai dialect as pronounced by them are useful instruments for speaker identification according to the following criteria:

(i) On checked syllables

By using the tone features, we can identify which speaker is the minority group or native Chiangrai's Northern Thai speaker by considering his pronunciation on checked syllables. That is, the minority groups pronounce Chiangrai's Northern Thai dialect with the glottalized tone on checked syllables, but native speakers do not.

Besides, we can divide the minority groups into two groups as follows:
Tones DS1, DS2, and DS3 are rising tone : Lahu and Karen
Tones DS1, DS2, and DS3 are falling tone : Akha

(ii) On smooth syllables

By using the number of tones, we can divide the minority groups into two types of tonal system in citation form and three types in connected speech.

In citation form

1. 4-tone system : Lahu and Akha
2. 6-tone system : Karen

In connected speech

1. 4-tone system : Akha
2. 5-tone system : Lahu
3. 6-tone system : Karen

(iii) On smooth and checked syllables

By using the pattern of tonal split and coalescence in both citation form and connected speech, we can divide the minority groups into two groups.

In citation form

1. Tones C and DS reflect the voiced and voiceless split : Karen
2. Tones C and DS do not reflect the voiced and voiceless split : Lahu and Akha
3. Tone DL4 merges with DS4 : Akha
4. Tone DL4 does not merge with DS4 : Lahu and Karen

In connected speech

1. Tone C reflects the voiced - voiceless split : Karen
2. Tone C does not reflect the voiced - voiceless split : Lahu and Akha
3. Tone DS reflects the voiced - voiceless split : Lahu and Karen
4. Tone DS does not reflect the voiced - voiceless split : Akha
5. Tone DL4 merges with DS4 : Akha
6. Tone DL4 does not merge with DS4 : Lahu and Karen

7.3 Suggestions for Further Studies

1. The results of the analysis can be used as a guideline on the tonal analysis of other minority languages.

2. This research focuses on a small place, sub-district, therefore the results may be limited. A larger place, such as a district or province, should be studied for data collection.

3. This study can be used as a guideline for other studies of lingua franca in other minority groups.

BIBLIOGRAPHY

Anirut Tanlaput. (1988). Tonal Variation of Lámpang Kham Muang. M.A. Thesis in Linguistics, Faculty of Graduate Studies, Mahidol University.

Bradly, David. (1979). Lahu Dialects. Canberra: Australian National University Press.

Brown, J. Mavin. (1965). From Ancient Thai to Modern Dialects. Bangkok : Social Science Association Press.

Crystal, D. (1991). A Dictionary of Linguistics and Phonetics. London : Blackwell.

Gedney, William J. (1972). A Checklist for Determining Tones in Tai Dialects. In M. Estellie Smith (ed.). Studies in Linguistics in Honor of George L. Trager (pp.423-427). The Hague : Mouton.

Goodman, Jim. (1996). Meet the Akha. Bangkok : White Lotus.

Jenvit Suknaphasawat. (1999). A Phonological Description of the Lahu Bakeo Language. M.A. Thesis in Linguistics, Faculty of Graduate Studies, Payap University.

Ladefoged, P. (1975). A Course in Phonetics. Newyork : Harcourt Brace Jovanovich, Inc.

Lewis, Paul. (1973). Tone in the Akha Language. Antropological Linguistics (vol.15, pp. 183-188).

Maddieson, Ian. (1984). The Effects on Fo of a Voicing Distinction in Sonorants and Their Implications for a Theory of Tonogenesis. Journal of Phonetics. (vol.12, pp.9-15).

Matisoff, James A. (1973). The Grammar of Lahu. Berkeley and Los Angeles : University of California press.

_____. (1973). Tonogenesis in Southeast Asia. In Hyman, Larry M. (ed.). Consonant Types and Tone (pp. 71-96). Los Angeles : The Linguistics Program University of Southern California.

Panadda Bamrung. (1993). A Phonological Study of Akha in Pa-Kha-Suk-jai Village, Tambol Mae-Sa-Long-Nok, King-Ampher Mae-Fa-Luang, Chiangrai Province. M.A. Thesis in Linguistics, Faculty of Graduate Studies, Mahidol University.

Puttachart Dhananjayananda. (1983). The Phonology of Sgaw Karen, with Comparisons with Thai. M.A. Thesis in Linguistics, Faculty of Graduate Studies, Mahidol University.

Ruengdet Pankhuenkhat. (1981). The Phonology of the Lanna Language. Paper presented at the 14th International Conference on Sino – Tibeton Languages and Linguistics, University of Florida.

