

The emergence from tone of vowel register and graded nasalization in the Eastern Chatino of San Miguel Panixtlahuaca: Part 2

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As described in the first part of this talk by Tony Woodbury, San Miguel Panixtlahuaca Chatino (PAN) distinguishes two registers in M and ML-tone syllables not ending in a glottal stop: *high* oral [i, e, ə, o, u] and strong-nasal [ĩ^ɲ, ē^ɲ, ā^ɲ, ō^ɲ] versus *low* oral [e, ε, a, ə, o] and weak-nasal [ẽ, ã, õ]. With the exception of etymological *iʔ, which splits between the high and low registers, only the low register vowels appear in such syllables when they end in glottal stop. (Vowels from the high register alone occur in syllables bearing all other tones.) Here, we develop phonetic explanations for these patterns and the sound changes responsible for them. The evidence supporting each of these explanations will be presented in the talk.

San Juan Quiahije Chatino (SJQ) cognates for PAN words in the low register bear a HL falling tone followed by a super-H floating tone, while SJQ cognates for PAN words in the high register are toneless. If the tone preceding the super-H was L or HL in the etymological sources of words in the low register in PAN, then the vowels could have lowered in this register because listeners misinterpreted their lower F0 as evidence of a lower tongue height. They would do so because lower vowels have intrinsically lower F0 values (Whalen & Levitt, 1995).

The much weaker nasalization of the vowels in the low than the high register is probably both a side effect and an enhancement of their lower height because nasalization is much less detectable in lower vowels and is more likely to be misperceived as vowel lowness than it is in higher vowels (Kingston & Macmillan, 1995). There's actually a puzzle here. If nasalization is more detectable as such in higher vowels, why are they the ones that are more heavily nasalized? Wouldn't the contrast with oral vowels be conveyed more robustly and maintained better if the lower vowels were the more heavily nasalized? One possible answer is that PAN speakers exaggerate nasalization where it will be most detectable to listeners, namely in higher vowels, rather than trying to overcome its likely misperception as lower tongue height, as in lower vowels. It is worth noting here that in San Juan Quiotepec Chinanteco, a three-way contrast between oral, weak-nasal, and strong-nasal vowels is found in high vowels and diphthongs and triphthongs with high offglides (Castellanos Cruz, 2014).

Finally, how does glottal stop restrict preceding vowels to the lower register? An answer to this question can perhaps be developed from Edmondson & Esling's (2006) proposal that laryngeal articulations consist of more than mere abduction or adduction of the glottis. They describe two sets of vowels in Somali and Kabiye which differ in height in much the same way as those belonging to the high and low registers in PAN. The difference between the two sets of vowels in these languages has previously been described as one of tongue root position with the vowels in the lower set being pronounced with a more retracted tongue root than those in the higher set. Edmondson & Esling propose that in the lower set, the tongue root is retracted by contracting the hyoglossus and the pharynx is narrowed further by contracting the pharyngeal constrictors. These constrictions are close to the pressure node for the first formant at the glottis, raise its frequency, and make the vowel sound lower. The larynx is raised in the lower set, shortening the oral cavity, which will also raise the first formant. The vocal tract is shortened further by

constricting the aryepiglottic sphincter and the ventricular folds deeper in the pharynx. If glottal stop in PAN is articulated with at least these two deep pharyngeal constrictions, then it too will shorten the oral cavity, raise the first formant's frequency of a neighboring vowel, and lower its quality.

In summary, we propose that low register separated from the high register in PAN through the misperception of a low F0 as information that the vowel was lower, the similar misperception of light nasalization as information that the vowel was lower with the compensatory exaggeration of nasalization in higher vowels to maintain the oral:nasal contrast, and finally the coarticulatory lowering of vowels next to glottal stop because its articulation constricted at least the lower pharynx as well as the glottis.

References

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