

# RELATIONSHIP BETWEEN DURATION AND INTENSITY CUES FOR STRESS MARKING IN FLUENT AND NON-FLUENT APHASIA IN SPANISH: A COMPENSATORY STRATEGY?<sup>1</sup>

## 1. INTRODUCTION

Most aphasiological studies have concluded that stress pattern assignment is unimpaired in both fluent and non-fluent aphasia [4]. However, the existence of specific stress errors in fluent aphasics has been reported in some cases [3].

Concerning the acoustic characteristics of stress production by aphasic patients in several languages, there has generally been found to be a deficit in durational cue processing [5] in non-fluent aphasia, often interpreted as a secondary consequence of a basic timing deficit [1], whereas the other acoustic stress correlates remain relatively unimpaired [5]. There has also been reported to be a “subtle phonetic deficit” affecting stress realisations in fluent aphasia [2].

In a previous study, we have shown that that, in the absence of phonological impairment, there is a phonetic (motoric) deficit affecting both Broca’s and conduction aphasics’ lexical stress processing, involving not only timing aspects but also F0 and intensity cues. We have reported a contradictory use of the three parameters in both aphasic groups’ realisations. The aim of this study, carried out on the same participants as the previous one, is to analyse whether abnormal duration cues for stress marking are somehow compensated for by intensity cues in order to avoid “equal stress” phenomena.

## 2. METHOD

### 2.1. Participants

Three groups of right-handed native speakers of Spanish took part in this experiment, matched by age, sex and educational level: 4 controls (N0), 4 Broca’s aphasics with AOS (BA) and 4 conduction aphasics (CA).

### 2.2. Material and procedure

We used the 45 disyllabic words from the Spanish COGNIFON lexical corpus in which the syllable structure was either CV-CV or CVC-CVC. All participants were asked to repeat these words, presented in isolation with a falling conclusive intonation.

### 2.3. Data analysis

We extracted each syllable duration and maximum intensity value and then calculated the increase in percentage of the duration and maximum intensity value of the stressed vs. unstressed syllable of each word (DUR\_iperc and INT\_iperc).

In order to examine the relationship between intensity and duration for stress marking, we carried out mixed-effects regression models in R in which participants and items were entered as random factors. The dependant variable was INT\_iperc and the predictors were Group (BA, CA and N0), Stress pattern (oxytone or paroxytone) and DUR\_iperc, and all possible interactions.

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### 3. RESULTS

An overall analysis showed three significant interaction effects on INT\_iperc: Stress pattern \* Group ( $F(2, 458.95)=13.4760$ ,  $p=2.055e-06$ ), Stress pattern \* DUR\_iperc:  $F(1, 481.07)=5.3168$ ,  $p=0.02155$ , and Group \*DUR\_iperc:  $F(2, 469.17)=3.4414$ ,  $p=0.03283$ . Thus, we decided to carry out separate analyses for each group.

In the N0 group, we found an effect of Stress pattern on INT\_iperc, but no effect of DUR\_iperc. In CA productions, both Stress pattern and DUR\_iperc were seen to have a significant effect on INT\_iperc ( $F(1, 161.10)=28.6822$ ,  $p <.001$  and  $F(1, 163.09)=4.7253$ ,  $p =0.03116$ ). In the Broca's aphasics group, there is an interaction effect of Stress pattern \* DUR\_iperc ( $F(1, 160.569)=5.3169$ ,  $p =0.0223990$ ).

### 4. DISCUSSION

These results are interpreted as resulting from two different underlying phenomena: a compensatory use of intensity as a stress cue in BA in stress patterns characterised by a durational cue-processing deficit in order to avoid "equal stress", and a "subtle phonetic deficit" involving abnormal (but linguistically acceptable) stress acoustic cue-processing in the other cases.

### 5. REFERENCES

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