

# EVOLUTION OF BANGKOK TONES

*Sarinee Anivan*

## SUMMARY

Tone characteristics, like other linguistic features, change through time. Variations in the nature of certain Bangkok tones among different groups ( of Thai ) may be due to the different rates and direction of their linguistic evolution. It is well known that the Bangkok tones as spoken by regional speakers are recognisably different from those spoken by native Bangkok speakers. This paper will argue that one reason for the difference is that while the tonal reproduction of Bangkok tones by Bangkok monodialectals have changed within this century, the regional bidialectals have not kept up with the change. Taking Ubon bidialectals, the forms of Bangkok tones used by them today are similar to those described by Bradley in 1909. It will be shown that certain differences between the tones used by Bangkok natives and the regional bidialectals are indeed caused by retention of old forms by the latter not by first dialect interference. This paper is based on an acoustical study of tone reproduction by 10 Bangkok monodialectals and 10 bidia-

lectals from each of three provinces ( Chiangmai, Ubon and Songkhla ). The historical data are obtained by an extensive review of the literature. The findings of this paper will give deeper understanding to processing of tones by Thai bidialectals as well as the patterning of various tonal contours that change through time.

## DEFINITION OF TERMS AND ABBREVIATIONS

“ Bangkok Thai ” is used here to mean the “ standard ” dialect which has its origin in the Bangkok area and is used by Bangkok natives as well as speakers of other regions. Other linguists might use the term “ Standard Thai ” or “ Siamese ”, instead.

Tones ( of the Thai dialects ), under this study, refer only to those of the open ( smooth ) syllables since the tones of closed syllables are tonemic realisations of their open syllable counterparts.

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## ABBREVIATIONS

BK denotes Bangkok tones spoken by Bangkok native speakers.  
BC denotes Bangkok tones spoken by Chiangmai native speakers.  
BU denotes Bangkok tones spoken by Ubon native speakers.  
BS denotes Bangkok tones spoken by Songkhla native speakers.  
CM denotes Chiangmai tones spoken by Chiangmai native speakers.  
UB denotes Ubon tones spoken by Ubon native speakers.  
SL denotes Songkhla tones spoken by Songkhla native speakers.  
H denotes High tone.  
L denotes Low tone.  
R denotes Rising tone.

M denotes Mid tone.  
F denotes Falling tone.

## 1. INTRODUCTION

Bangkok Thai tones, being the tones of the “standard dialect” of the nation, have been well documented. Most of these documentations, some dating from early this century, are based mainly on synchronic accounts of the production of monodialects of Bangkok. Among others, the best known works are Bradley (1909), Jones (1918) quoted in Henderson (1976), Haas (1942), Praya Uppakitsilpasan (1946), Henderson (1949), Praya Anumanrajathon (1955), Abramson (1962 & 1976), Erickson (1974).

It is generally agreed that Bangkok Thai has five distinctive tones: High ( *siang trii* ), Mid ( *siang sǎman* ), Low ( *siang eèk* ), Falling ( *siang tho* ) and Rising ( *siang chàtawaa* ). However, there are some differences in opinion as to which contour best describes the High tone, the Falling tone and the Rising tone. See Figures 1 and 2.

Bradley's *High tone* is a high rising followed by a heavy fall while the High tone of Abramson (1962 & 1976) and Erickson (1974) is a high gradual rise with a slight fall.

Abramson (1962 & 1976) and Erickson (1974) show that the *Falling tone* starts at a relatively higher range with a slight rise before a heavy fall. This same tone, according to Bradley (1909), starts at the low range and falls quickly to the lowest range.

The *Rising tone* as described in the modern works has some sustained fall at the start before a rapid rise while that of Bradley has no sustained fall at the beginning.

There are two explanations for these discrepancies. Both Abramson (1962) Erickson (1974) considered that the discrepancies between the earlier and modern works were the result of shortcomings in the methodology used in the early 1900s.

However, Henderson (1964 & 1976) explained this in terms of evolutionary change of tones within this century. Data on regional speakers of Bangkok tones from my research show patterns which point to the existence of the old forms and lend support to evolution as the probable explanation. With a larger sample size and more objective procedures, difficulties over data collection and validity of comparison between impressionistic and acoustic studies are reduced.

## 2. METHODOLOGY

The approach of this study is essentially to show that the old forms as described by Bradley did exist; the presumption being that the current contours of BK are the evolutionary result of the old form. Having no recording from the early 1900s, “proof” must necessarily be indirect. For this “proof”, I will look at the tone characteristics of Bangkok tones as spoken today by the regional speakers which deviate from the current Bangkok “norm” and show that they closely resemble the old forms. Where interferences can be discounted, it will be shown that the more probable source of the regional features is the retention of old forms.

In the sections that follow, normalised data from 10 speakers from each of the 4 dialect groups (Bangkok, Chiangmai, Ubon and Songkhla) are reviewed and comparisons made in 3 ways. Firstly, tone curves of Bangkok native speakers (henceforth, BK) are compared to those Bangkok tones produced by speakers of Chiangmai, Ubon and Songkhla (henceforth, BC, BU and BS, respectively). With BK as the “norm”, variants are detected and each tone will be described in turn according to the result from my research. Secondly, these variants are compared with the BK old forms. Similarities between regional variants and BK old forms would indicate that the latter is a likely determinant of the former. Thirdly, where the variants are similar to the old forms they are also compared with the features of their first dialect, D1. Similarities between the variants and the D1 would indicate the possibility of D1 interference. When these similarities do not exist, retention of old form is a better explanation for the variant characteristics.

## 3. DESCRIPTION OF INDIVIDUAL TONES

### 3.1 High Tone ( *Siang trii* ) ( Figure 3 )

BK : The curves of this tone are uniform among the ten BK speakers. A generalisation can be made as follows : it starts at or slightly above the mean *F<sub>0</sub>* value, after a small initial fall, rises slowly and terminates with a levelling off at the high range.

