Tones in Standard Thai Connected Speech[1]

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INTRODUCTION

The five tones of Standard Thai—mid, low, falling, high, and rising—have been studied for many decades from several different angles. As far as instrumental studies are concerned, the tones were first analysed in the context of monosyllabic words spoken in isolation (Bradley, 1911; Abramson, 1962; Erickson, 1974). Later tones on longer utterances were analysed to address the issues of coarticulation (Abramson, 1979; Gandour, Potisuk, & Dechongkit, 1994) and tonal representation (Gandour, 1975). There was also a study analysing the five tones in unstressed syllables in disyllabic words spoken in isolation (Phinicharom, 1991), and there were sociolinguistic studies to correlate variation in tonal realization with speakers' age groups (Arunreung, 1990; Panroj, 1991).

In the studies mentioned above, Standard Thai was chosen because it is the official variety of Thai "spoken by educated speakers in every part of Thailand, used in news broadcasts on radio and television, taught in school, and described in grammar books and dictionaries" (Tingsabadh & Abramson, 1993). In this study we have a different reason for choosing Standard Thai. We are interested in tonal variation among the sub-dialects of Central Thai, a number of which have been analysed (Tingsabadh, 1980, 1990; Debavalya, 1983; Ratanadilok Na Phuket, 1983; Malaichalern, 1988; Nualjansaeng, 1992; Banditkul, 1993; Pornsib, 1994; Krisnapan, 1995). Although from the sociolinguistic point of view Standard Thai has a different status from that of Central Thai, it can be classified as Central Thai on the basis of its tone system and its pattern of tone splits (Gedney, 1972; Brown, 1965). Consequently, we decided to turn our attention to Standard Thai. There are two main objectives in this study: to add tonal realizations of Standard Thai to our set of results, and to test the methodology that we have developed so far.

Tones of Thai dialects have been investigated since the 1950s (Miller, 1956; Chantavibulya, 1956; Haas, 1958). Up to recently, most of the studies analysed tones auditorily and their data were limited to monosyllabic words spoken in isolation (i.e., citation forms) (Pudhitanakul, 1979; Withayasakphan, 1979; Ngourungsi, 1980; Debavalya, 1983). The methodology that we now use concentrates on instrumental analysis, and our data come mainly from connected speech. We do include a set of words minimally distinguished by tone (i.e, a tone set) in our data, as we have come to believe that the tonal realizations in these words are the base forms of the tones (Tingsabadh & Krisnapan, 1992).

In the connected speech material we analyse both stressed and unstressed syllables in monosyllabic, disyllabic, and polysyllabic words. The methodology has been developed during the past six years (Tingsabadh, 1990; Tingsabadh & Krisnapan, 1992; Krisnapan, 1995). Several previous studies of tone have influenced the outcome of this methodology (Abramson, 1962; Tingsabadh, 1980; Ratanadilok Na Phuket, 1983; Malaichalern, 1988; Chinchest, 1989; Panroj, 1991).

Professor Vichin Panupong has played an important role in Thai dialectology beginning with her pioneering study of the Songkhla dialect (Chantavibulya, 1956). Our study is a part of a project investigating tonal variation in Central Thai, so we feel that it is appropriate to present this paper in her honour.

METHOD

Informant

The informant is a thirty-three-year-old educated male speaker of Standard Thai. This study selected him as its informant because he had been invited by the Thai Department, Faculty of Arts, Chulalongkorn University to record passages as their listening tests.

Data

The data in this study consist of two parts: the tone set /khaa^1, khaa^2, khaa^3, khaa^4, khaa^5/, and stressed and unstressed syllables in monosyllabic, disyllabic, and polysyllabic words that occur in connected speech. Five tokens are used for each tone in each context (see Table 1). Altogether 175 tokens were analysed.

The tone set was included to obtain tonal realizations in citation form. A word list was prepared consisting of the five tokens of every word listed at random. The informant was asked to read the list with a short gap between words. To obtain the connected speech data, the informant was asked to read five passages totalling approximately 5000 words at normal (i.e., medium-fast) speed.

Table 1. *Tokens for Each Tone in the Data According to Types of Speech, Degrees of Stress, and Number of Syllables per Word*

		Monosyllabic Word	Disyllabic Word	Polysyllabic Word
Connected speech	Stressed	5	5	5
	Unstressed	5	5	5
Citation form		5		

Analysis

The analysis in this study consists of two steps. The first uses auditory judgment to analyse the connected speech data into pause-defined units (PDUs)—the stretches of speech beginning and ending with a pause without any pause in between, and to identify stressed and unstressed syllables. Five syllables for each tone in each context (see Table 1) were selected from the middle section of the PDUs.

