Key words: Mandarin, third tone sandhi, toneme deletion, Optimality Theory

THIRD TONE PATTERNS IN MANDARIN CHINESE: A NEW PERSPECTIVE

1. THE PROBLEM Though a well-studied phenomenon, Mandarin Chinese third tone sandhi (T3S), in which the first of two adjacent third tones (T3) is realized as a second tone (T2), has been somewhat of a theoretical thorn. Traditionally represented as the rule "3 → 2 / __ 3", a categorical tone change from the low-dipping T3 to the high-rising T2, most analyses of T3S are derivational in nature (e.g. Duanmu 2000, Chen 2000, Xu 2001). In strings of adjacent T3s, sandhi is claimed to arise cyclically. Non-derivational accounts quickly run into problems as they are often based on ad-hoc constraints and dubious assumptions regarding the prosodic domains in which T3S applies. The current paper proposes a non-derivational OT account rooted in a toneme deletion analysis which appeals to well-established principles of tonal markedness and their interaction with the Obligatory Contour Principle (OCP).

2. THE APPROACH Our analysis departs from existing accounts in a number of non-trivial respects and brings several new empirical discoveries to light based on fieldwork with several native speakers and careful phonetic analysis. Rather than assuming that T3 is underlyingly low (cf. Yip 2000), we follow Lin (1993), Chen (2000), and Yin (2003) in arguing that the underlying form of T3 is its complex citation form, consisting of three tonemes: /M(id), L(ow), H(igh)/. We furthermore propose that T3S is a more general phenomenon than typically assumed and as such is realized in two different ways. Before another T3 in the same prosodic domain, the underlying MLH (T3) changes to MH (T2) via deletion of the L toneme. The result is canonical T3S. Elsewhere, MLH changes to ML via deletion of the H toneme, an instance of so-called "half T3S". Ultimately then, the only environment where the full underlying T3 contour surfaces, other than citation form, is a position of prosodic prominence. In other words, T3-bearing syllables in prominent positions do not undergo sandhi, a fact that to the best of our knowledge has been largely overlooked or ignored in both the descriptive and theoretical literature.

3. THE ANALYSIS Our analysis is structured around the following proposals and is supported empirically by pitch track data from a variety of speakers.

i) Sequences of two non-prominent T3s are accounted for with seven general well-motivated constraints: ***COMPLEX CONTOUR**, which forces reduction of three-toneme contours like that of T3 >> **MAX-T**, which protects tonemes from deletion otherwise >> both ***BOUNDARY RISE**, which militates against a tonal rise at the end of a prosodic domain (see Zhang's (2007) ***RISE FINAL**) and **OCP (TONE)**, which prevents toneme deletion from yielding a sequence of identical adjacent surface tonemes within a prosodic domain >> {***H >> *L >> *M**}, a cross-linguistically motivated hierarchy of tonal markedness constraints (Pulleyblank 1986, Akinlabi 1997) which ensures that H-tonemes are more susceptible to deletion than L-tonemes, and that M-tonemes are the least likely to delete. Both canonical and half T3S emerge as natural consequences under this ranking (see (1)).

ii) In order to account for sequences of three or more T3s, it is necessary to factor in the prosodic structure of an utterance. Following Shi (1986), Chen (2000), and Duanmu (2004) among others, we assume that the basic prosodic structure of an utterance maps onto its syntactic structure. Given the prosodic domains shown in (2a), demarcated by parentheses (as in three-word utterances like (*Li*)(*mai jiu*) 'Li buys wine'), we appeal once again to the positional markedness constraint ***BOUNDARY RISE**. When ranked below the faithfulness constraint **MAX-T** and above the general tonal markedness constraints, ***BOUNDARY RISE** ensures that a rise at the end of a domain is only allowed in two-toneme contours that consist of a rise underlyingly, like the Mandarin T2, but crucially not T3. See the tableau and pitch track data in (2).