BC/BU/BS\* : Among the regional speakers, the contours of this tone do not have the uniformity

\* Although the regional groups are each compared with BK separately, the deviations from BK are very similar and for convenience are grouped together so that the contrast between BK and the regional as a whole are more vivid.

as shown by the BK speakers. They range from those which are similar to BK speakers to those which are distinct variants. The main difference occurs at the final portion of the curve. That is, instead of levelling-off at the final contour, some regional speakers display a *substantial final fall*. This is exhibited in three speakers of BC, seven subjects of BU and two subjects of BS. This is the feature which makes the contour resemble those of Bradley's old form. The magnitude of the fall tends to vary between dialects. For example, BU speakers appear to have a steeper fall than the BC and the BS speakers.

### 3.2 Mid tone ( *Sǎng sǎman* ) ( Figure 4 )

BK : All curves of this tone begin at or around the mean  $F_0$  range, and slowly move down with varying degrees of fall.

BC/BU/BS : As in those of BK subjects, the Mid tone of the groups of regional speakers have the same uniform characteristics as well as variant features. Thus, it can be said that regardless of the location of regional speakers, the pronunciation of this tone is not different from that of BK speakers.

### 3.3 The Low tone ( *Sǎng èk* ) ( Figure 5 )

BK : The Low tone of BK speakers starts at or slightly below the mean  $F_0$  line, and falls at slightly different rates.

BC/BU/BS : The Low tone of all the regional speakers have the same characteristics as those of BK speakers.

### 3.4 The Falling tone ( *Sǎng tho* ) ( Figure 6 )

BK : The contour of this tone starts at a high pitch range, sustains this level and drops rapidly to the lowest range. There is an optional slight rise at the beginning.

BC/BU/BS : In general, the speakers of BC, BS and some of BU pronounce this tone similar to BK speakers.

Some BU speakers however pronounce this tone differently from BK speakers, in that the contours of these speakers do not show an initial  $F_0$  sustention but drop immediately, which makes them appear more similar to Bradley's old form than the modern BK as far as the tonal slope is concerned.

### 3.5 The Rising tone ( *Sǎng chàtawā* ) ( Figure 7 )

BK : This tone starts at a lower  $F_0$  range, drops slightly initially, then rises up to the highest range.

BC/BU/BS : The speakers of BC, BU and BS speak the Rising tone uniformly and similar to those of BK speakers.

## 4. INTERFERENCE FROM D1

The major differences in the tonal production between the regional speakers ( BC, BU and BS ) and the BK speakers lie in the High and the Falling tones. In this section, I will argue that the deviation is not likely to be caused by interference from the speakers' regional dialects ( D1 ) in all cases.

In the production of the High tone of Bangkok dialect ( D2 ) by the regional speakers, the deviant contours among all three regional groups ( BC, BU and BS ) show clear uniformity in spite of the fact that all four D1 ( Bangkok, Chiangmai, Ubon and Songkhla ; see Figure 8 ) have tonal characteristics which are different from each other. Had interference been dominant, the characteristics of D2 could be expected to conform more to the respective D1s, and would have shown more inter-dialectal variability. Uniformity would indicate the influence of a single source. Figure 8 shows that only Chiangmai dialect ( D1 of BC ) has a contour similar to the BC High tone deviant. Thus, although the deviation of BC High tone can be explained in terms of D1 interference, those of BU and BS cannot.

Furthermore, D1 interference cannot be recognised in all cases by tonal substitution on the basis of lexical cognation since each D1 has different tonal realisation, i.e. the same lexical items that take the High tone in Bangkok are realised as the High tone in Chiangmai, but appear as the Mid-falling tone in Ubon and as the Low-falling tone in Songkhla. ( Appendix B )

The deviation of the Bangkok Falling tone is found only in the BU data. It is possible that D1 interference is the cause here since Ubon has a similar contour as that of the BU deviation ( i.e. High immediate-falling ).

However, when comparing the tonal realisation on the basis of lexical cognation, it appears that the argument for D1 interference is weakened since the same lexical items which take the Falling tone in Bangkok are realised in three different tones in Ubon, i.e. High, Low and Mid-falling. Thus, in this case, the deviation of BU falling could be better explained in terms of old form retention.

## 5. THE REGIONAL BANGKOK TONE DEVIATIONS AND OLD FORMS

As can be seen in Figure 1, the contours of Bangkok High and Falling tones as described by Bradley

( 1909 ) are similar to those of the deviation pronounced by some of the BC, BU and BS speakers ( with the exception of the feature at the starting point of the Falling tone ). Although the existence of the old-form curves especially that of the High tone is rejected by Abramson ( 1962 ) ( Figure 2 ) and Erickson ( 1974 ), impressionistic studies by Jones ( 1918 ) ( Quoted by Henderson 1976 ) show full support for Bradley's work. Furthermore, subsequent observations of the Bangkok tonal variations by Henderson ( 1964 & 1976 ) strongly **demonstrated that some of the Bangkok tones, especially the High tone, have evolved.** Details of these arguments are as follows :

Jones ( 1909 ) was quoted in Henderson ( 1976 ) as saying that " the ( BK ) tones are exactly as analysed by Bradley except that the Falling tone **begins rather higher than the Mid tone** " ( Henderson 1976, : 165 ). Jones further took special note of the Fo contour of the Mid and the High tones in which he stated that "**Bradley is undoubtedly right about the slight fall at the end of the Mid tone and the slight rise and strong fall at the beginning and end of the High tone.**" ( Henderson 1976 : 165 ) ( bold--mine )

Forty-five years later, Henderson ( 1964 ) brought attention to phonetic change in some tones of BK since Bradley's and Jones' studies. The changes started with a contraction of the final fall of the High tone, where the fall previously extended to the low pitch range, it now lies within the mid pitch range. Later, the final fall has become optional, thus creating two variants for this tone : one with a final fall and the other with no fall. Henderson ( 1976 ) observed that the High tone variant **with the final fall** still persists among Thai speakers. Furthermore the usage of the variants is not observed to be linked with age groups ( Henderson 1964 : 416 ). This indicated that since the early 1900s the change has been gradual. My data from BK show that the final fall has been so much shortened that it now is only a very slight fall.