The second step involves instrumental analysis. The WINCECIL speech analysis system developed by the Summer Institute of Linguistics (SIL), run on a PC microcomputer, was used to find the F_0 curve of each token. Normalization of duration was made by measuring at every 10th percentage point along the time axis of each raw curve. The F_0 values of the five curves of each tone in each context were averaged. Line graphs showing the averaged F_0 of each tone in all contexts (Figures 1–5) and the averaged F_0 curves of the five tones in each context (Figures 6–12) were produced.

RESULTS

Each Tone in All Contexts

Figures 1–3 show that the realizations of the level tones—mid, low, and high—are similar both in citation form (CF) and in the six contexts of connected speech: stressed syllable in monosyllabic word (Sd1Syl), unstressed syllable in monosyllabic word (Usd1Syl), stressed syllable in disyllabic word (Sd2Syl), unstressed syllable in disyllabic word (Usd2Syl), stressed syllable in polysyllabic word (Sd34Syl), and unstressed syllable in polysyllabic word (Usd34Syl).
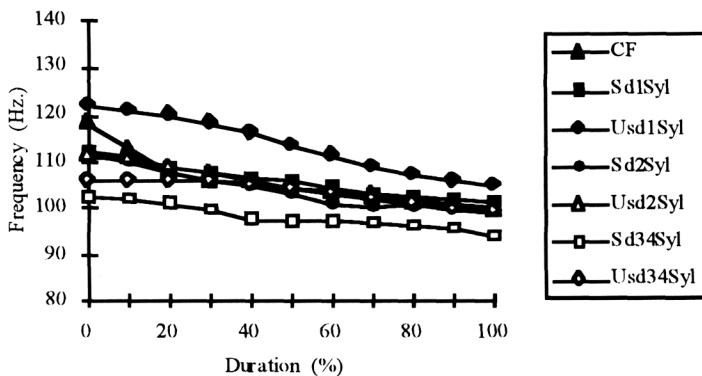

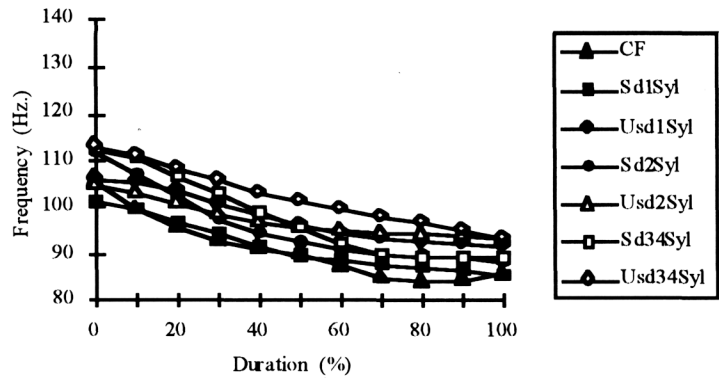Figure 1. Standard Thai mid tone in citation form and six contexts in connected speech.

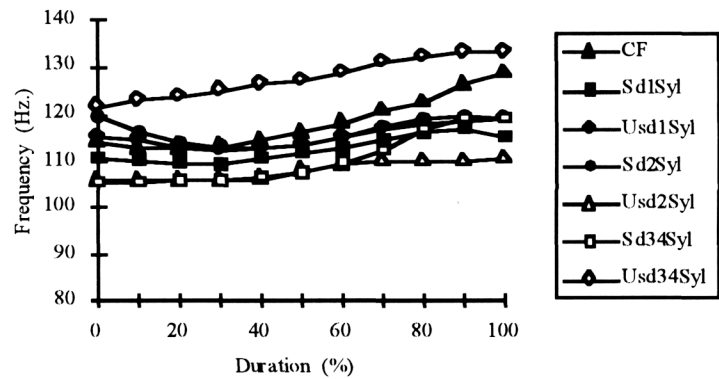Figure 2. Standard Thai Low Tone in citation form and six contexts in connected speech.

Figure 3. Standard Thai high tone in citation form and six contexts in connected speech.

