Diph-, Monoph-, and Other Thongs from Rio de Janeiro, Brazil

Michael Colley
Rice University

Diphthongization of back vowels before word final "-s" and "-z" (eg. *faz* [fajʃ] "does") is a salient characteristic of the Portuguese spoken in Rio de Janeiro. This variation is well established, existing in Rio since at least the 1960s (Head 1965). It creates a potential merger in words like *mas* "but" and *mais* "more", although it has never been established acoustically that they are indeed merged, and if so, whether they are merged for all speakers. The purpose of the study is to examine the effects of social class and age on the diphthongization of /a/ and /o/ in the pre-"s/z" environment and their potential merger with /ai/ and /oi/, respectively.

Although many methods are available for quantifying diphthongization (see for example Maclagan and Hay 2007), they do not provide objective criteria for measuring diphthongs. To help establish a more objective method, a script was created in the Praat program to locate the steady state of the vowel. The steady state is defined by tracking F1 and F2 at regular intervals (eg. every 15 ms.) and finding the longest period in the vowel in which the difference in F1 and F2 between two consecutive intervals is less than a chosen threshold (in this case 10 Hz). Formant measurements (using FFT spectra) are taken at the midpoint of the steady state and the end point, defined as 25 ms. from the end of the periodic waveform of the vowel. This method allows diphthongization to be quantified in two different ways. First, the Cartesian distance of the difference in formant values from the steady state to the end point provides an estimation of the length of the glide. Second, the points at which the formants begin to change for each vowel (defined as the next point after the steady state) are compared. This study shows that both measurements are important for quantifying diphthongization.

Speakers are natives of Rio de Janeiro, ranging in age from 18 to 50. All speakers show at least some diphthongization of /a/ and /o/ in the pre-"s/z" environment. The results suggest that most speakers (especially older speakers) have a near merger of /a/ and /ai/ and of /o/ and /oi/ in this environment. The youngest speakers (those under 25), however, have these vowels completely merged, suggesting a change in progress.

Many speakers also tend to front and raise /a/ and /o/ in the pre-"s/z" environment. Speakers who have a near merger of these vowels tend to front and raise some tokens of /a/ and /o/, but not /ai/ and /oi/. If this merger is indeed complete for some speakers, one would expect /ai/ and /oi/ to also be fronted and raised for these speakers. The data confirm this hypothesis.

This research shows the importance of treating diphthongization as a continuum, and provides an objective method for quantifying diphthongization. It also provides perhaps the first acoustically-measured sociophonetic work on Brazilian Portuguese, and provides data about changes in progress in a region for which there has been little research.

Head, Brain Franklin (1965). A Comparison of the Segmental Phonology of Lisbon and Rio de Janeiro. Austin: University of Texas Dissertation.

Maclagan, Margaret, and Jennifer Hay (2007). "Getting *fed* up with our *feet*: Contrast maintenance and the New Zealand English 'short' front vowel shift" *Language Variation and Change* 19, 1-25.