Some challenging facts of Brazilian Portuguese phonology

Eleonora C. Albano
Lafape - IEL - Unicamp/Dinafon-CNPq

This presentation discusses some facts of Brazilian Portuguese (henceforth BP) phonology which can contribute to the ongoing discussion on the use of dynamic models in phonological theory. The focus is, however, on description, not modeling, of such facts.

The facts are: (1) mid vowel opening harmony; and (2) the relationship between stress and vowel opening. What is remarkable about such phenomena is their incidence at various levels of abstraction in the language's phonology. Both manifest themselves in morpho-phonological processes, probabilistic phonotactic biases, sociolinguistic allophony, and low level phonetic detail.

The data come from unpublished work by members of the Dinafon research group, and involve both acoustic phonetic measurements and lexical statistics. The acoustic phonetic studies look at words and non-words in contexts including carrier and regular sentences. The statistical studies use an oral language database (LAEL, n. d.) and a written language database (Linguateca, n. d.). Recourse to the BP sociolinguistic literature is also taken.

Vowel harmony involving the opening dimension has been at work long enough to play a role in the development of Portuguese verb inflection. The traces it left in the two unproductive, yet regular, conjugations underlie today's opaque, morphologically conditioned mid/high vowel alternations, such as *'sente'/'sinto'* (he, she it feels/ I feel). On the other hand, a transparent synchronic variable process is spreading in the BP lexicon, by which an unstressed mid vowel is raised by a following high vowel, such as in '*b[u]nito*'. This is a typical sociolinguistic variable with multiple linguistic and social conditioning (Bisol 1981). At the same time, vowel to vowel co-articulation in BP is assimilatory, and, thus, harmonic. Though it affects all formants, it is most stable with F1. The direction is the same as in the sociolinguistic process, i.e., an unstressed vowel agrees with a following stressed vowel. The magnitude of the formant shifts is, however, minimal: about 50 Hz for F1 and 100 Hz for F2. Obviously, the three kinds of processes cannot be the same. They rather seem to be "layers" of a sound change recurring in the language at various scales at various moments. To complete the picture, probabilistic phonotactics agrees with such a trend: within the word, pre-stressed mid vowels significantly favor co-occurrence with a high or high-mid stressed vowel.

Similarly, stressed mid vowel opening has played an important role in the development of Portuguese inflection, affecting nouns, adjectives, and verbs. Most noun and adjective alternations are suppletive, applying only to a small part of the vocabulary. In verbs, however, opening ablaut has remained active, responding for opaque morphologically conditioned alternations, such as *'p[E]ga'/ 'p[e]gar'*, in the productive, major conjugation. In addition, there exists a high frequency process by which stressed mid vowels are pronounced open in acronyms, such as *CEP* ['sEp], or foreign words, such as *Sch[E]rer*. Here again the picture is completed by a probabilistic phonotactic bias by which stress is significantly associated with open and open-mid vowels. By contrast, the low level counterpart of such processes is not as straightforward as in the harmony case. While a trend has been documented for hyper-

articulated vowels to display a higher F1 (Arnold 2005), maneuvers to counteract it have also been reported (Roces-Rodrigues 2010). Such maneuvers cannot be interpreted simply as undershoot avoidance, as they affect vowel-to-vowel relations, which are not obviously associated with reduction. At any rate, active control of the relationship between opening and stress or emphasis (Erickson 1998) is implied by the existence of such opposing trends. Once more, "layers" of a longstanding, multiply scaled discontinuous sound change seem to be at play.

The scaling and discontinuity aspects of such phenomena make them plausible candidates for a dynamical systems treatment. Besides documenting them at various levels, the presentation will attempt to bring more data to bear on the issue by looking at the frequency distributions of words synchronically undergoing harmony and stressed vowel opening.

References

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