Solot Sirisai. (1986). The Phonological Description of Lahu Nyi Language spoken in Chayi Village, Patung Sub-District, Mae Chan District, Chiangrai Province. M.A. Thesis in Linguistics, Faculty of Graduate Studies, Mahidol University.

Theraphan L. Thongkum. (1994). Phonological Variation and Phonological Change In Mien-Yao : A Result of Language Contact with Thai. Current Issue in Sino-Tibeton Linguistics.(pp. 915-927).

_____. (1997). Tone Change and Language Contact : A Case Study of Mien-Yao and Thai. In Abramson, Arthur S. (ed.) Southeast Asian Linguistic Studies in Honor of Vichin Panupong. Bangkok : Chulalongkorn University Press.

Wipawan Plungsuwan. (1981). A Tonal Comparison of Tai Dialects in Ratchaburi. M.A. Thesis in Linguistics, Faculty of Graduate Studies, Mahidol University.

กัลยา ติงศภัทิย์, ม.ร.ว. (2533). วรรณยุกต์ในภาษาไทยถิ่นสุพรรณบุรี : การศึกษาเปรียบเทียบวรรณยุกต์ในคำเดี่ยวกับวรรณยุกต์ในถ้อยคำต่อเนื่อง. ภาควิชาภาษาศาสตร์ คณะอักษรศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย.

เกดนี่, วิลเลี่ยม เจ. (2521). คำสำหรับทดสอบเสียงวรรณยุกต์ในภาษาไทยถิ่น. (ธีระพันธ์ ล.ทองคำ, ผู้แปล). กรุงเทพฯ: โครงการวิจัยภาษาไทยและภาษาพื้นเมืองถิ่นต่าง ๆ สถาบันภาษา จุฬาลงกรณ์มหาวิทยาลัย.

พรศรี ชินเชษฐ. (2532). วรรณยุกต์ภาษาลาวแง้วในคำพูดเดี่ยวและคำพูดต่อเนื่อง. วิทยานิพนธ์ปริญญาอักษรศาสตร์มหาบัณฑิต, ภาควิชาภาษาศาสตร์ บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย.

ธีระพันธ์ ล. ทองคำ. (2527). กำเนิดและวิวัฒนาการของวรรณยุกต์ในภาษามอญเขมร. วารสารอักษรศาสตร์,16 (2), 53-67.

เรืองเดช ปันเขื่อนขัติย์. (2531). ภาษาถิ่นตระกูลไทย. กรุงเทพฯ : มหาจุฬาลงกรณ์ราชวิทยาลัย.

_____. (2541). ภาษาศาสตร์ภาษาไทย. กรุงเทพฯ : มหาจุฬาลงกรณ์ราชวิทยาลัย.

สมทรง บุรุษพัฒน์. (2543). ภูมิศาสตร์ภาษาถิ่น. กรุงเทพฯ : บริษัทเอกพิมพ์ไทจำกัด.

สิงห์คำ ศิริลักษณ์. (2543). แผนพัฒนาตำบล. เชียงราย : องค์การบริหารส่วนตำบลแม่ยาว. อัดสำเนา.

สุริยา รัตนกุล, คุณหญิง. (2523). ปัญหาของเด็กชาวเขาเผ่าอีก้อ มูเซอ และลีซอขณะที่เรียนภาษาไทย. ข่าวสารศูนย์วิจัยชาวเขา,4 (1), 27-34.

_____. (2531). นานาภาษาในเอเชียอาคเนย์ ภาค 1. กรุงเทพฯ : เรือนแก้วการพิมพ์.

อมร ทวีศักดิ์. 2542. สัทศาสตร์. กรุงเทพฯ : บริษัทสหธรรมิกจำกัด.

APPENDIX

Fundamental Frequency Values of Tones of Chiangrai's Northern Thai Dialect in Citation Form Pronounced by Lahu

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Tone 1 (smooth)	107.6	101.1	98.5	97.6	98.6	101.0	104.1	107.4	109.9	112.6	115.1
Tone 2 (smooth)	119.2	119.1	119.4	120.2	121.1	122.1	124.0	126.8	128.3	129.5	129.9
Tone 3 (smooth)	114.6	112.6	111.0	109.8	108.9	108.2	107.3	106.4	105.5	103.9	102.5
Tone 4 (smooth)	144.3	143.0	141.2	139.2	136.9	134.1	131.0	127.6	123.5	118.8	114.8
Tone 3 (checked)	116.8	114.8	113.1	111.7	110.8	109.8	108.9	107.8	106.6	105.3	103.9
Tone 4 (checked)	131.3	129.6	126.9	124.8	122.9	120.9	118.5	115.6	112.3	109.6	107.4
Tone 2 (checked)	133.9	134.3	135.4	137.0	139.0	141.0	142.9	144.6	146.0	146.5	146.2

