Tonogenesis in Malagasy Dialects and Control of Perceptual Attention

Malagasy is among the most written-about Austronesian languages, but relatively little of this work has investigated its phonetic characteristics. The most in-depth phonetic description available is Rakotofiringa (1982), which includes many detailed instrumental measurements of speakers from the Merina dialect region around the capital city of Antananarivo. Similar studies of the other approximately 17 dialects are not available, and most comparative work has focused on phonology and sound correspondences (among others, Verin et al. 1969; Dez 1963; Botouhely 2007), with anecdotal mentions of impressionistic phonetic differences appearing sporadically in the literature (e.g. Dahl 1952). The present study combines detailed phonetic measurements of Malagasy speakers from different dialect regions with results of a speech perception experiment and finds evidence for tonogenesis in certain dialects arising from a shift in phonetic cue weighting in fricatives.

Malagasy has two pairs of fricatives—/f/-/v/ and /s/-/z/—which, according to the orthography (developed by the London Missionary Society in the mid-1800s) and accounts of other linguists, are distinguished primarily by the presence or lack of modal voicing. Previous phonetic studies have noted that the voiced fricatives may sometimes be partially devoiced but have indicated that modal voicing usually extends through a significant portion of these fricatives (Rakotofiringa 1982; Dahl 1952). However, Malagasy speakers from the Merina and Betsileo dialect regions (Central Highlands) who were recorded for the present study show much more extensive devoicing of /v/ and /z/ than previous studies have indicated, particularly in syllables carrying the primary stress. This loss of modal voicing appears to be compensated by a marked difference in \( f_0 \) contour throughout the following vowel, with high pitch occurring after voiceless and low rising pitch after voiced fricatives. In contrast, speakers of other dialects (including Sakalava, Antakarana and Tsimihety, in this study) consistently maintain modal voicing throughout their /v/ and /z/ productions; while these speakers do also display \( f_0 \) differences on following vowels, the difference is less pronounced.

This differing use of modal voicing and \( f_0 \) in production is also mirrored in perception. In a two-alternative forced choice identification task using minimal pairs, speakers of the Central Highlands dialects were more likely to rely on differences in \( f_0 \) to make their decision; for these listeners, high \( f_0 \) could even “override” the presence of fricative voicing, leading a listener to identify a fricative with continuous modal voicing as voiceless when it was followed by a vowel with high pitch. In contrast, speakers of other dialects relied primarily on modal voicing as a cue to fricative identity when it was present in the signal, only rarely identifying modally voiced fricatives as voiceless when followed by vowels with high pitch; when no modal voicing was present, they also used \( f_0 \) as a cue, but responses were less consistent than for speakers from the Central Highlands region.

The coarticulatory effect of consonant voicing on following vowel pitch has been noted in many other languages, as has the ability of listeners in non-tone languages to use vowel \( f_0 \) as a cue to preceding consonant identity (e.g., for English, see Whalen et al. 1993; Pardo & Fowler 1997; for Korean, see Kim et al. 2002; among others). Rakotofiringa (1982) notes this same \( f_0 \)
difference in his speakers of Merina Malagasy recorded in the early 1970s but does not discuss the question of whether pitch serves as a contrastive cue for these speakers. The results presented here, in addition to highlighting the perception-production link, may therefore be indicative of a sound change in progress in the Central Highlands Malagasy dialects. The mechanism of change appears to be a shift in the balance of acoustic cues, with following vowel pitch taking the place of modal voicing as the contrastive cue to fricative voicing for some Central Highlands speakers; this follows the model of tonogenesis proposed by Hombert et al. (1979) and is supportive of claims made by Beddor (2009) about the role of coarticulation in sound change.

These results also have implications concerning the extent of individual control over the use of linguistic variants in perception. It is no surprise that speakers who weight \( f_0 \) over modal voicing in their own production are able to use pitch more reliably as a cue in perception; nor is it a surprise that speakers who maintain modal voicing in production are also able to fall back on the secondary cue of pitch in perception when modal voicing is not present in any tokens. However, the results also show a learning effect, with the latter group in particular becoming more attuned to the pitch cue throughout the course of the experiment. This combined with the fact that the overwhelming majority of the tokens in the test set had no modal voicing on the fricative might lead us to suspect that listeners were aware of and actively controlling which cue they paid most attention to in performing the task and that they were intentionally shifting their attention to pitch rather than modal voicing. However, the learning effect was small for the tokens with modal voicing, suggesting that even if listeners were aware of the relevance of pitch to the task, they did not or were not able to actively force this cue into a position of primacy in their perceptual systems.

References


Kim, Mi-Ryoung; Patrice Speeter Beddor; and Julie Horrocks. 2002. The contribution of consonantal and vocalic information to the perception of Korean initial stops. *Journal of Phonetics* 30.77–100.