A different situation is found in the case of the contour tones: the falling tone (Figure 4) and the rising tone (Figure 5). Their distinct fall and rise, which appear in citation form, disappear in connected speech.
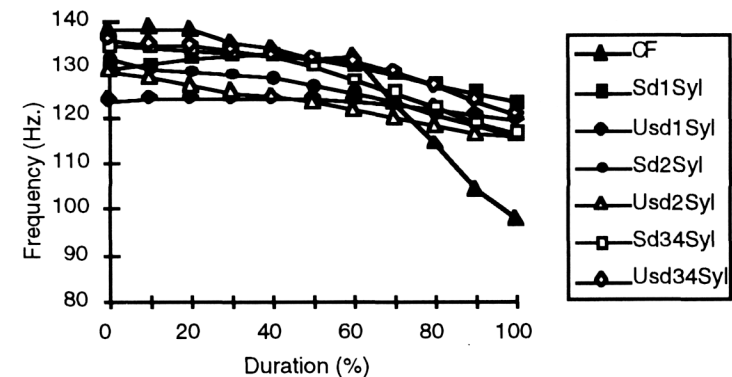

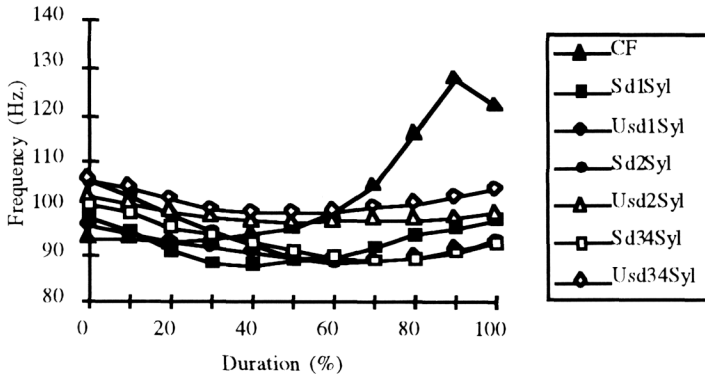Figure 4. Standard Thai falling tone in citation form and six contexts in connected speech.

Figure 5. Standard Thai rising tone in citation form and six contexts in connected speech.

Phinicharom (1991) found the same modification of the falling and the rising tones when she investigated tonal realizations of Standard Thai tones in unstressed syllables of disyllabic words spoken in isolation. Our study shows that in connected speech both tones lose their fall and their rise respectively in every context even if the syllable is stressed. In addition, our finding partially contradicts the results of another study (Gandour, 1975). We agree with Gandour's conclusion that "the FALLING and RISING contour tones do not neutralize to MID level tone" (p.177), but we disagree with his conclusion that the two tones "simply become progressively shorter in shorter stretches of time." As mentioned above, this study finds that the shapes of the two tones are modified in connected speech. The discrepancy between the two studies can be explained by the use of "systematically controlled sentence frames" in Gandour (1975) and the use of read passages in this study.   See SWLP 95 p. 391

Comparing Figures 3 and 4, one sees that the falling tone looks more like a high tone, its realizations occupying the topmost slot in the tone space. In shape the falling tone in connected speech (Figure 4) looks very similar to the mid tone (Figure 1), but in height the two tones are quite distinct; the falling tone is higher than the mid tone.

As for the high tone (Figure 3), its realizations in connected speech clearly differ from the other four tones. It becomes the only rising tone in the set beginning its rise at the middle of the tone space.

The rising tone (Figure 5) with its non-rising realizations in connected speech becomes similar to the low tone. The realizations of the two tones begin at the same height and slide down during the first half. Their difference comes during the second half where the low tone continues to slide down, while the rising tone slides up a little.

All Tones in Each Context

Figures 6–12 show that the tonal realizations in citation form (Figure 6) are similar to those in one context in connected speech, stressed syllable in monosyllabic word (Figure 7). However, even in this case, the two contexts yield distinct realizations due mainly to the falling and the rising tones. The tonal realizations in the other contexts of connected speech are quite different from those in citation form. Krisnapan (1995) found the same result in Phetchaburi Thai.
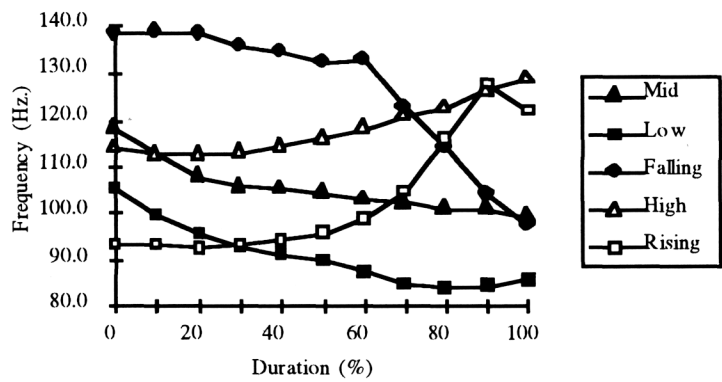
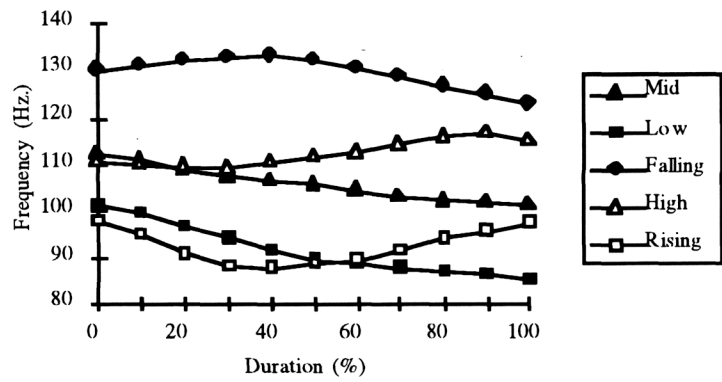Figure 6. Standard Thai tones in citation form.

