Teochow Tone Sandhi and the Representation of Tone

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1. The Issue

In his definitive work on tone, Pike (1948) recognizes two tonal systems as typologically distinct: contour tone system typical of Asian languages and terraced-level tone system typical of African languages. Although Pike’s typological distinction is descriptively uncontroversial, the phonological representation of tone remains a controversial issue in phonological theorizing. At the core of the controversy is the theoretical status of tonal contour, on which there are roughly two views: the Aficanist position treats contour as derivative, and the Asianist position treats contour as basic. This controversy precedes the development of autosegmental phonology. In the spirit of distinctive feature theories, Wang (1967) postulates contour features such as [rise] and [fall] as primitives in his feature system, whereas Woo (1969) recognizes only level features such as [high] and [low], and derives contour tones through the concatenation of level tones.


* I benefited from discussion with Dr Lim Buan Chay in the process of writing this paper. Errors of fact or interpretation are my own.
Teochow Tone Sandhi

shape of words can be characterized in terms of H, M, and L,¹ and contour tones are mere concatenation of level tones, as exemplified by the data from Margi (Williams 1971/1976:464):

(1) a. bdle + na $\rightarrow$ bdłè-ná ‘to forget’

b. bdle + na $\rightarrow$ bdle + na
\[
\begin{array}{c|c|c}
\text{L} & \text{H} \\
\end{array}
\]

The verb bdle surfaces with the rising tone in isolation; when it is suffixed with the toneless suffix na, bdle surfaces with the low tone, and na with the high tone. This kind of behavior can be understood if the rising tone is concatenated of L and H, as shown in (1b). It is clear from the autosegmental analysis of many African tonal systems that tonal contour is an epiphenomenon. Like the rising tone of Margi, contour tones are represented as concatenations of level tones, and there is no theoretical significance whatsoever to tonal contour. This is the central thesis of the Africanist viewpoint.

The phonological behavior of contour tones in Asian languages is, however, markedly different from that shown in (1), so is the Africanist position on the representation of tonal contour. Most linguists in traditional Chinese linguistics circle recognize register and contour as two essential components of tone (cf. Luo and Wang 1957, Wu 1984), either implicitly or explicitly. In fact, traditional notions such as yin and yang, and tone labels such as ping ‘even’, shang ‘rising’, qu ‘departing’ and ru ‘entering’, are related to register and contour. The exact meanings of the tone labels ping, shang, qu and ru are obscure, and modern dialect data are not illuminating in this respect; but almost certainly the tones are labeled in accordance with their contour (Wang 1980:102). Our knowledge of yin and yang

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¹ In accordance with common practice, I use H for high tone, M for mid tone and L for low tone.
is more certain. Simplifying matters somewhat, *yin* tones, which are high-registered, co-occur with voiceless consonants, whereas *yang* tones, which are low-registered, co-occur with voiced consonants. Due to historical change modern Chinese dialects show varied tone-consonant correspondence, but in some Wu dialects where voicing is contrastive among consonants, the correspondence is quite good, as is dramatically demonstrated by the tone inventory of Songjiang, near Shanghai (*Jiangsu... 1960*).\(^2\)

(2)\(^2\)

<table>
<thead>
<tr>
<th></th>
<th>ping</th>
<th>shang</th>
<th>qu</th>
<th>ru</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>53</td>
<td>44</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>b.</td>
<td>31</td>
<td>22</td>
<td>13</td>
<td>3</td>
</tr>
</tbody>
</table>

Examples:

<table>
<thead>
<tr>
<th>53</th>
<th>ti</th>
<th>low</th>
<th>31</th>
<th>di</th>
<th>lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>t'i</td>
<td>ladder</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>ti</td>
<td>bottom</td>
<td>22</td>
<td>di</td>
<td>brother</td>
</tr>
<tr>
<td>t'i</td>
<td>body</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>ti</td>
<td>emperor</td>
<td>13</td>
<td>di</td>
<td>field</td>
</tr>
<tr>
<td>t'i</td>
<td>tear</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>pa?</td>
<td>hundred</td>
<td>3</td>
<td>ba?</td>
<td>white</td>
</tr>
<tr>
<td>p'a?</td>
<td>tap</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The interaction between tones and consonants in syllable-initial position illustrated in (2) can be understood in physiological terms. It plays an important role in tonogenesis in languages such as Vietnamese (*Haudricourt 1954, Halle and Stevens 1973, Matisoff 1973*).


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\(^2\) The numbers represent pitch height, with 5 being the highest, 1 the lowest. Contour is indicated by the two numbers: 44 is a high level tone; 53 is a high falling tone, and so on.
common tone sandhi process is the famous Tone 3 Rule of Mandarin, exemplified in (3) (Cheng 1973):

(3) mai ma ‘to buy horses’
     315 315 → 35 315

As shown above, the tone 315, classified as Tone 3 in the Pinyin system, changes to 35 (Tone 2) if followed by another 315. This type of tone sandhi is typical of Chinese, but not of African languages. ³

The descriptive difference in tonal behavior between the Africanist tone system and the Asianist tone system is pretty well established, and serves as the empirical source for the analytical controversy surrounding the representation of contour. This controversy assumes a peculiar form in recent phonological research. With a richer representational repertoire than is available under classical, SPE-compatible phonological theories, nonlinear phonology allows more possibilities in representing tonal contour. A high rising tone, for instance, can be represented as follows (tbu: tone-bearing unit; u: upper; rd: raised; t: tone; r: register; c: contour):

³ The distinction between Africanist and Asianist tone systems is a descriptive convenience, and there is bound to be some overlap between the two systems. Upon careful analysis Margi-type tone sandhi can be found in some Wu dialects such as Shanghai (Zee and Maddieson 1979, Selkirk and Shen 1990), and Tibetan dialects as well (Hu 1982, Duanmu 1992, Edmondson et al 1995, and references cited therein). Among African languages there are sandhi processes which crucially depend on tonal contour, see Newman (1986).