

Modeling Diachronic Change in the Thai Tonal Space

The Bangkok dialect of Thai contrasts five tones, traditionally transcribed as high, mid, low, falling, and rising (Table 1). The phonetic implementation of the pitch contours, however, is more complicated than the phonological labels imply, as shown in Figure 1 (Abramson 1962) and Figure 2 (Morén & Zsiga 2006). The “high” tone is actually mid-rising, the “falling” tone has a rise-fall contour, and the “rising” tone has a fall-rise contour. Figures 1 and 2 also illustrate a diachronic change in the realization of some of the contours, particularly for the **rising** tone. Figure 1 is based on the speech of two older males recorded in the 1950’s (Abramson 1962). Figure 2 shows contours for identical lexical items as spoken by a younger female in 2004 (Morén & Zsiga 2006). In the graph from 1962, pitch in the rising tone rises from the bottom of the range early in the syllable to the top of the range at syllable endpoint. In the graph from 2006, the “rise” of the rising tone is implemented only late in the syllable, and the endpoint is no higher than the endpoint of the mid tone. Such curtailment in the offset of the rising tone (and in connected speech, the falling tone as well) are also documented in Potisuk et al. (1997) and Nitisaroj (2006), particularly in the speech of younger women. Additional variability in the shape of the high tone, in whether its upward curve is convex (Figure 1) or concave (Figure 2) is reported in Gandour et al. (1991).

Concomitant with the change in the production of the rising tone has been a change in perception. In a perception experiment using synthesized speech, Abramson (1978) played to Thai listeners monosyllabic tokens with straight-line pitch trajectories across the syllable. A steeply rising trajectory, from the bottom of the pitch range at syllable onset to the top of the pitch range at syllable offset, was identified as a lexical item with a rising tone (that is, as “thick” or “leg”) in 90% of presentations. Abramson concludes that “abrupt” pitch change is the principle cue to the rising tone in Thai. In a partial replication and extension of Abramson’s experiment by Zsiga & Nitisaroj (in press), the same steeply rising trajectory was identified with the lexical item bearing the rising tone (“thick”) in only 5% of presentations; 85% of the time, this trajectory was identified with the high tone item (“aunt”). Zsiga & Nitisaroj found that, consistent with the contour illustrated in Figure 2, the only tokens reliably identified as “rising” were those in which the pitch contour reached the bottom of the range at or near syllable midpoint. This low point is the crucial perceptual cue: any actual rise is optional in citation form and prohibited in connected speech.

How can such a drastic change have taken place over 30 years, such that the principle perceptual requirement for “rising” tones is that they stay low? The change can be understood only in the context of an abstract phonological representation, specifically, an autosegmental representation in which contour tones are compositional, and the mora is the tone-bearing unit in Thai (Figure 3, based on Morén & Zsiga 2006). This representation has implications for both production and perception. In production, pitch targets are realized as inflection points aligned with moras. The high tone is defined as reaching a high pitch target late in the syllable: the path to that target, concave or convex, can vary. The rising tone has two pitch targets: low at syllable midpoint (right edge of first mora), high at syllable endpoint (right edge of second mora). Being separately specified, the two targets can vary independently.

The diachronic change in Thai plausibly began as phonetic reduction driven by simplification of complex contours. Rises, being harder to implement (Xu 1999) are affected to a greater extent than falls, and the tone associated to the second (weaker, less sonorant) mora is preferentially affected. As final rises are curtailed, “abrupt pitch change” becomes a less reliable cue to the rising tone, and attention shifts to the other phonologically-specified target, the L associated to the first mora. This shift may then drive further reduction of the final rise, as it loses perceptual importance. Eventually, phonetic reduction of the pitch range is phonologized as deletion of the tonal autosegment. With moraic association, however, the contrast between the rising tone (L on the first mora) and the low tone (L on the second mora) is not lost.

Viewed through the lens of an abstract phonological representation, the diachronic change can be understood as a shift in perceptual importance from one phonologically specified target to another. Without reference to such a representation, the reversal in perception of rising trajectories makes no sense. This research thus supports the importance of abstract phonological representations in constraining the targets and outcomes of diachronic change in both perception and production (Klarsen 2006).

Table 1. Five-way tonal contrast in Thai.

high	mid	low	falling	rising
ná: aunt	na: rice field	nà: custard apple	nâ: face	nǎ: thick
k ^h á: to trade	k ^h a: to be stuck	k ^h à: galangal (a spice)	k ^h â: value	k ^h ǎ: leg

Figure 1. Thai tonal contours in citation form, from Abramson 1962.

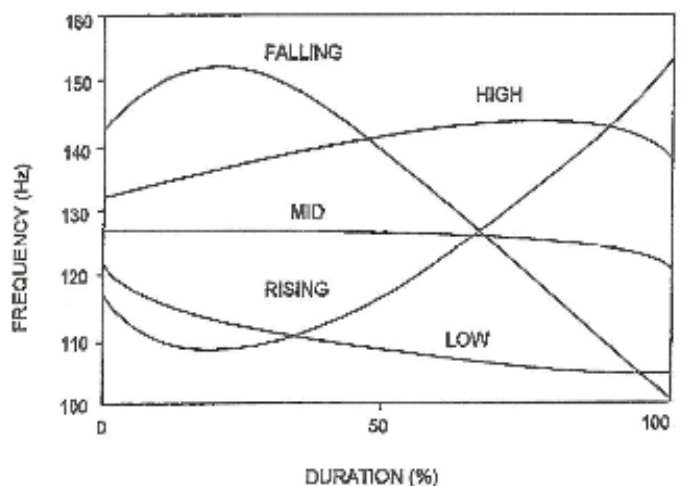


Figure 2. Thai tonal contours in citation form, from Morén & Zsiga 2006.

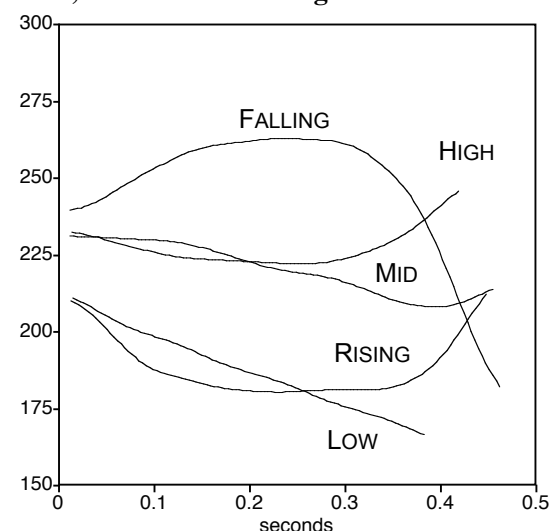


Figure 3. Moraic representation of Thai tonal contrasts.

<u>Mid</u>	<u>High</u>	<u>Low</u>	<u>Falling</u>	<u>Rising</u>
	H	L	H (L)	L (H)
μ μ	μ μ	μ μ	μ μ	μ μ

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