Stressed vs unstressed vowel duration and vowel space area in fluent vs nonfluent aphasia in Spanish: A preliminary study
Lorraine BAQUÉ
Laboratori iLexSem, Universitat Autònoma de Barcelona (Spain)
Lorraine.Baque@uab.cat

Background
The aphasiological literature has traditionally distinguished between anterior aphasia, associated with non-fluent speech, characterized by phonetic distortions arising from a disruption at the motor level of encoding, and posterior aphasia, characterized by fluent speech with phonological errors, due to a deficit at a higher level. However, these studies focused predominantly on consonantal errors and assumed that the vowel system was relatively spared.

The existing studies on vowels’ production in aphasia have reached differing conclusions. While there is evidence from frequential analyses and vowel space studies pointing out to the fact that vowels produced by subjects with pathology do not differ from those of normal speakers (Ryalls 1986, Kent & Rosenbeck 1983, Jacks et al 2010), studies suggesting the contrary are also available. In particular, it has been reported that in anterior aphasia vowels are posteriorized and vowel space is reduced (Whiteside et al. 2010), and that both anterior and posterior aphasic patients exhibit a greater intra-phonemic variability (Ryalls 1986). Such findings have been interpreted as indicating some sort of articulatory difficulty in both aphasic types. Moreover, anterior aphasics have been reported to significantly lengthen vowels’ durations as compared to both normal and posterior aphasics (Ryalls 1981, Schirmer 2004).

Objective
The objective of this preliminary study is to analyze the variability in vowel production as a function of pathology and stress in a task of words repetition.

Methods
From a corpus used in an earlier study (Baqué et alii 2006), we have selected 240 lexical items containing vowels in both stressed and unstressed positions (N=580), in combinations with stops and fricatives in Spanish. 12 subjects participated in the experiment (4 anterior aphasics, 4 posterior and 4 controls). We analyzed acoustically all correct productions in terms of duration and F1 and F2 values. We calculated 7 indexes of the vowel space (CMintra, CMinter, Phi, pVSA, cFCR, F2RR, F1RR, cf. Audibert & Fougeron 2012). In order to see the effect of pathology and stress on the temporal and frequential variables, we carried out Linear Mixed Model analyses (by-object and by-item) in R.

Results
Our results show a clear effect of the interaction of pathology and stress on temporal parameters. Moreover, we found that, in reference to the control group, fluent aphasic group exhibits a tendency towards reduction of vowel space as opposed to non-fluent group (F1RR, CMintra) and that there is an effect of stress on F1RR, F2RR, cFCR and pVSA parameters. We also observed a greater intra-phonemic variability in both aphasic groups.

The results of this study, in spite of its limitations, allow to contribute to a number of issues under debate: about the extent to which vowels are preserved in aphasic speech, about the phonetic and phonological nature of deficits typically posited in fluent vs non fluent aphasia, and finally, about the subtle phonetic impairment in fluent aphasia (Vijayan & Gandour 1985).

References:


