

ANALYSIS VOWEL COARTICULATION IN CONTINUOUS SPEECH

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The objective of this communication consists on doing an acoustic analysis of the vocalic reduction phenomenons which appear in Spanish and Catalan when two vowels are closed in spontaneous speech.

PROCEDURE

Our investigation is based on continuous speech, for that reason the corpus has been obtained from the recordings of two informants, a Spanish one and a catalan one. They have been informally interviewed for about three hours.

Working with continuous speech has a lot of problems. The main problem is that the corpus is not as long as we would have desired because some of the examples we are looking for are not in the recording we made previously. For that reason we had to reduce the study we had planned before, because there are not enough cases to realise a statistic treatment.

For Spanish language we started from a corpus of 370 examples, 71 % of these examples are cases of complete reduction, 15 % are cases of partial reduction and 14 % correspond to pauses.

In catalan the results are quite the same. From a corpus of 272 examples, 77 % correspond to complete reduction, 11 % are partial reduction and 12 % where there is no reduction. These different levels have been established listening to the recordings and afterwards they have been demonstrated in the acoustic analysis.

There were some differences in those cases because of the position of the accent. We have found four situations:

- a) V V́
- b) V́ V
- c) V V

d) $\acute{V} \acute{V}$

In the context d) in Spanish we have not found any cases while in catalan we have found only two.

In the cases a) and b) there were not enough examples to determine a statistic basis so we have only taken into account those cases where the vowels in contact are unstressed. In this situation we have not worried about vowel combinations like [-i i-], [-o o-] (for catalan there is also [-u u-]) where the cases were very few as you can see in the tables given below.

SPANISH	Complete reduct.	Partial reduct.	Pause
[-o o-]	73	27	22
[-e e-]	175	20	21
[-i i-]	2	1	0
[-o o-]	1	6	7

CATALAN	Complete reduct.	Partial reduct.	Pause
[-ə ə-]	190	28	31
[-i i-]	1	0	0
[-u u-]	0	0	1

The consonantic context is another problem. Vowel duration and

frequency change depending on the point of adjacent consonantes articulation. To study with precision the facts that appear when two vowels are in contact we have thought it was necessary to homogenize the consonantic context. The context that provided us with the widest corpus was this one: alveolar or dental consonant -V V- alveolar consonant.

After selecting the corpus, we based our study on the spectrographic analysis. The parameters we have taken into account are:

-Duration of the first and second formant (d1, d2 respectively).

-frequency of the first and second formant in three points:

-initial point (F1.1, F2.1)

-steady point (F1.2, F2.2)

-final point (F1.3, F2.3)

RESULTS

After doing the statistic treatment the results are these.

Complete reduction D1 F1.1 F1.2 F1.3 D2 F2.1 F2.2 F2.3

[-a a-]	46	487	497	475	50	1404	1410	1432
[-e e-]	47	413	448	304	47	1712	1736	1765
[-ə ə-]	50	462	482	491	51	1506	1514	1529

Partial reduction D1 F1.1 F1.2 F1.3 D2 F2.1 F2.2 F2.3

[-a a-]	153	513	600	565	151	1326	1300	1244
[-e e-]	68	430	428	461	66	1505	1574	1574
[-ə ə-]	307	467	565	413	296	1207	1163	1131

Pause (1st element)	D1	F1.1	F1.2	F1.3	D2	F2.1	F2.2	F2.3
[-a a-]	97	478	587	568	90	1392	1392	1424
[-e e-]	207	451	464	494	210	1715	1794	1829
[-ə ə-]	243	467	630	717	243	1310	1305	1337

Pause (2nd element)	D1	F1.1	F1.2	F1.3	D2	F2.1	F2.2	F2.3
[-a a-]	71	652	630	587	71	1272	1283	1261
[-e e-]	53	502	497	492	55	1837	1882	1875
[-ə ə-]	56	636	690	701	52	1283	1261	1250

CONCLUSIONS

Analysis of acoustic parameters show us that there is nearly always a complete reduction when two vowels are closed in fluent speech.

On the other hand, in the case of a pause the duration of the first vocalic element is longer than the second one. This finding is consistent for all vowels and speakers. The duration of the second formant and the duration in cases of complete reduction are similar.

A second finding of the present study is that, in general, the second formant frequency in the examples of partial reduction is lower than the second one in the other cases.

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