

TONAL OVERLAPPING: AN INSTRUMENTAL STUDY OF SUPHANBURI THAI

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The Thai language spoken in Thailand consists of four dialects: Central Thai, Northern Thai, Northeastern Thai, and Southern Thai. As the names indicate, these dialects are spoken in the four regions of the country: the central region, the northern region, the northeastern region, and the southern region respectively. The main characteristics that differentiate these dialects are the phonological system and lexical items. In addition, each dialect is further divided into many sub-dialects. These sub-dialects are differentiated mainly by tones. Tonal variation among the Thai dialects and sub-dialects cover the whole range of possibilities: phonetic realization, phonotactic distribution, phonemic systems, and lexical distribution (Wells 1982).

As far as Central Thai is concerned, its sub-dialects are also differentiated almost exclusively by tones. There are three main sub-dialects of Central Thai: western Central Thai, central Central Thai, and eastern Central Thai (Tingsabadh 1985). Western Central Thai is spoken in the provinces to the northwest and southwest of Bangkok, central Central Thai in the provinces around Bangkok, and eastern Central Thai in the provinces along the eastern seaboard. In this study⁽¹⁾ the variety investigated is an accent⁽²⁾ of western Central Thai spoken in Siprachan--a district in Suphanburi province⁽³⁾.

Two wordlists were used in this study. The first consists of about six hundred simple everyday monosyllabic and polysyllabic words. These words appear on the list in semantic groups (e.g. body parts, kinship terms, animals, and plants). To minimize interference from Standard Thai--the interviewer's dialect--the repetition method was avoided. Instead, pictures and/or questions were used to elicit the words on the list from the informant.

The second wordlist--which will be referred to from now on as 'the tone set'--consists of the words /ka¹ kha² kha³ kha⁴ kha⁵ kha⁶/. These words are minimally distinctive by tones except for the word carrying tone 1. This discrepancy is necessary since in this accent tone 1 does not occur with a syllable with an initial aspirated stop. The tone set was prepared after a preliminary analysis was carried out by auditory judgement on the first wordlist. When it was found that this accent has six tones, the tone set was constructed representing all of the tones. Ten tokens of each of the six words were included at random in the wordlist. The words in this list were elicited by a special method. First of all, the informant was taught to recognize a sign for each of the words. The interviewer then showed him a sign at a time according to the order on the prepared wordlist. The informant then said all of the sixty words as prompted. The whole interview including the first and the second wordlists was recorded on tape.

The recording was analyzed at the Linguistics Research Unit in Bangkok. All of the words in the tone set were analyzed together with some of the words in the first wordlist. From the first list, ten syllables were chosen to represent each tone in each of the following six contexts: (a) monosyllabic words; (b) the unstressed syllable of disyllabic words; (c) the prominent-stressed syllable of disyllabic words; (d) the unstressed syllable of three-and-four-syllable words; (e) the stressed syllable of three-and-four-syllable words; and (f) the prominent-stressed syllable of three-and-four-syllable words. In all three hundred and sixty syllables were analyzed⁽⁵⁾.

The instrument used in the analysis was the DSP Sona-Graph Model 5500. The fundamental frequency (F₀) value of each syllable was measured using the stored setup number 05 which presents a wideband spectrogram and a combination display of pitch, amplitude envelope, zero crossing, and waveform⁽⁶⁾. In this study only the

pitch trace was measured. The syllable duration was normalized. Measurement was done at every 10% point of the duration of each syllable. Results were then recorded on the Macintosh computer using the programme EXCEL1.05T. After that a graph was produced for each tone in each context showing both the actual F_0 curves of the ten syllables as well as the average F_0 curve of each tone in each context. Graphs showing just the average F_0 contours of the six tones in all of the contexts (i.e. the tone set and contexts (a)-(f) above) were also produced separately.

The six tones of this accent are as follows (see Figures 1 and 2): tone 1 mid-level, tone 2 upper mid-falling, tone 3 upper mid-rising-falling, tone 4 mid-rising, tone 5 high-delayed falling, and tone 6 mid-falling⁽⁷⁾.

Considering just the average F_0 contours (see Figures 1-7), one finds a certain amount of variation among the realizations of the six tones.

Firstly, variation due to the different contexts studied is evident. The six tones are shown to have different realizations in the tone set (see Figure 1), the ordinary monosyllabic words (see Figure 2), the unstressed syllable of disyllabic words (see Figure 3), the prominent-stressed syllable of disyllabic words (see Figure 4), the unstressed syllable of three-and-four syllable words (see Figure 5), the stressed syllable of three-and-four syllable words (see Figure 6), and the prominent-stressed syllable of three-and-four syllable words (see Figure 7). The graphs show that the shapes of the tonal realizations are influenced by the degree of stress. The weaker the stress, the narrower the rise and the fall in the F_0 contours. It is interesting to note that the realizations of the six tones in the tone set and the ordinary monosyllabic words are quite different from those in the prominent-stressed syllable of disyllabic and three-and-four-syllable words.

Secondly, the pitch range--the interval between the highest pitch and the lowest pitch--of the six tones varies from one context to another. The range is widest (100-160 Hertz) in the monosyllabic words (see Figures 1 and 2) and the prominent-stressed syllable of both disyllabic and three-and-four-syllable words (see Figures 4 and 7). In the unstressed syllable of disyllabic words and the stressed syllable of three-and-four-syllable words (see Figures 3 and 6), the range is between 120 and 155 Hertz. In the unstressed syllable of three-and-four-syllable words (see Figure 5), the range

is the narrowest (125-150 Hertz). Thus, the weaker the stress, the narrower the pitch range. It is noticeable that the high point of the range is not very different among the contexts while the low point of the range clearly differs.

Thirdly, it was found that tonal distinction can vary from one context to another. The tones in question are tone 1 and tone 4, and tone 1 and tone 2. This informant's tone 1 and tone 4 are distinct in the tone set (see Figure 1), the ordinary monosyllabic words (see Figure 2), and the stressed syllable of three-and-four-syllable words (see Figure 6). These two tones are not distinct in the unstressed syllable of disyllabic words (see Figure 3), the prominent-stressed syllable of disyllabic words (see Figure 4), and the prominent-stressed syllable of three-and-four-syllable words (see Figure 7). In the case of tone 1 and tone 2, they are distinct in all of the contexts except in the unstressed syllable of three-and-four-syllable words (see Figure 5).

Up to this point only the average F_0 contours were considered. In this study graphs showing the F_0 contours of every syllable analyzed as well as the average F_0 contour were produced for each tone in each context (i.e. the tone set and the contexts (a)-(f) mentioned above). In this paper only the graphs of tone 3 in all of the contexts are shown (see Figures 8-13). The graphs showing the F_0 contours of every syllable analyzed--which will be called from now on 'the detailed graphs'--give us some interesting insights into the nature of tonal realizations.

Firstly, the detailed graphs show that the average F_0 contours leave out information known in auditory studies as 'allophones'. It is shown in the detailed graphs that each of the tones is realized differently even within the same context. In Figure 9, for example, tone 3 has four allophones: the one with a distinct rise and a distinct fall, the one with a moderate rise and a moderate fall, the one with a moderate rise and a distinct fall, and the one which is relatively level.

Secondly, in the two types of monosyllabic words used in this study--the tone set and the ordinary monosyllabic words--the tones are often realized differently. In the tone set, there is considerable uniformity in the realizations of tones (see Figure 8). On the other hand, in the ordinary monosyllabic words, a variety of patterns appear (see Figure 9). This shows that elicitation techniques have a great deal of influence on the way tones are realized.