While the evolution of the High tone is well accounted for, that of the Falling tone is not discussed anywhere in the literature in spite of the fact that there is an apparent difference between the findings of the early works ( Bradley 1909 and Jones 1918 ) and those of the modern works ( Abramson 1962 and Erickson 1974 ). However, my BU data lend support to the existence of Bradley's falling contour as far as slope is concerned. The reason for the change not

being given attention to before could be that the change was so gradual that it was hardly noticed. Even among the regional speakers, the adaptation is nearly complete.

Since it is not possible to explain some cases of the deviant tones of the regional speakers by the principle of D1 interference, it is therefore plausible that the cause of deviation of the case in question comes from a single source, ie. the old form. This view may find indirect support from the findings of Diller ( 1979a ) and Gandour ( 1977 ) who postulated that bidialectals tend to hold their two tonal systems separate, though not totally; this is due to social pressure against the mixing of the two tonal systems.

Thus, it can be concluded that there is a strong possibility that once upon a time Bangkok tones had their contours as depicted by Bradley ( 1909 ). These tonal contours then slowly evolved to the shapes as shown by Abramson, Erickson, and my BK data. From the evidence of these modern works, it appears that the old forms are totally replaced. However, on the evidence of the production of the regional speakers, it looks like some of the regional speakers have not caught up with the changes that have taken place among the BK speakers. Furthermore, it seems that the rate of catching-up varies from dialect to dialect. Perhaps this is due to non-linguistic factors such as socio-economic ones which can facilitate or hinder contact between the regional speaker and Bangkok speakers. This may be why BU speakers show stronger forms of old form retention than the BC and the BS speakers since it is well recognised that among the three provinces ( Chiangmai, Ubon and Songkhla ), Ubon is the least economically developed.

## 6. PAIR-WISE ADAPTATION HYPOTHESIS

The close interrelationship between the High and the Falling tones can be better understood if we investigate the manner in which the direction of tonal slope changes.

The contour of the old High tone ( see Figure 1 ) is very similar to that of the modern Falling tone ( see Figures 2 and 6 ). Thus, it seems that the evolutionary relationship of the old High tone on the one hand and that of old Falling tone on the other is determined by the principle of production for maximal perception. Suppose that the Falling tone started to change in a direction similar to its contemporary High tone ( ie, from immediate fall to sustained-high before a heavy

fall), in order to keep to the principle of maximal perception, the High tone had to move away from its existing contour (sustained high before a heavy fall) and created its new identity (sustained high and rise with slight fall). If the High tone did not change, it could not be distinguished from the evolved Falling tone.

## 7. CONCLUSION

The characteristics of Bangkok tone contours from various groups of "educated" regional speakers range from those that are very similar to the BK "norm" to those that are obviously deviant. The deviation

is found mainly in the High and the Falling tones. The uniformity of the deviation leads me to postulate its cause as coming from a single source: old form retention. This postulation is supported by inference to various sources in the literature. The value of such postulation is that it offers some insight into tonogenesis in general and that of Bangkok tones in particular. In this study, two aspects of tone development are specifically investigated: firstly, that of the native BK speakers and secondly, the processing of the regional speakers' two tone systems. Understanding of such processes at the micro-scale can contribute to the broader understanding of whole languages which rely heavily on their tonal relationships.

FIGURE 1 (Bradley 1909)

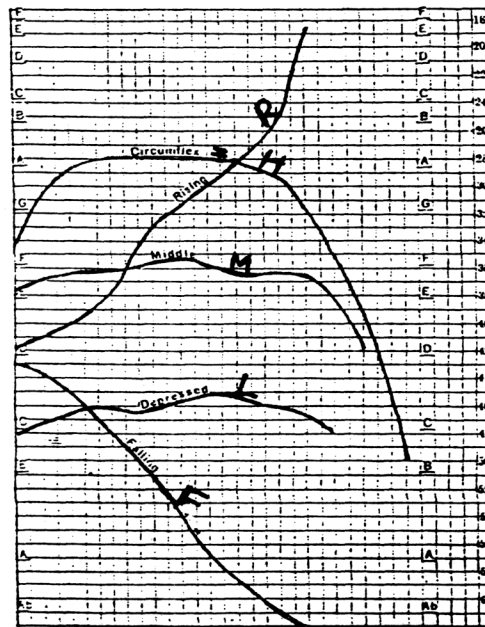


FIGURE 2 (Abramson 1962)