Figure 7. Standard Thai tones in connected speech: stressed syllable in monosyllabic word.
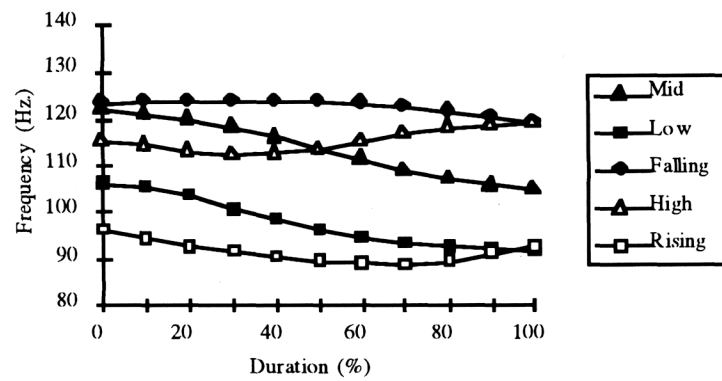

Figure 8. Standard Thai tones in connected speech: stressed syllable in monosyllabic word
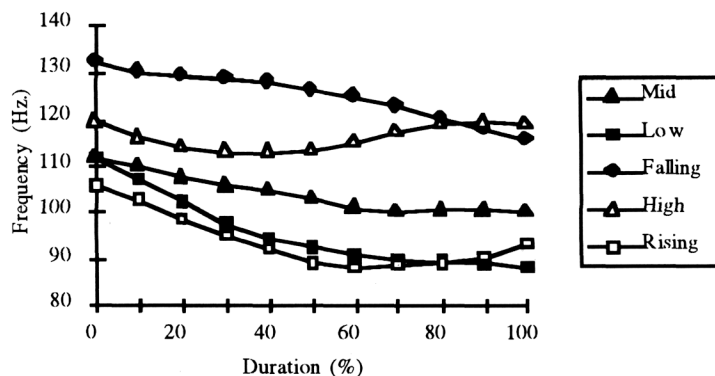
Figure 9. Standard Thai tones in connected speech: stressed syllable in disyllabic word.
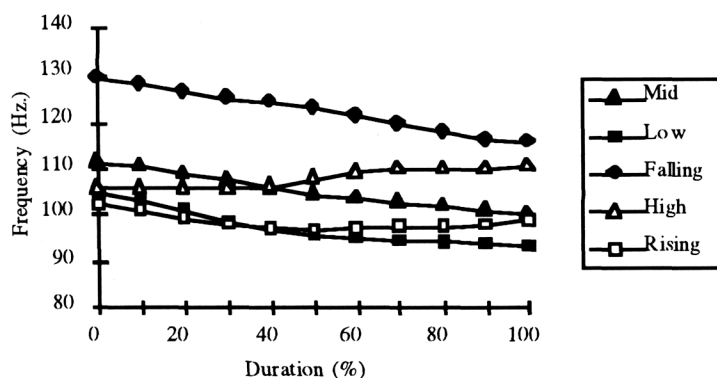

Figure 10. Standard Thai tones in connected speech: unstressed syllable in disyllabic word.
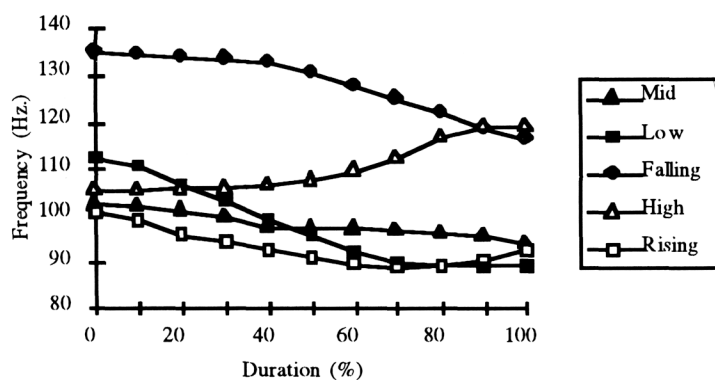