iii) Utterances that include prosodically prominent syllables also behave as predicted by our grammar. Consider the oft-cited five-word example in (3). We propose that the full underlying contour of prominent T3-bearing syllables is preserved in cases such as these due to an undominated positional faithfulness constraint: **MAX-T (σ́)**, which guards against toneme deletion in prosodically prominent positions. The surface tone patterns reported in (3) arise naturally as a consequence of the constraint ranking previously motivated. This is of empirical significance because in both the descriptive and the theoretical literature, the reported T3 patterns do not correspond to the facts in the data we elicited, factoring out variation caused by differences in speech rate. To the extent that our grammar makes clear predictions about the distribution of T3s, our theory is falsifiable. And to the extent that these predictions are borne out in the speech patterns of the native speakers we interviewed, our analysis is both conceptually credible and descriptively adequate.

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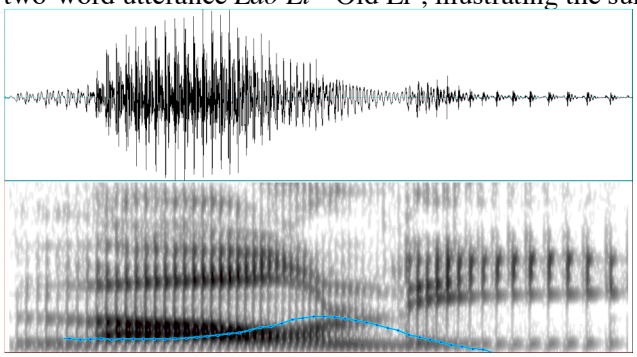
(1) a. Tableau deriving canonical and half T3S in a two-word utterance:

/(MLH MLH)/	*COMPLEX CONTOUR	MAX-T	*BOUNDARY RISE	OCP (TONE)	*H	*L	*M
a. (MLH MLH)	*!*		*	*	**	**	**
b. (MH M)		***!			*		**
c. (ML MH)		**	*!		*	*	**
d. (ML ML)		**		*!		**	**
e. (LH ML)		**			*	**!	*
f. ☞(MH ML)		**			*	*	**

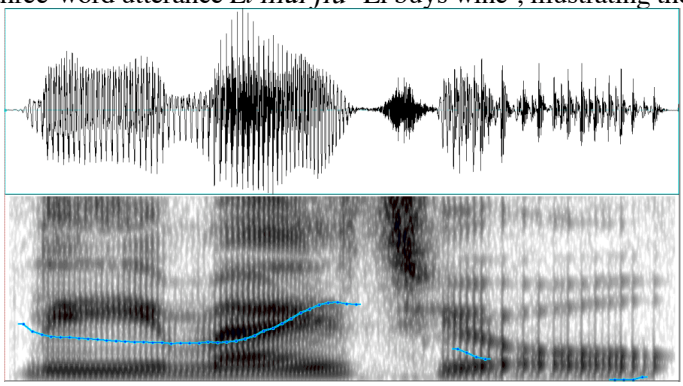
b. Pitch track for the two-word utterance *Lǎo Lǐ* 'Old Li', illustrating the surface output in (1a):



(2) a. Tableau deriving the tonal pattern in a three-word utterance with $[N]_{NP}$ $[V\ NP]_{VP}$ syntax:

/(MLH) (MLH MLH)/	*COMPLEX CONTOUR	MAX-T	*BOUNDARY RISE	OCP (TONE)	*H	*L	*M
a. (MLH) (MLH MLH)	*!**		**	*	***	***	***
b. (MH) (MH ML)		***	*!		**	*	***
c. (MH) (ML ML)		***	*!	*	*	**	***
d. (ML) (MH MH)		***	*!	*	**	*	***
e. (MH) (ML MH)		***	*!*		**	*	***
f. (ML) (ML ML)		***		*!		***	***
g. (ML) (LH ML)		***			*	***!	**
h. ☞(ML) (MH ML)		***			*	**	***

b. Pitch track for the three-word utterance *Lǐ mǎi jǐu* 'Li buys wine', illustrating the surface output in (2a):



(3) Lao Li mai HAO jiu. 'Old Li buys GOOD wine.'
(MLH MLH) (MLH) (MLH MLH) *Underlying representation*
(MH ML) (ML) (MLH ML) *Surface output*

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