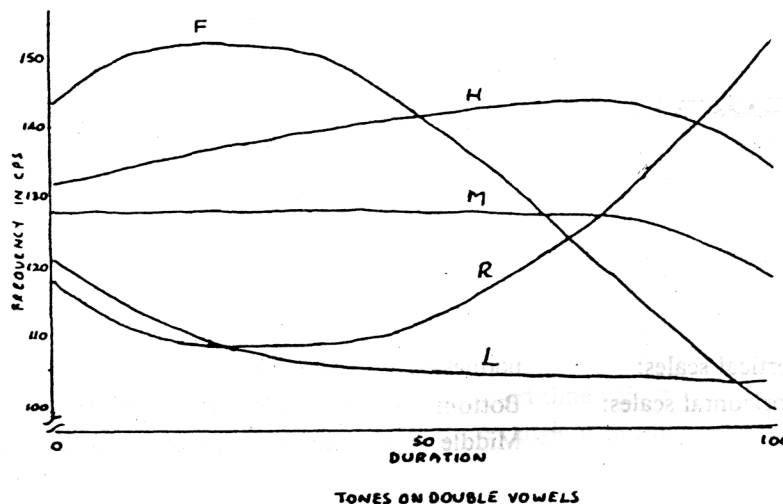
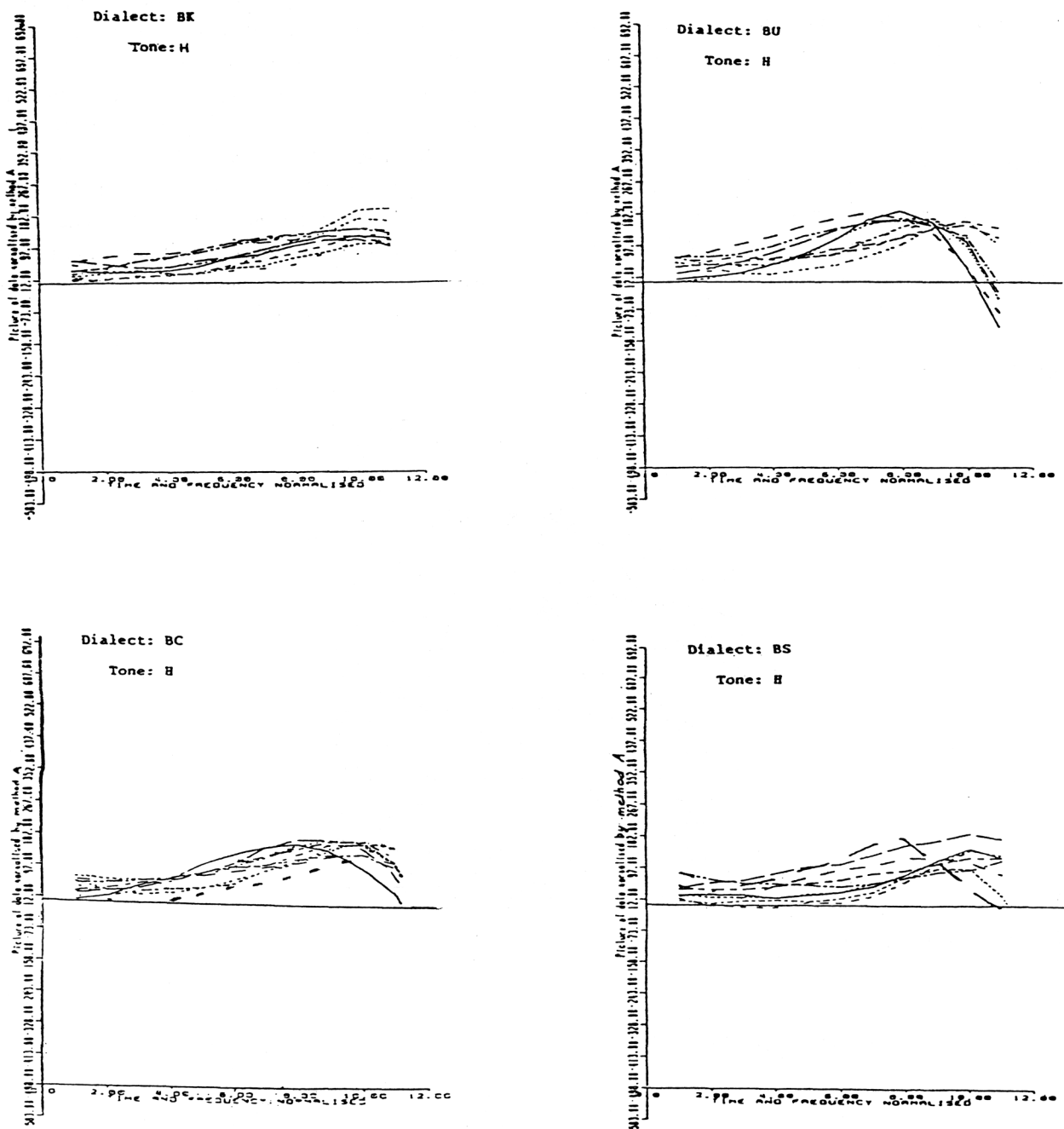
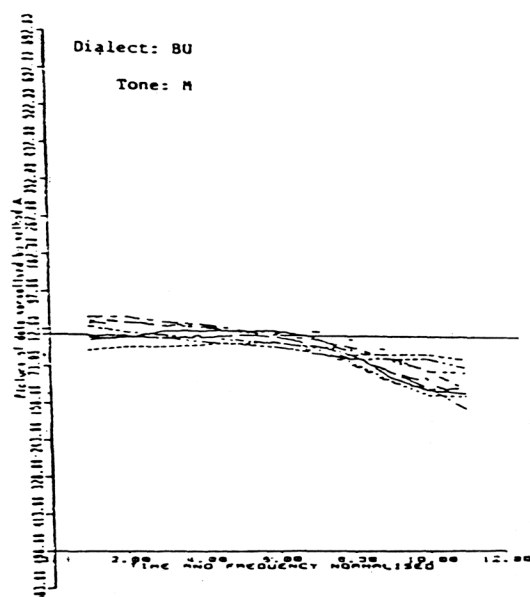
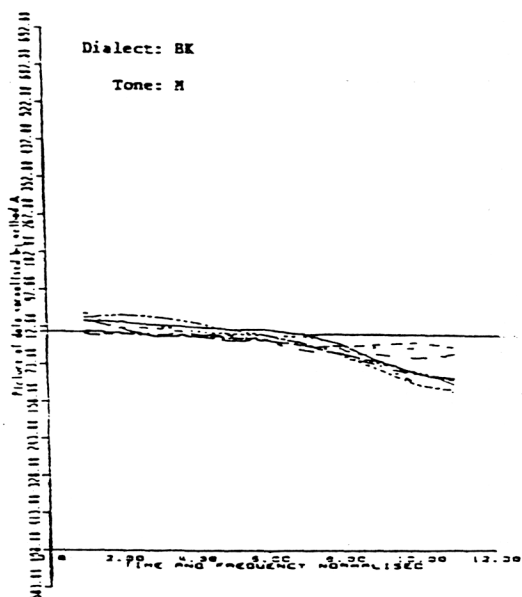


