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ScienceDirect
Speech Communication 50 (2008) 916–924
SPEECH COMMUNICATION
www.elsevier.com/locate/specom

Lexical reorganization in Brazilian Portuguese: An articulatory study

A.R. Meireles [a,*], P.A. Barbosa [b]

[a] Federal University of Minas Gerais, Speech Prosody Studies Group, Faculdade de Letras, Av. Antônio Carlos, 6627, Pampulha, Belo Horizonte, MG 31270-901, Brazil
[b] State University of Campinas, Speech Prosody Studies Group, Departamento de Lingüística, Cx. Postal 6045, Campinas, SP 13083-970, Brazil

Received 25 May 2007; received in revised form 29 March 2008; accepted 13 May 2008

Abstract

This work, which is couched in the theoretical framework of Articulatory Phonology, deals with the influence of speech rate on the change/variation from antepenultimate stress words into penultimate stress words in Brazilian Portuguese. Both acoustic and articulatory (EMMA) studies were conducted. On the acoustic side, results show different patterns of post-stressed vowel reduction according to the word type. Some words reduced their medial post-stressed vowels more than their final post-stressed vowels, and others reduced their final post-stressed vowels more than their medial post-stressed vowels. On the articulatory side, results show that the coarticulation degree of the post-stressed consonants increases with speech rate. Also, with the use of a measure called proportional consonantal interval (PCI), it was found in measurements of articulation that such measure is influenced by the word type. Three different groups of words were found according to their PCI. These results show how dynamical aspects influenced by speech rate increase are related to the lexical process of change/variation from antepenultimate stress words into penultimate ones.

Keywords: Speech rate; Dynamical systems; Articulatory Phonology; Linguistic change; Lexical variation

1. Introduction

It is generally known by linguists who study Portuguese that some Old Portuguese antepenultimate stress words have undergone change into penultimate stress words. Besides, these words can synchronically covary with each other in Modern Portuguese. For most of these words, this phenomenon is related to the linguistic process known as syncope, that is, word internal elision (cf. Câmara, 1988, p. 220). Diachronically, a syncope of the medial post-stressed vowel in antepenultimate stress words started in Classical Latin (saeculum > saeclum; calidus > calmus; eremus > ermus) (cf. Quednau, 2002), and continued in Vulgar Latin (speculum > speclum; angulus > anglus; oculus > oclus) (cf. *Appendix Probi* citations commented in Silva-Neto, 1946, p. 140).

Historically, there was since Classical Latin (cf. Nunes, 1969, p. 13) a gradual change from antepenultimate stress words into penultimate stress words, resulting in very rare realizations of antepenultimate stress words in Old Portuguese (derived from Vulgar Latin) (Nunes, 1973; de Vasconcelos and Michaelis, 1956). Besides, even these rare forms, according to Hauy (1994, p. 42), became penultimate ones in connected speech. Summing up, the use of these words gradually decreased in the following way: Classical Latin > Vulgar Latin > Old Portuguese. Nevertheless, in the fifteenth century, in which Latin culture became greatly valued, antepenultimate stress words were reintroduced into the Portuguese lexicon (cf. de Vasconcelos and Michaelis, 1956, p. 62), reviving the covariation between antepenultimate and penultimate stress words (e.g.: óculos vs. oclos; aurículo vs. orelha).

This lexical variation followed two distinct paths from Latin to Portuguese: (a) lexicalization of the penultimate stress word, as in: speculum > speclum > espelho; calidus > calmus > calmo; apicula > apicla > abelha; (b) historical

* Corresponding author. Tel.: +55 31 93483110.
E-mail addresses: meirelesalex@gmail.com (A.R. Meireles), pabarbosa.unicampbr@gmail.com (P.A. Barbosa).

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doi:10.1016/j.specom.2008.05.005

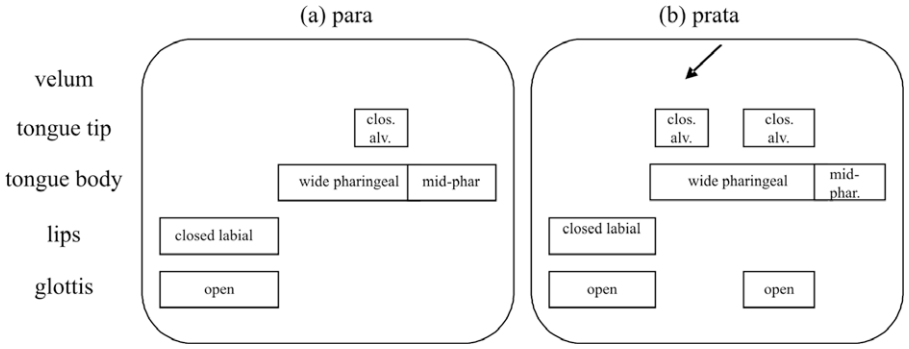

Fig. 1. Gestural differences between the words "para" and "prata", according to AP model. It is represented here: (a) gestural score for "para"; (b) gestural score for "prata" (see text for details).