Fundamental Frequency Values of Tones of Chiangrai's Northern Thai Dialect in Citation Form Pronounced by Akha

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Tone 1 (smooth)	125.9	120.4	117.3	116.2	117.7	119.8	122.6	124.4	127.3	129.6	130.5
Tone 2 (smooth)	126.5	127.0	127.1	128.0	129.3	131.5	133.3	134.8	135.8	137.0	137.3
Tone 3 (smooth)	130.5	128.5	126.4	124.7	123.4	122.0	120.8	119.5	118.2	116.9	115.9
Tone 4 (smooth)	154.4	152.5	151.0	149.5	147.9	145.8	142.8	139.6	136.0	132.4	128.3
Tone 3 (checked)	131.7	129.9	128.4	126.3	124.6	123.0	122.0	120.9	119.5	118.3	117.5
Tone 4 (L-checked)	155.5	150.9	146.9	143.2	140.2	137.1	133.5	130.1	126.7	123.4	121.3
Tone 4 (S-checked)	161.1	160.0	158.4	157.0	155.6	153.9	152.1	150.0	147.2	144.8	142.1

Fundamental Frequency Values of Tones of Chiangrai's Northern Thai Dialect in Citation Form Pronounced by Karen

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Tone 1 (smooth)	105.0	98.6	94.7	92.2	92.4	93.9	96.4	99.1	102.2	105.2	107.5
Tone 2 (smooth)	112.1	112.4	113.1	114.2	115.5	116.6	118.1	120.0	122.3	124.1	124.8
Tone 3 (smooth)	113.9	111.9	110.7	109.4	108.1	107.2	106.2	105.1	104.0	103.0	101.4
Tone 4 (smooth)	123.5	123.6	123.1	121.5	119.0	115.5	111.9	107.7	104.2	100.0	96.9
Tone 5 (smooth)	129.7	129.4	128.5	127.3	126.1	124.9	123.4	121.9	120.2	118.5	116.2
Tone 6 (smooth)	146.3	145.3	144.0	141.3	138.0	133.9	129.0	123.0	116.2	110.3	104.6
Tone 3 (checked)	113.2	111.9	110.8	109.4	108.0	106.8	105.7	104.8	103.7	102.6	101.5
Tone 4 (checked)	124.0	124.1	124.1	123.1	121.1	118.6	115.9	112.8	109.7	105.8	101.5
Tone 2 (checked)	122.4	123.1	124.0	125.5	126.9	128.8	130.7	132.5	134.1	135.1	135.4
Tone 5 (checked)	141.7	140.9	139.5	137.9	136.8	136.1	135.2	134.1	132.5	130.9	129.7

Fundamental Frequency Values of Tones of Chiangrai's Northern Thai Dialect in Citation Form Pronounced by Native Speakers

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Tone 1 (smooth)	105.3	102.7	100.3	98.6	98.3	98.9	100.3	102.2	104.6	106.4	107.5
Tone 2 (smooth)	116.5	115.6	115.1	115.4	116.4	118.9	121.1	123.3	125.6	126.6	126.6
Tone 3 (smooth)	120.7	119.0	117.6	116.5	115.6	114.6	113.9	113.1	112.4	111.7	110.0
Tone 4 (smooth)	124.1	121.9	119.4	117.0	114.0	110.4	106.9	103.7	100.2	97.2	95.1
Tone 5 (smooth)	138.1	137.0	136.2	135.4	134.4	133.3	132.0	130.3	128.1	125.1	122.6
Tone 6 (smooth)	154.0	152.7	150.8	148.5	145.0	139.1	130.7	123.4	115.2	109.5	106.7
Tone 3 (checked)	120.3	119.3	118.1	117.3	116.6	116.0	115.5	115.1	114.3	113.2	112.4
Tone 4 (checked)	125.4	124.6	122.9	120.5	118.1	114.8	112.2	109.3	106.6	104.2	103.1
Tone 2 (checked)	127.2	128.2	129.3	131.1	134.0	137.0	140.1	142.6	144.5	145.6	146.4
Tone 5 (checked)	152.9	150.9	149.6	148.7	147.8	146.7	145.4	143.9	142.6	141.1	140.2

Fundamental Frequency Values of Tones of Chiangrai's Northern Thai Dialect in Connected Speech Pronounced by Lahu

