

## A conflict between /ʔ/ and tone

Phonetic and diachronic studies have widely attested the correlation between a glottal stop and high pitch on vowels (Haudricourt 1954, Matisoff 1973, Hombert et al. 1979, etc.). Yet, although /ʔ/ and high pitch work well together in the development of H tones, this study shows a case where /ʔ/, although dependent on, is in conflict with a H-tone.

The study explores the interaction of tone and /ʔ/ in Mundurukú, an Amazonian language spoken in Brazil. The language has two contrastive tones, High and Low (Picanço 2005), which pattern in interesting ways with the laryngeal consonant. In particular, the behavior of /ʔ/ is highly constrained by the tone system of language, and this relationship is unidirectional: the realization of the glottal stop requires certain tonal configurations; tones, on the other hand, are independent.

The first issue refers to the control a High tone has on the creaky effect of /ʔ/ on adjacent vowels. In this position, /ʔ/ is predominantly realized as heavily constricted voicing, but coarticulation with a vowel, preceding or following /ʔ/, depends crucially on tone. For example, in a sequence VʔV (LʔH), the vowel on the left is most affected by creakiness, whereas in VʔV (HʔL), creakiness goes to the right. Acoustic measurements of various sequences VʔV show that the creaky effect of /ʔ/ lasts longer in a L-tone vowel. In addition, L-tone vowels are more likely to be affected than H-tone vowels (the majority of the samples analyzed exhibit constricted voicing in L-toned vowels). These results are consistent with the view that laryngeal features pattern in such a way to optimize perception of pitch distinctions (Silverman 1997).

Another issue is the correlation between a syllable-final /ʔ/ and a following H tone. Here the laryngeal consonant only surfaces if the following H-tone also surfaces; but if tonal-changing processes apply, and forces H to change to L, /ʔ/ disappears with the tone. This pattern is not specific to Mundurukú; similar cases have been reported for other languages as well (e.g. Burling 1959, Yip 1995). However, the nature of this relationship is still mysterious as there seems to be no good (synchronic) reason, phonetic or phonological, for /ʔ/ to be affected by, or affect, the H tone of a following syllable in a sequence VʔCV. To answer this question, the study thus turns to the history of /ʔ/ and tones in Mundurukú, as an attempt to show that the /ʔ/-H tone interaction finds a better explanation in historical data.

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