Figure 11. Standard Thai tones in connected speech: stressed syllable in polysyllabic word.
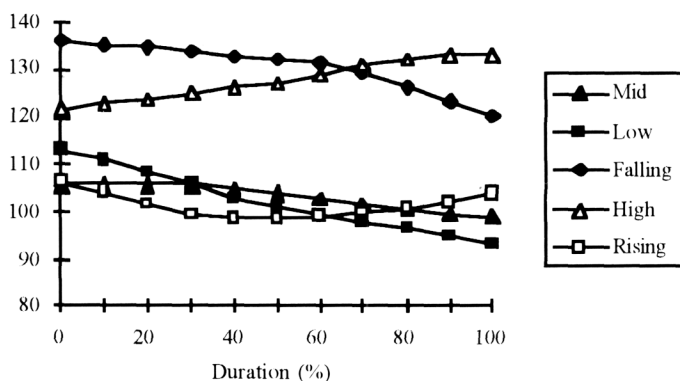
Figure 12. Standard Thai tones in connected speech: unstressed syllable in polysyllabic word.

As far as the tones in citation form are concerned, the F_0 curves obtained in this study (Figure 6) are similar to those in the studies by Abramson (1962) and Erickson (1974). In our study the rising tone has a slight fall at the end. This has not been reported in the other studies and may be a personal trait of our informant. It is interesting to note that the high tone does not have any fall at the end. This characteristic is a modern realization of this tone (Panroj, 1991). The falling tone of this informant, on the other hand, has a steep gradient at the end. This characteristic is no longer a widespread feature among the younger generation (Arunreung, 1990; Panroj, 1991).

Among the six contexts in connected speech (Figures 7–12), the number of syllables per word clearly influences the relationship among the mid, the low, and the rising tones. They come closer together when there are more syllables per word. The degree of stress also has some influence on the tones; their realizations are straighter in unstressed syllables. It should be noted that while Figures 7–12 show the same duration for stressed and unstressed syllables, in speech unstressed syllables are shorter than stressed syllables.

The relationship among the five tones in disyllabic and polysyllabic words (Figures 9–12), either in stressed syllable or in unstressed syllable, differs from what we have found in the Central Thai sub-dialects (Tingsabadh & Krisnapan, 1992; Krisnapan, 1995). In this study, the falling tone remains high and the high tone has a clear rise in all four contexts. In Suphanburi Thai and Phetchaburi Thai, however, the height and the shape of both tones become very similar to those of the other tones in these contexts. Since the speech of just one speaker was analysed in this study, it is not possible to say whether the discrepancy is one feature that differentiates Standard Thai from the Central Thai sub-dialects. Further investigation is required in this matter.

The relationship between the mid tone and the low tone varies from context to context in this study. Figures 6–8 show that both in citation forms and in monosyllabic words in connected speech, the two tones are similar in shape but quite distinct in height throughout the whole syllable. In disyllabic words in connected speech (Figures 9–10) they move closer together, but the mid tone is still a little higher than the low tone throughout the syllable. In polysyllabic words in connected speech, however, the two tones crisscross (Figures 11–12), the low tone starting a little higher than the mid and ending a little lower than the mid. The results suggest that the mid and the low tones

may not be distinct in disyllabic and polysyllabic words in connected speech either in stressed or unstressed positions. In a perception study of Standard Thai tones in citation form, Abramson (1976, p.9) found that "the two Thai tones that are most vulnerable to confusion are the mid and the low tones." This study shows that it should be very difficult to distinguish the two tones in connected speech.

CONCLUSION

This study shows how Standard Thai tones are realized in the two main contexts, citation form and connected speech. The results confirm that tones are realized differently in these two contexts and the relationship among the tones varies from context to context. The study also shows that the degree of stress and the number of syllables per word influence the way tones are realized both in pitch height and pitch shape.

The results in this study have come from just one speaker. It is necessary to analyse the speech of a few more Standard Thai speakers to comfirm our findings. Spontaneous speech obtained from unrehearsed conversation will be the object of a future study. The methodology used in this study, which has been developed from that used in Krisnapan (1995), seems to yield satisfactory results which should provide us with a reasonably good picture of tonal variation among the sub-dialects of Central Thai, as well as those of the other Thai dialects.

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