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Tone 1 (smooth)	116.7	116.3	107.0	106.1	107.4	110.3	113.9	117.6	120.8	123.4	124.8
Tone 2 (smooth)	132.7	132.7	133.5	135.2	136.9	138.8	140.7	142.6	144.3	145.4	145.5
Tone 3 (smooth)	122.0	119.9	117.7	115.8	114.0	112.4	111.0	109.6	108.1	106.7	105.4
Tone 4 (smooth)	139.5	138.8	137.4	135.4	133.2	130.6	127.4	124.4	121.2	118.3	115.3
Tone 5 (smooth)	147.0	146.9	146.0	144.3	142.2	140.0	137.6	135.0	132.6	130.4	128.5
Tone 3 (checked)	125.2	123.4	121.6	120.0	118.3	116.8	115.4	114.0	112.5	110.8	109.1
Tone 4 (checked)	138.8	138.1	136.5	134.0	131.4	128.6	125.6	122.3	118.4	114.8	111.1
Tone 2 (checked)	149.7	150.4	151.5	153.1	154.6	156.0	157.6	159.3	161.0	162.5	163.6
Tone 5 (checked)	157.4	157.3	156.9	156.0	154.8	153.4	152.0	150.6	149.1	147.9	147.0

Fundamental Frequency Values of Tones of Chiangrai's Northern Thai Dialect in Connected Speech Pronounced by Akha

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Tone 1 (smooth)	120.0	113.5	110.0	109.0	110.0	112.9	116.4	120.1	124.1	127.8	130.3
Tone 2 (smooth)	141.5	141.0	141.7	143.2	145.0	147.3	149.4	151.5	153.4	155.2	156.1
Tone 3 (smooth)	127.9	126.3	124.7	123.0	121.4	120.1	118.8	117.6	116.4	115.2	114.1
Tone 4 (smooth)	147.7	147.6	146.8	145.5	143.7	141.6	139.2	136.7	134.2	131.6	129.4
Tone 3 (checked)	129.0	127.3	125.4	123.5	122.0	120.5	119.2	117.9	116.5	115.2	114.2
Tone 4 (L-checked)	144.1	144.5	144.1	143.1	141.1	138.6	135.7	132.6	129.9	126.9	123.6
Tone 4 (S-checked)	170.3	169.6	168.6	166.9	165.2	163.5	161.7	159.8	158.0	156.4	155.1

Fundamental Frequency Values of Tones of Chiangrai's Northern Thai Dialect in Connected Speech Pronounced by Karen

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Tone 1 (smooth)	101.2	96.1	92.9	91.6	92.0	93.8	96.3	99.2	102.2	104.8	106.7
Tone 2 (smooth)	114.9	115.1	115.9	117.2	118.5	120.0	121.6	123.2	124.8	126.1	127.2
Tone 3 (smooth)	105.1	104.0	102.9	101.4	100.1	98.9	97.6	96.3	95.0	93.9	93.1
Tone 4 (smooth)	117.0	117.5	116.8	114.8	112.0	108.5	105.1	101.9	99.1	96.5	94.7
Tone 5 (smooth)	127.8	127.4	126.6	125.2	123.6	122.1	120.6	119.1	117.6	116.2	115.0
Tone 6 (smooth)	138.0	138.5	137.8	135.7	132.3	127.1	120.7	113.8	106.3	100.2	94.8
Tone 3 (checked)	105.0	104.0	102.9	101.7	100.5	99.3	98.1	96.8	95.4	94.1	93.0
Tone 4 (checked)	115.8	115.9	115.1	113.2	110.6	107.5	104.2	100.8	97.3	94.7	93.0
Tone 2 (checked)	126.4	127.3	128.6	130.1	131.7	133.4	134.9	136.4	137.7	138.7	139.4
Tone 5 (checked)	141.5	141.7	142.1	141.8	141.1	139.8	138.4	136.9	135.4	133.2	131.0

Fundamental Frequency Values of Tones of Chiangrai's Northern Thai Dialect in Connected Speech Pronounced by Native Speakers

