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A study on oral diphthongs in Brazilian Portuguese.

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Abstract
This is a phonological study on the Brazilian Portuguese oral diphthong [uw], represented orthographically by "ul", which is in variation in the spoken language. We have investigated the phenomenon experimentally and acoustically. And we have modelled the results within Optimality Theory by means of the MaxEnt Grammar Tool program. It is, therefore, a study in language that uses experimental and computational methodologies in interaction.

Key words:
Oral diphthong, reduction, positional faithfulness.

Introduction

We can notice, as native speakers, that the diphthong [uw] can be reduced to a simple vowel, [u] (e.g. consul/consu). The objective of this research is to verify what phonetic and phonological reasons of the phenomenon are.

The phenomenon was investigated on the basis of an experiment on a corpus composed of existing words of Brazilian Portuguese (BP) and pseudo words that are compatible with the BP lexicon, having the diphthong in initial, medial and final positions, and in stressed and unstressed syllables. After recording the word list by two speakers of the dialectal variety of Campinas / SP, an acoustic analysis was performed in the Praat program.

Results and Discussion

The results show that 74.3% of the diphthongs were preserved in stressed syllables and were reduced in 96.5% in unstressed syllables. Moreover, 54.3% of the diphthongs were preserved in initial syllables and 51.7% of the reductions occurred in non-initial syllables. The monosyllables, which are initial and tonic syllables, had 100% preservation of the diphthong. The vowel lengthening, used to compensate the deletion of [w] was also a used resource, obtaining 67.5% occurrence in stressed syllables and 53.5% in initial syllables.

Image 1. Percentage of each variable total.
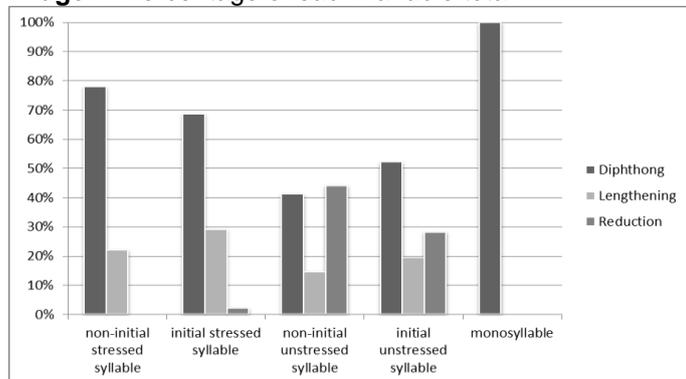
Modeling has been done by means of Optimality Theory (TO) (Prince & Smolensky 1993, McCarthy & Prince 1993) which, roughly speaking, is a theory that admits that there are violable phonological constraints that serve as basis for the choice of un optimal candidate among all the possible outputs in relation to an input. The constraints chosen for this research were:

Max-IO: Input segments must have output correspondents.
Ident-IO(duration) : An output segment has the same value for [duration] as its input correspondent.
The variations of these two as to the initial syllable (**s1**) and the stressed syllable (**s'**) are also relevant and therefore were inserted in the analysis. Due to the diphthong in question be composed of acoustically similar segments, there is a tendency to reduce to a single vowel triggered by the **OCP** constraint (McCarthy, 1986), and then, it has also been inserted. Below, there is a tableaux of the word "culpa" in which the diphthong is in stressed and initial syllable, for example:

Chart 1. Stressed syllables.

/kuw.pa/	MAX-s1 0.576	MAX-s' 4.458	MAX 4.542	OCP 0.016	IDENT-s1(dur) 0.08	IDENT-s'(dur) 0.343	IDENT(dur) 0.965
a. kuw.pa				*			
b. ku:.pa					*	*	*
c. ku.pa	*	*	*				

The MaxEnt Grammar Tool program was used to generate the weights of each constraint (represented below the constraints in the tableaux above). The program also generated predictions of optimal candidates whose percent values are very close to those found in our quantitative data analysis.

Conclusions

We can conclude from the quantitative results and the values of the predictions given by MaxEnt that the reduction is favored in unstressed and non-initial syllables, arguing in favor of our hypotheses and the literature, since stressed and initial syllables are privileged positions and tend to resist phonological processes (Beckman, 1998).

Acknowledgement

[1] BECKMAN, Jill N. Positional faithfulness, positional neutralisation and Shona vowel harmony. Phonology, v. 14, n. 1, p. 1-46, **1997**.
[2] KAGER, René. Optimality theory. Cambridge University Press, **1999**.
[3] MCCARTHY, John J. OCP effects: Gemination and antigemination. Linguistic inquiry, p. 207-263, **1986**.