FIGURE 3 High tone

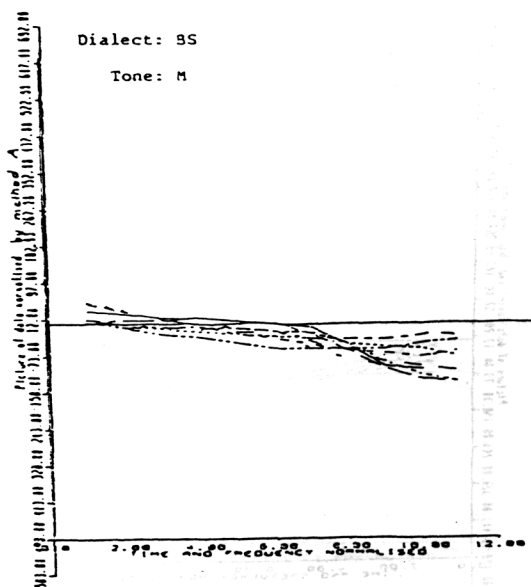
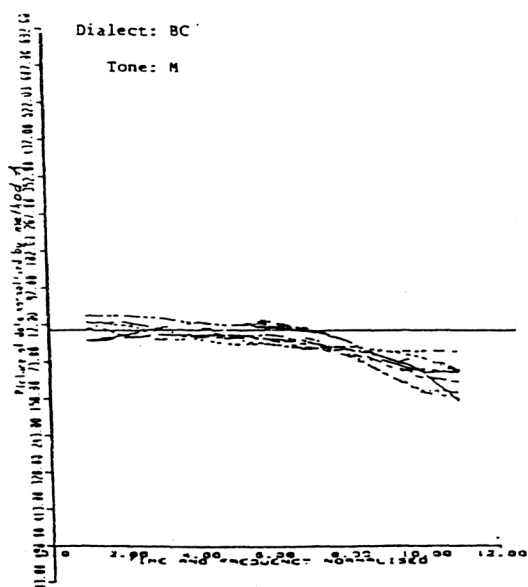


Vertical scales: normalised Fo values Hz  
Horizontal scales: Bottom — normalised time values  
Middle — mid Fo range of normalised values

FIGURE 4 Mid tone



Figure



Vertical scales:

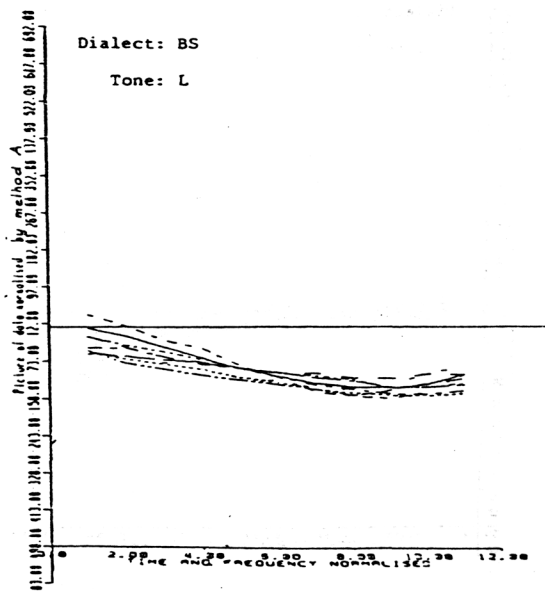
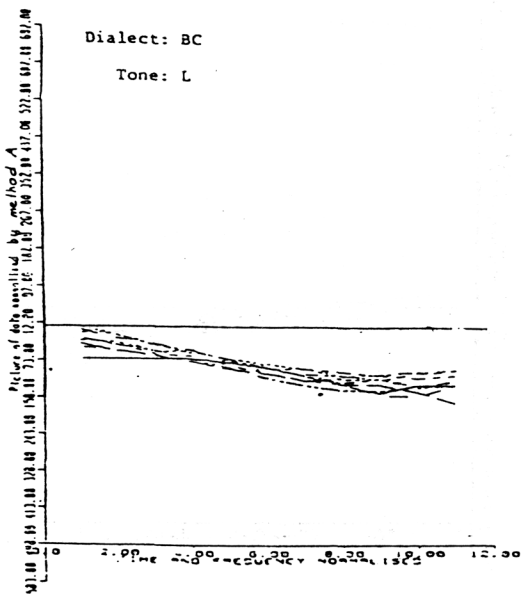
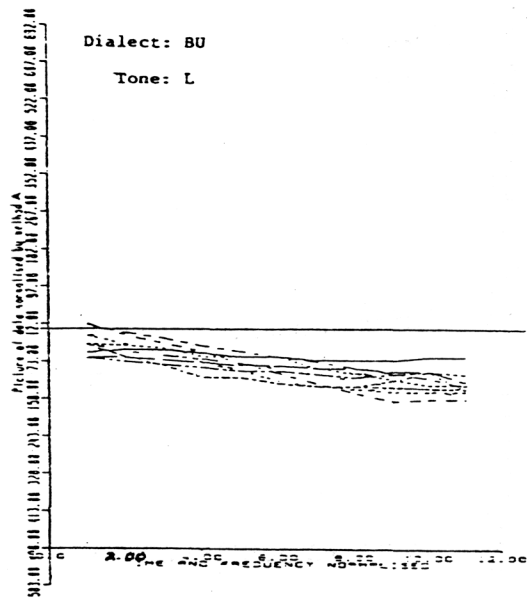
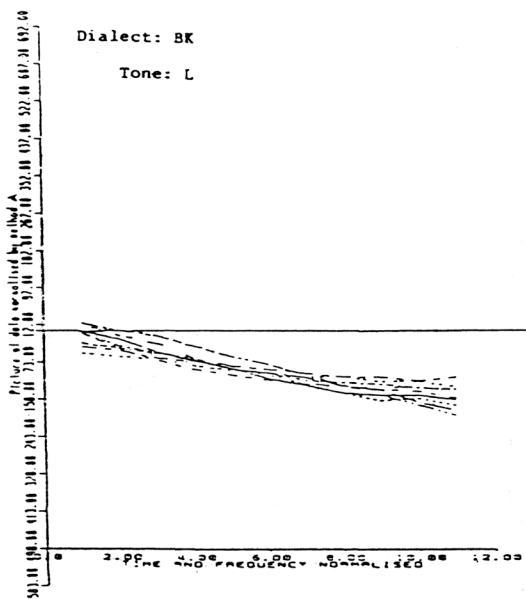
normalised Fo values Hz

Horizontal scales:

Bottom — normalised time values

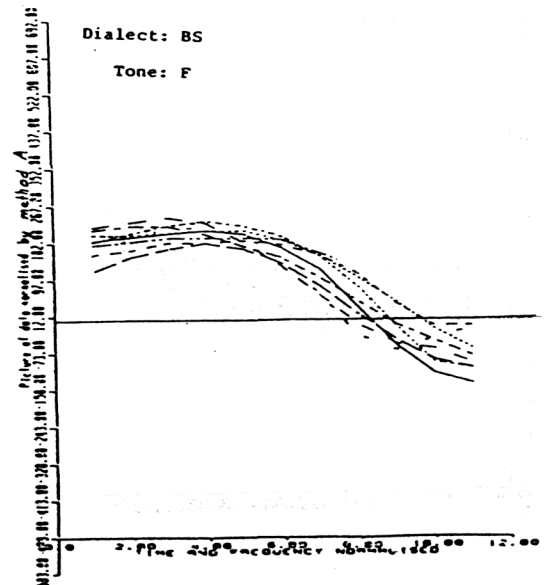
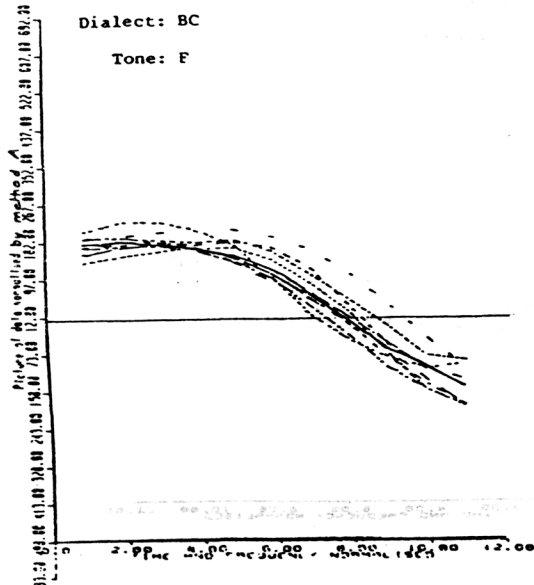
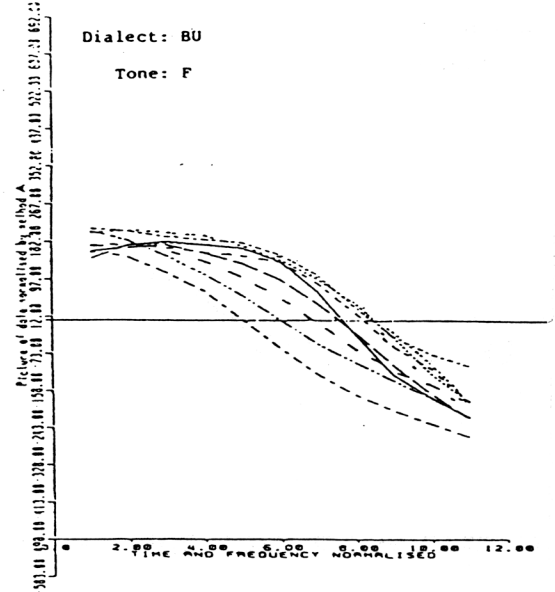
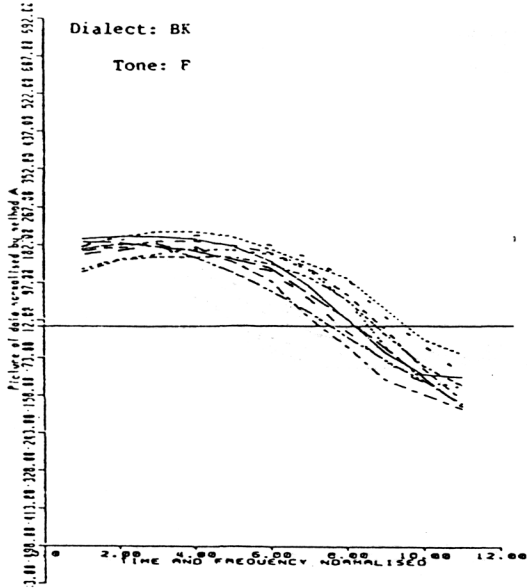
Middle — mid Fo range of normalised values

FIGURE 5 Low tone



Vertical scales:            normalised Fo values Hz  
Horizontal scales:    Bottom    —    normalised time values  
                             Middle    —    mid Fo range of normalised values