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Tone 1 (smooth)	123.6	117.6	114.4	112.6	112.8	114.2	116.7	120.7	123.7	126.0	126.9
Tone 2 (smooth)	134.5	134.7	136.8	138.9	140.9	143.4	145.9	149.0	151.8	155.9	158.7
Tone 3 (smooth)	127.4	125.8	124.1	122.9	121.9	121.1	120.0	118.6	117.6	115.9	114.2
Tone 4 (smooth)	142.9	141.1	138.0	135.0	131.5	128.5	123.7	118.9	113.6	109.0	105.3
Tone 5 (smooth)	151.5	150.6	149.7	148.4	146.9	145.2	143.5	141.6	139.4	136.2	133.1
Tone 6 (smooth)	166.4	165.8	164.5	160.7	154.9	147.2	138.5	129.5	122.1	119.6	117.7
Tone 3 (checked)	127.2	125.7	124.2	122.6	121.5	120.2	119.0	117.8	116.6	115.3	114.2
Tone 4 (checked)	141.4	139.4	136.8	133.1	129.6	125.2	120.4	115.3	109.9	105.4	103.4
Tone 2 (checked)	153.0	153.7	154.8	156.6	158.9	161.4	164.0	166.5	168.3	169.2	169.5
Tone 5 (checked)	169.6	168.5	166.8	164.9	162.8	160.8	159.1	156.9	155.4	153.4	151.7

Fundamental Frequency Values of Tones of Lahu in Citation Form Pronounced by Native Speaker

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
tone1	122.1	120.7	119.7	120.4	122.1	123.1	122.4	120.7	117.9	116.9	117.1
tone 2	122.3	121.9	120.8	120.3	120.5	120.5	119.6	118.2	117.1	116.4	116.0
tone 3	134.7	133.1	129.2	125.8	121.8	118.7	114.4	110.4	106.7	103.6	99.3
tone 4	145.7	144.0	141.9	139.4	137.4	135.6	133.3	130.6	127.8	125.5	122.9
tone 5	147.3	149.2	149.9	149.8	148.5	146.9	145.7	142.9	140.1	136.3	130.3
tone 6	165.3	165.4	166.0	166.8	167.5	167.8	167.9	167.4	166.4	165.2	162.7
tone 7	159.3	158.5	158.2	159.1	161.1	162.6	163.6	163.8	161.9	160.2	159.2

Fundamental Frequency Values of Tones of Akha in Citation Form Pronounced by Native Speaker

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
tone1	114.1	115.1	114.7	113.2	112.1	110.4	108.5	107.4	103.7	102.2	99.3
tone 2	115.9	115.6	115.0	114.4	113.5	113.0	112.8	112.4	111.7	110.5	109.1
tone 3	128.0	126.3	123.7	122.8	122.2	122.8	123.3	123.7	124.5	125.1	125.1
tone 4	122.6	124.3	126.6	128.5	130.5	133.4	136.4	138.4	138.7	137.7	135.8
tone 5	142.3	141.9	143.1	144.7	146.8	148.0	148.1	148.4	148.6	147.9	146.7

Fundamental Frequency Values of Tones of Karen in Citation Form Pronounced by Native Speaker

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
tone 1	92.5	91.9	91.4	90.9	90.2	89.6	88.9	88.3	87.4	87.0	87.0
tone 2	99.3	100.2	101.0	101.1	101.1	100.9	99.6	98.9	98.5	97.6	96.5
tone 3	106.4	105.6	104.2	102.0	100.0	97.5	94.7	91.4	87.7	83.3	76.8
tone 4	102.8	103.3	103.4	102.6	101.1	99.4	96.7	94.4	91.4	88.7	86.1
tone 5	104.2	104.4	105.4	106.2	107.4	108.4	109.3	110.0	110.1	110.0	109.1
tone 6	115.1	116.3	117.3	118.0	118.4	118.9	119.0	119.4	119.9	119.2	117.4

Tonal System of CNTD Pronounced by Lahu in Citation Form

	A	B	C	DL	DS
1	1 [212]				
2		3 [21]	4 [52]	3 [21]	2 [45]
3	2 [34]				
4				4 [42]	

Tonal System of CNTD Pronounced by Lahu in Connected Speech

	A	B	C	DL	DS
1	1 [212]				
2		3 [21]	5 [42]	3 [21]	2 [45]
3	2 [34]				
4		4 [31]		4 [31]	5 [54]

Tonal System of CNTD Pronounced by Akha in Citation Form

	A	B	C	DL	DS
1	1 [212]				
2		3 [21]	4 [52]	3 [21]	4 [54]
3	2 [23]				
4				4 [51]	

Tonal System of CNTD Pronounced by Akha in Connected Speech

	A	B	C	DL	DS
1	1 [212]				
2		3 [21]	4 [42]	3 [21]	4 [54]
3	2 [34]				
4					

Tonal System of CNTD Pronounced by Karen in Citation Form

	A	B	C	DL	DS
1	1 [212]				
2		3 [21]	5 [43]	3 [21]	2 [35]
3	2 [24]				
4		4 [31]	6 [52]	4 [31]	5 [54]