variation still under way, as in: século ~ seclo (Latin: saeculum ~ saeclum); ângulo ~ anglo (Latin: angulus ~ anglus); óculos ~ oclos (Latin: oculus ~ oclus).

Analysis based upon mainstream linguistics considered that in this variation there was a suppression (cf. Amaral, 2002, p. 102), a loss (cf.Quednau, 2002, p. 79) or a fall (cf. Williams, 1961, p. 66) of the medial post-stressed vowel. Due to this fact, penultimate stress words can be represented in informal texts as "abobra (for abóbora), cosca (for cócega), anális[1] (for análise)". It is worth pointing out, however, that these authors worked with linguistic theories which favor the speaker's linguistic intuition, not taking into consideration phonetic details in their analyses. Yet, it will be demonstrated here, within the Articulatory Phonology (henceforth AP) framework (Browman and Goldstein, 1986; Browman and Goldstein, 1989; Browman and Goldstein, 1990; Browman and Goldstein, 1992), that what really happens is not the "loss" of a phoneme-sized segment, but a reduction of magnitude of the gestures composing either the medial post-stressed or the final post-stressed vowel. In other words, what happens in such cases is an acoustic-articulatory reduction of gestures, which may be perceived/reinterpreted as a transitional gesture of the surrounding gestures.

Before presenting a pilot study on the acoustics of lexical variation and the findings of an articulatory study, a brief revision of how the AP framework deals with lexical variation will be shown in the next section.

2. Lexical variation in the articulatory phonology

In AP there is no dichotomy between phonetic and phonological level and the minimal unit of research is the articulatory gesture, defined abstractly by the task dynamics model (Kelso et al., 1986). This phonological model proposes some principles of magnitude and temporal change to account for linguistic phenomena such as coarticulation, allophonic variation and several subsegmental phenomena in language acquisition and speech pathology.

[1] In this case there is no syncope, but apocope, which is the loss of a sound at the end of a word.

Besides, gestures have a temporal and spatial scope (cf. Fig. 1), suggesting that they do not disappear (or appear) in syllabic restructurings, i.e., they are always present and the sensation of loss (or insertion) of a segment is due to: (i) a magnitude reduction (or increase) of a certain gesture (vide Albano, 2001 for a gestural explanation of the "epenthetic" vowel in Brazilian Portuguese (henceforth BP), as in "paiz" (for "paz"), caused by a constriction gesture delay in sequences of vowel followed by /s/ in word final position); (ii) an increase (or reduction) of gestural overlap, such as in the increase of gestural overlap for the word "para" (Fig. 1a), which will be similar to the gestural organization in the beginning of "prata" (Fig. 1b). It can be inferred from Fig. 1b that the overlap between the tongue body and tongue tip gestures can cause a change from "para" to "pra", which is the usual pronunciation of this preposition in many BP dialects. These changes in gestural magnitude, as will be shown here, seem to be conditioned by social, psychological, individual and phonetic factors, which can be elicited by speech rate variation. Therefore, following Byrd (2003), "the postulation of abstract, dynamically-specified, and underlying stable phonological units, constrains the possibilities for accounting for variability in word forms".

In the next sections, it will be shown how AP deals with the variation between antepenultimate stress and penultimate stress words in BP and how it explains the change of a lexical item into another one. This is a novel approach in BP studies. As far as is known, no previous articulatory studies have been conducted with BP data. Because of this, this research intends to inaugurate a new methodological approach for analyzing BP data. In order to do so, firstly it will be presented some results of a previous acoustic study and, then, an articulatory study based on the AP framework, which can explain lexical variation in BP.

3. Previous acoustic study

Most of the researchers who have shown the influence of speech rate upon lexical realizations in BP have used qualitative analyses instead of quantitative ones Abaurre-Gnerre (1979); Abaurre-Gnerre (1981); Meireles (2001).