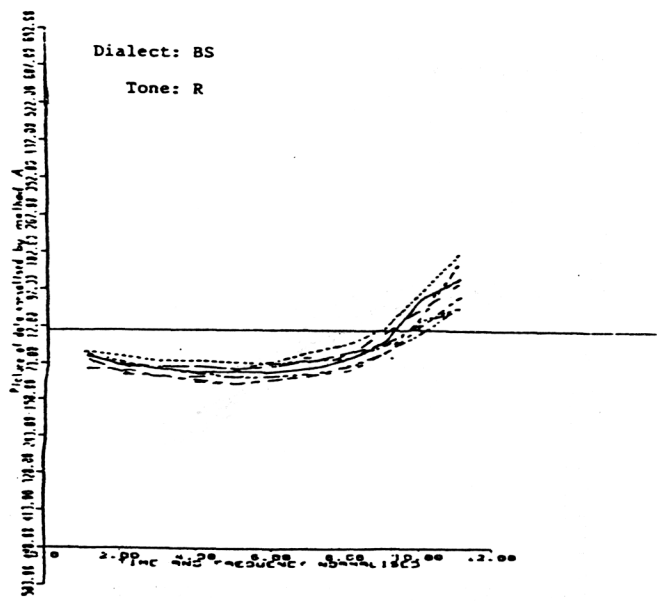
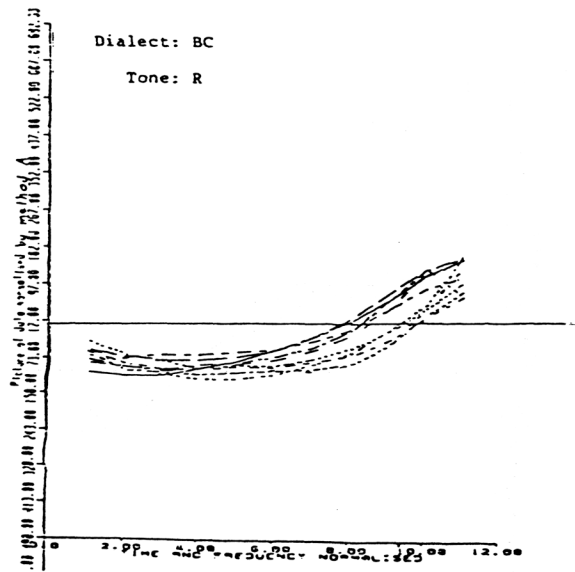
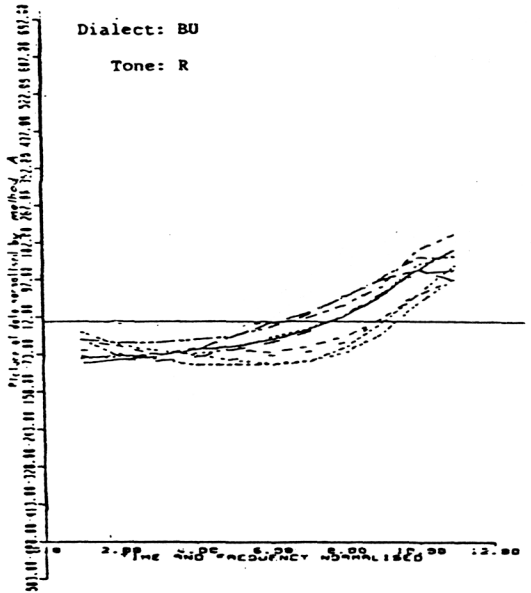
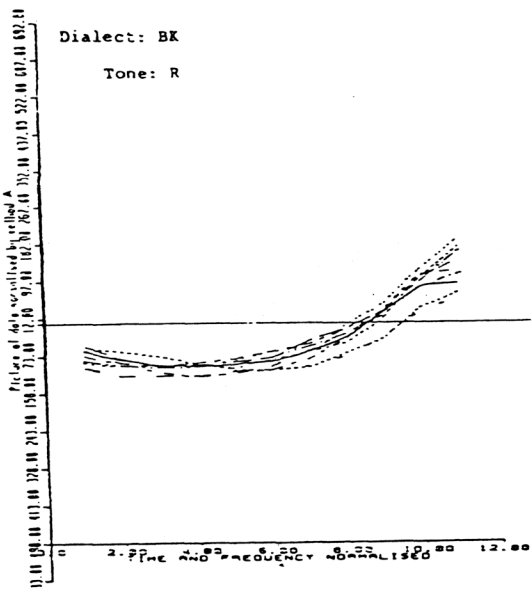


**FIGURE 6 Falling tone**

Vertical scales: normalised Fo values Hz

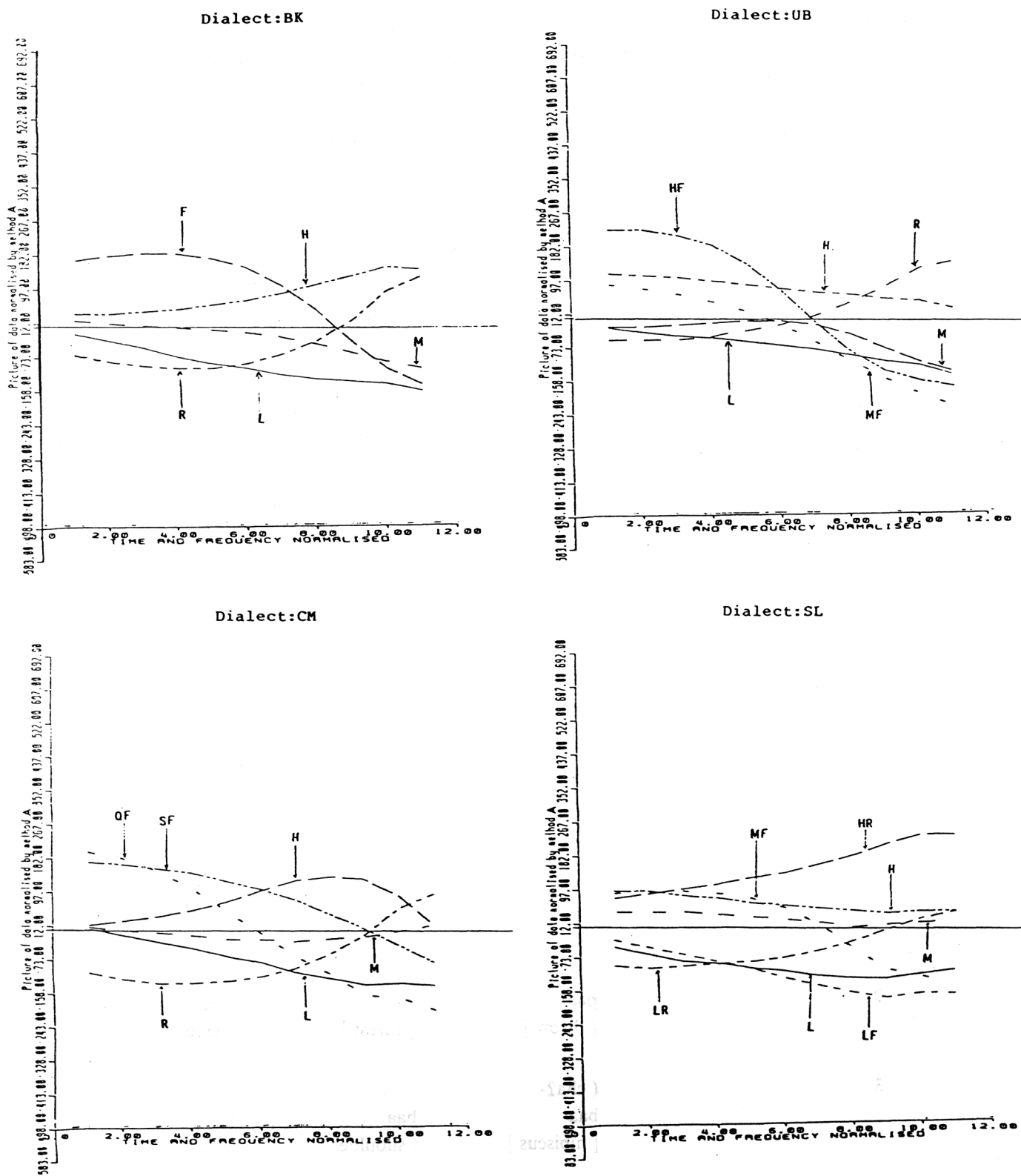
Horizontal scales: Bottom — normalised time values  
Middle — mid Fo range of normalised values