Tonal System of CNTD Pronounced by Karen in Connected Speech

	A	B	C	DL	DS
1	1 [212]				
2		3 [21]	5 [43]	3 [21]	2 [45]
3	2 [34]				
4		4 [31]	6 [51]	4 [31]	5 [54]

Tonal System of CNTD Pronounced by Native Speakers in Citation Form

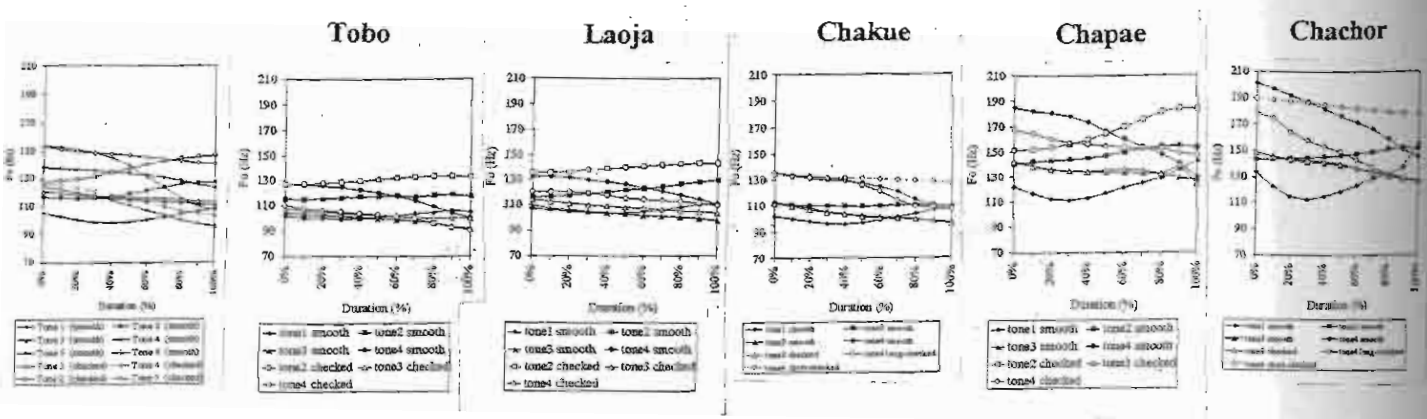
	A	B	C	DL	DS
1	1 [212]				
2		3 [22]	5 [43]	3 [22]	2 [35]
3	2 [23]				
4		4 [31]	6 [52]	4 [31]	5 [54]

Tonal System of CNTD Pronounced by Native Speakers in Connected Speech

	A	B	C	DL	DS
1	1 [212]				
2		3 [21]	5 [43]	3 [21]	2 [45]
3	2 [35]				
4		4 [31]	6 [52]	4 [31]	5 [54]

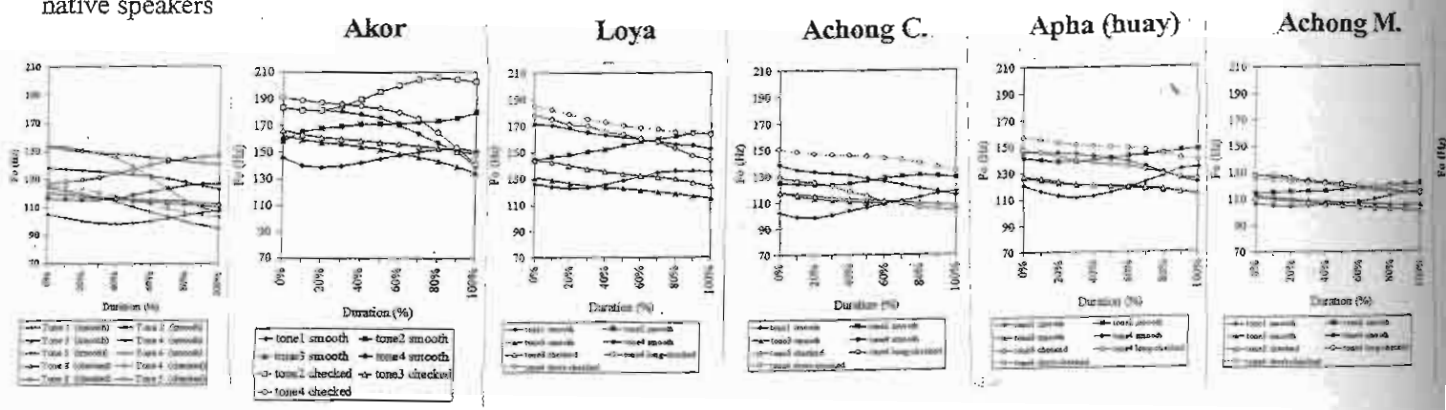
Chiangrai's Northern Thai dialect pronounced by native speakers

