

On the Phonological Representation of Contour Tones

Jackson T. Gandour*
Bell Laboratories, Murray Hill, N.J.

Victoria A. Fromkin
University of California, Los Angeles

In the study of tone in generative phonology, there has been much discussion as to whether contour tones should be represented phonologically as single indivisible units or as sequences of level tones. Some generative phonologists (e.g. Wang 1967) allow unit-contour tone features on the phonological level of representation, while others (e.g. Woo 1969) disallow them. In this brief paper, we will discuss a case of tonal alternation in Lue (data from Li 1964), a Tai dialect spoken in the southern part of Yunnan province, China. It will be shown that unit-contour tone features not only provide for a simpler solution but also a more insightful one.

According to Li, Lue has six phonemic tones, one of which has two alternate phonetic realizations: 1. 55 'high level', 2. 31 'falling', 3. 35 'high-rising', 4. 33 'mid level', 5. 13 'low rising' or 11 'low level', 6. 22 'mid-low level'. The examples in (1) illustrate the distributional restrictions of the alternant phonetic realizations of tone 5.

- (1) xa¹³ ## 'to kill'
 xa¹³ pet⁵⁵ 'to kill a duck'
 xa¹³ nok³³ 'to kill a bird'
 xa¹¹ kun³¹ 'to kill a person'
 xa¹¹ kay³⁵ 'to kill a chicken'

The low tone occurs before the falling tone (31) and high-rising tone (35); the low-rising tone occurs elsewhere. Since the low-rising tone occurs in more environments, no matter how one chooses to represent the contour tones, the rule for handling the tonal alternation will be stated more simply if the low-rising tone is taken as underlying, the low level tone as derived.

Using Woo's set of tone features, in which contour tones are represented as sequences of level tones, one possible specification of the seven phonetic tones is as given in (2).

- (2)
- | | 55 | 31 | 35 | 33 | 22 | 11 | 13 |
|--------|----|----|----|----|----|----|----|
| HIGH | ++ | -- | -+ | -- | -- | -- | -- |
| LOW | -- | -+ | -- | -- | ++ | ++ | +- |
| MODIFY | -- | -- | -- | -- | ++ | -- | -- |

The rule to derive the low tone from the low-rising tone can then be stated as in (3).

$$(3) [-\text{LOW}] \rightarrow [+ \text{LOW}] / [+ \text{LOW}] \text{ ______ } [-\text{LOW}] \left\{ \begin{array}{l} [+ \text{HIGH}] \\ [+ \text{LOW}] \end{array} \right\}$$

As indicated by its structural description, this rule says that the low-rising tone (13) changes to a low level tone (11) when preceded by a low tone and followed by a non-low tone and either a high tone or low tone. The complexity and phonetic implausibility of this rule obscures the simple tonal process underlying this alternation.

Using Wang's set of tone features, in which contour tones are represented as unit wholes, the seven phonetic tones may be specified as given in (4).

(4)	55	31	35	33	22	11	13
HIGH	+	-	+	-	-	-	-
CENTRAL	-	-	-	+	+	-	-
MID	-	-	-	+	-	-	-
RISING	-	-	+	-	-	-	+
CONTOUR	-	+	+	-	-	-	+

The rule for handling the tonal alternation can then be stated as (5).

$$(5) \left[\begin{array}{l} -\text{HIGH} \\ +\text{RISING} \end{array} \right] \rightarrow \left[\begin{array}{l} -\text{RISING} \\ -\text{CONTOUR} \end{array} \right] / \text{ ______ } [+ \text{CONTOUR}]$$

This rule says that a low-rising contour tone changes to a low level tone when immediately preceding other contour tones. This particular tonal alternation, we would like to suggest, is an instance of a more general process of tonal dissimilation. The result of this dissimilatory process is the simplification of a contour tone in non-final position. The simplicity and phonetic naturalness of this process is neatly captured in a rule formulated with contour tone features.

These particular features or feature specifications, of course, are not the only ones to choose from. We do claim, however, that unless contour tone features are used in its structural description, the rule for handling this tonal alternation in Lue would be unduly complex, obscuring the simple tonal dissimilation which is revealed in rule (5).

* Postdoctoral Fellow.

- Li, F. K. 1964. The phonemic structure of the Tai Lü language. *Bulletin of the Institute of History and Philology, Academia Sinica* 35:7-14.
- Wang, W. S-Y. 1967. Phonological features of tone. *International Journal of American Linguistics* 33.2:93-104.
- Woo, N. 1969. Prosody and phonology. MIT doctoral dissertation. Available from Indiana University Linguistics Club.