FIGURE 7 Rising tone



Vertical scales:            normalised Fo values Hz  
Horizontal scales:    Bottom    -    normalised time values  
                         Middle    -    mid Fo range of normalised values

**FIGURE 8** Tone inventory of the four Thai dialects



Vertical scales: normalised Fo values Hz  
Horizontal scales: Bottom – normalised time values  
Middle – mid Fo range of normalised values

## Appendix A

### Procedures

The materials for this paper were part of a larger research into the tones of Thai dialects. Data of the project were collected in 1982 and analysis completed in 1985 for an unpublished Ph.D thesis at Macquarie University.

#### 1. Informants

Ten informants ( 5 males and 5 females ) from each of the four dialects : Bangkok, Chiangmai, Ubon and Songkhla were used in this study. They were born, bred and educated in the area they represented. They were tertiary -level students aged between 19-24.

#### 2. Word Stimuli

Test words in this study are shown in the following Table.

### 3. Analysis of data

The data were analysed with the Pitch Computer at Macquarie University. For male speakers, the Computer was set at 230 Hz or 300 Hz low-pass calibrations and at 300 or 600 Hz for female speakers, depending on the pitch of their voice. The results were obtained through the print-outs where the waveforms as well as digital values of frequencies were presented. Fo values of every tone token given at every 21 msec interval.

The computer results were confirmed by the results from the analysis through the Migograph-34.

#### ( i ) Computation of data

Since the Fo perturbation of initial consonants is not an aim of the study, these data were not included for analysis. In effect, the tone domain for this analysis was taken approximately to begin at 21

Table 1.

Word-lists			
proto-tone	*A	*B	*C
cons class			
1	phaa [ cliff ] naa [ thick ]	phaa [ spit ] naa [ custard apple ]	phaa [ cloth ] naa [ face ]
2	paa [ throw ]	paa [ forest ]	paa [ aunt ]
3	( cha?- baa [ hibiscus ]	baa [ shoulder ]	baa [ crazy ]
4	naa [ field ]	naa [ should ]	naa [ aunt ]

msec - 42 msec after onset for voiceless consonants and at 42 msec - 63 msec for voiced consonants. In terms of time-course, the influence of initial consonant in a tone language like Thai (Gandour 1974) and Yoruba (Hombert 1979) has been proved to be around 30 msec for voiceless and 50 msec for voiced consonants as well as sonorants. Beyond this tone onset, the contour remains "stable" for all types of consonant of the same tone. In order to make tones comparable within and between speakers, they were first time-normalised and then Fo-normalised.

### ( ii ) Time-normalisation

Duration was normalised by using a 10% incremental scale. The normalisation calculation was done by first setting the tone domain of each token for 100%, then points of measurement were taken at 0%, 10%, 20%, ..., 100% (total of 11 points). This kind of normalisation of tones was proposed first by Abramson (1962) in his acoustic study of BK Thai tones. Where a required Fo value for a percent-time increment falls between two raw data points, its value is obtained by interpolation between these points.

Fo values of each of the 11 points were subsequently averaged out from about 10 repetitions of each tone for each speaker. As a result, each speaker has a number of tone curves depending on his/her dialect(s), i.e. 5 tone curves for BK, 6 for CM, 7 for SL and

6 for UB. Each of these tones is now comparable in terms of duration but not Fo range. Thus, to make them comparable with respect to their Fo range, they were Fo-normalised.

### ( iii ) Fo-normalisation

For each speaker, Fo normalisation was done by subtracting each of his/her 11 tone points (Fi) away from his/her total Fo average (Ft), dividing by the standard deviation of his/her total tone points (SDt), then converting this to a percentage, viz

$$F_n = \frac{F_i - F_t}{SD_t} \times 100.$$

Fo normalised values obtained above were plotted against normalised time (measurement point) in Figures 3 - 8.

Fo values are given in terms of SD% and on each figure, a reference line is established at the mean Fo (i.e. 0% of SD). Thus, any point that occurs above the mean line (i.e. positive values) indicates that it is uttered at the upper Fo range while those that occur below this line (i.e. negative values) are from the lower Fo range.

The curves are for individuals and are grouped according to tone types within the Bangkok dialect. Generalisations can be drawn about characteristics of each group.

APPENDIX B

Phonemic distributions of BK tones

		smooth syllables		
		*A	*B	*C
initial cons.				
1	/ph/	( R ) [ 235 ]	( L ) [ 221 ]	
2	/p/	( M ) [ 332 ]		
3	/b/			
4	/ph/		( F ) [ 451 ]	( H ) [ 445 ]

Phonemic distributions of UB tones

		smooth syllables		
		*A	*B	*C
initial cons.				
1	/ph/	( R ) [ 235 ]	( H ) [ 443 ]	( L ) [ 221 ]
2	/p/	( M ) [ 232 ]		( MF ) [ 321 ]
3	/b/			
4	/ph/	( HF ) [ 531 ]		

Phonemic distributions of CM tones

		smooth syllables		
		*A	*B	*C
initial cons.				
1	/ph/	( R ) [ 235 ]	( L ) [ 221 ]	( SF ) [ 541 ]
2	/p/			
3	/b/	( M ) [ 333 ]		
4	/ph/		( QF ) [ 521 ]	( H ) [ 454 ]

Phonemic distributions of SL tones

		smooth syllables		
		*A	*B	*C
initial cons.				
1	/ph/	( HR ) [ 455 ]		( H ) [ 444 ]
2	/p/	( R ) [ 234 ]		( M ) [ 333 ]
3	/b/			
4	/ph/	( MF ) [ 431 ]	( L ) [ 221 ]	( LF ) [ 211 ]

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