Chiangrai's Northern Thai dialect Pronounced by the Lahu



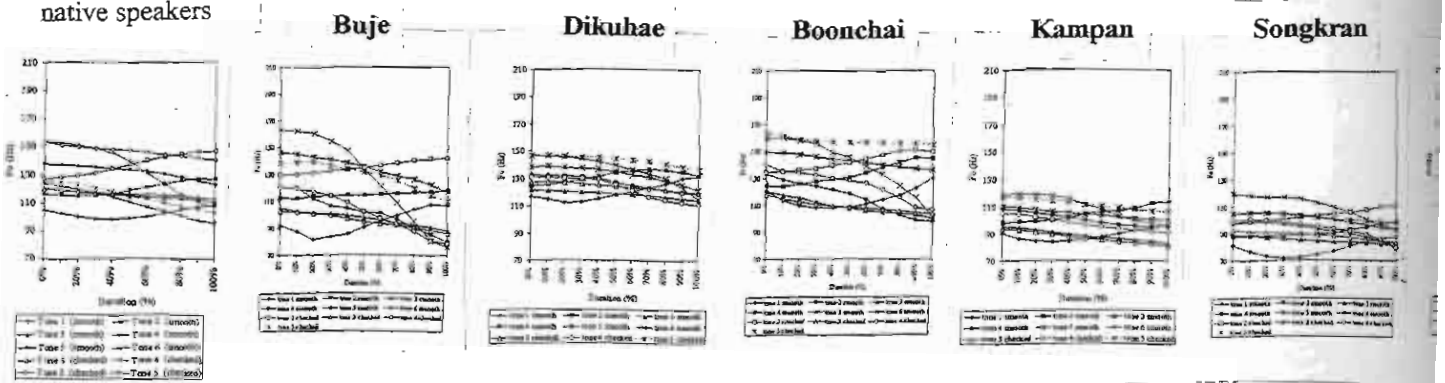
Chiangrai's Northern Thai dialect pronounced by native speakers

Chiangrai's Northern Thai dialect Pronounced by the Akha



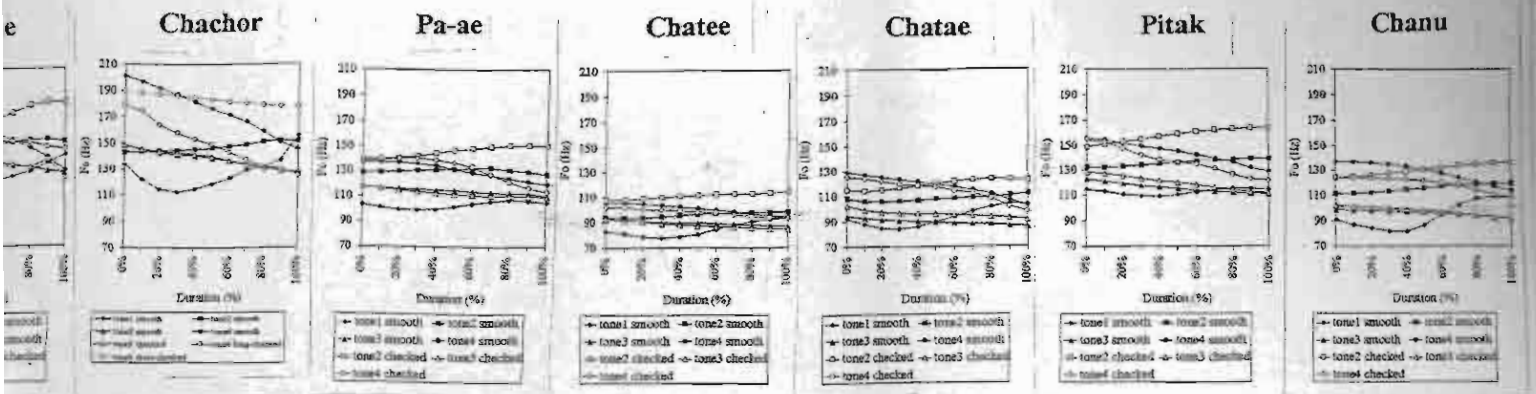
Chiangrai's Northern Thai dialect pronounced by native speakers

