

How to capture vowel deletion in connected speech? – Some methodological issues with Portuguese data

Introduction and theoretical background

Speakers of European Portuguese reduced a great number of the unstressed vowels in connected speech, but the extent of this deletion has only been incompletely described. The phonological unstressed vowel system in EP underwent vowel raising and it is currently reduced to the following three high and one low mid vowel [ɐ, i, i, u], whereas in stressed position we can find the same inventory as in BP /a, ε, e, i, ɔ, o, u/ (Mateus & d'Andrade 2000; Vigário 2003). Some of the vowels of EP Portuguese – mostly /i/, but also /u/ (Mateus e Martins, 1982; Silva, 2007; 2008, Cunha 2011) can be reduced and deleted in current speech. One of the major consequences of the massive high vowel deletion in EP is the increase of consonant sequences in amount and complexity, due to the minimization of the lexical contrast between lexical and post-lexical clusters resulting in near homophones (e.g. post-lexical /k(i)rer/, "to want" and cluster /krer/, "to believe", Mateus & d'Andrade 2000, Mateus 1982).

In order to obtain a good description of vowel deletion, it would be necessary to analyse many hours of conversation and extensive materials of more or less unguided conversation. Since conversational data has to be transcribed and segmented manually, this is too time consuming for a single person or a small research group. The scarce literature on this topic for Portuguese used mostly short monologs of 1-4 speakers about a biographic topic or spontaneous conversation with the interviewer. These materials could show some influence of linguistic factors such as consonantal context and word position on vowel deletion (e.g. Martins, 1975; Mateus e Martins, 1982, Cunha 2011), some influence of prosodic structure (Frota et al. 2006) and the strong influence of socio-linguistic variables such as gender and regional provenience (Silva, 2007; 2008). However, these studies used different methods and the analysed materials were very scarce.

A further methodological difficulty is to determine when a vowel is deleted, devoiced or shortened in duration. An analysis on the presence or absence of the unstressed vowel is too broad to capture details about partial realization of reduced vowels such as devoicing, shortening which usually precede deletion (e.g. Davidson, 2006; Manuel, 2006). None of the previous studies tested the influence of the grammatical gender on vowel deletion. The major point of interest here is that the masculine marker /u/ is the second most deleted vowel in Portuguese, whereas the feminine marker /a/ showed much lower deletion rates (Mateus e Martins, 1982, Cunha, 2011). Therefore, a biographical monolog of a feminine participant would by nature realize much more vowels only because her speech includes more /a/s than a masculine participant would do.

Research questions and hypotheses

The main aim of this paper is to describe vowel deletion in European Portuguese using different methodologies and materials in order to discuss how data collection and analysis influence the description of a phonological process. We expect that the quantification of vowel duration and the analysis of vowel quality will improve the description of vowel

deletion. Different materials may have an influence on the amount of deletion: on the one side, we expect unguided conversation to show a greater amount of deletions than read sentences. Grammatical gender from feminine participants should have an influence on vowel deletion, since the feminine marker /a/ is less deleted than the masculine marker /u/.

Methods

In order to test these issues, we analyse acoustic data from 6 participants of European Portuguese. The data include a biographical monolog, a map task conversation between two participants and 12 read sentences with 2- repetitions. For each set of data we analysed vowel duration, the distribution of the realised unstressed vowels in a F1xF2 vowel space and computed the percentage of realised and deleted vowels for the different materials. We modelled the results with mixed models in R.

Results

In general, the task had a main effect on the quantification of vowel deletion. The description of the unstressed vowels in a F1xF2 space was hard, since many vowels were completely devoiced. Absolute vowel duration did show some differences, however, it was difficult to normalise duration over the tasks. So that different durations could be explained by the nature of the tasks.

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