PHONETIC ALIGNMENT IN YOLOXÓCHITL MIXTEC TONE

Cross-linguistically, tonal pitch targets are phonetically aligned to prosodic units of varying types. In Mandarin Chinese, for instance, the syllable serves as the unit of tonal pitch alignment (Xu, 1998). In Thai, tones are aligned to moras (Morén and Zsiga, 2006; Zsiga and Nitisaroj, 2007). Yet, in languages with more complex tonal inventories and larger word types, it is less clear how tones are phonetically aligned to words. The Yoloxóchitl Mixtec dialect (YM, henceforth) is remarkable for its particularly large tonal inventory, with 5 contrastive tones on the initial mora of bimoraic roots and 10 contrastive tones on final moras (9 on monosyllables) (Castillo García, 2007). As a result, 21 possible tonal patterns are attested on monosyllabic, CVV roots, while 28 patterns are attested on disyllabic roots. Tonal patterns on monosyllabic roots are given in Table 1.

TABLE 1. Tonal Patterns on Monosyllabic Roots (CVV)

	μ_2	/1/	/2/	/3/	/4/	/13/	/14/	/24/	/32/	/42/
μ_1	/1/		1.1	X	1.3	1.4	X	X	X	1.32	1.42
	/3/		X	3.2	3.3	3.4	X	X	X	X	3.42
	/4/		X	4.2	X	4.4	4.13	4.14	4.24	X	X
	/13/		X	13.2	13.3	13.4	X	X	X	X	X
	/14/		X	X	14.3	X	14.13	14.14	14.24	X	X

Since many complex tonal patterns surface on YM words, e.g. /ka^{14}a^{24}/ 'does not slip', how might these pitch targets are aligned across words? Furthermore, contrastive glottalization occurs both on bisyllabic (CVʔCV) and monosyllabic (CVʔV) roots. Glottalization has been found induce pitch perturbations on adjacent vowels in related languages, such as Coatzospan Mixtec (Gerfen and Baker, 2005) and Itunyoso Trique (DiCanio, 2008). Does the presence of glottalization on YM words cause a realignment of tonal targets so as to avoid pitch perturbation?

The alignment of glottalized and non-glottalized tonal targets was examined in this study with original field data collected by the author from 10 speakers (5 male, 5 female) of YM. Four repetitions of 261 words produced in citation were examined per speaker, varying in word type (monosyllabic, disyllabic), glottalization, and tone. Pitch and spectral tilt data (used to examine voice quality) were extracted from the recordings with the VoiceSauce program (Shue et al., 2009). Preliminary findings from 3 speakers show that tonal targets in non-glottalized contexts are closely aligned with the duration of each mora in the word. Thus, words with tone /13.4/ are distinguished from words with tone /1.4/ by the speed in which pitch is raised. In the former, pitch raises quickly on the first mora. In the latter, pitch raises only on the second mora. Moreover, across all word types, the presence of glottalization induces a significant raising of pitch on the preceding vowel (t[1834] = 8.1, p < .001). Notably, high tones undergo greater pitch raising in the context of glottalization than other tones do (t[1834] = 2.7, p < .01). Despite the strong effect of glottalization on pitch, tonal realignment does not occur in the context of glottalization.

Apart from providing the first phonetic description of tone in YM, this study shows evidence for moraic tone timing in the language. The mora is typically considered to be the tone-bearing unit (TBU) in Mixtecan languages (Macaulay, 1996; Daly and Hyman, 2007). While only words in citation contexts were considered here, the present study demonstrates a close relationship between the phonological and phonetic structure of tone.

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