Chiangrai's Northern Thai dialect Pronounced by the Karen

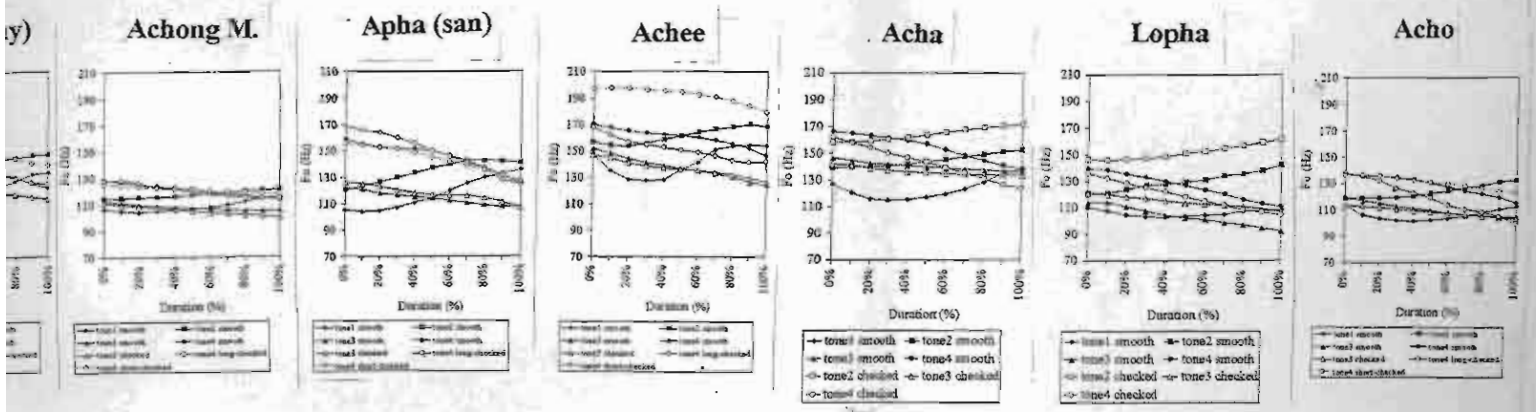


Tonal Characteristics of Chiangrai's Nort in Citation Form

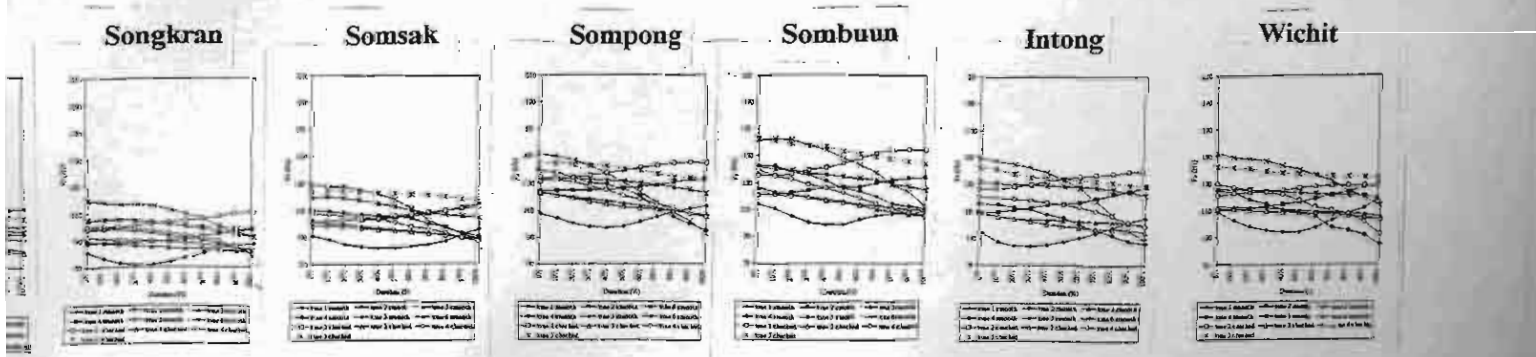
angrai's Northern Thai dialect
Pronounced by the Lahu



ıgrai's Northern Thai dialect
Pronounced by the Akha



ıgrai's Northern Thai dialect
ronounced by the Karen



s of Chiangrai's Northern Thai Dialect
n Citation Form

BIOGRAPHY

NAME Mr. Attasith Boonsawasd

DATE OF BIRTH 18 February 1978

INSTITUTIONS ATTENDED Ongkarak School, Nakhornnayok, 1988-1991 : Certificate of Mathayomsuksa III

Ongkarak School, Nakhornnayok, 1991-1994 : Certificate of Mathayomsuksa VI

Burapha University, 1994-1998 : Bachelor of Education (Thai)

Mahidol University, 1998-2001 : Master of Arts (Linguistics)

RESEARCH GRANT The Thailand Research Fund, 1999-2001