A first glimpse of the mid back merger in Girona Catalan

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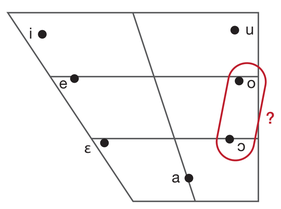
1. Introduction



▸ The vowel system of the majority of Catalan varieties, including the Standard, comprises seven stressed items.

▸ In the diocese of Girona, however, **mid back vowels [o] and [ɔ]** seem to be either **merged** or merging.

▸ Data from 96 speakers in 12 designated survey areas within Girona has been collected.

▸ This is a **pilot study** of the vowels obtained in one of the survey areas, the Ter-Brugent deanery (*TB*), to observe the appearance or not of the [ɔ]-[o] merger and to identify possible variation patterns.

2. Methods

2.1 Survey area

- The diocese of Girona (North-Eastern Catalonia) is a traditional division in Catalan dialectology, and specifically in literature regarding the [o]-[ɔ] pair in the Girona region.
- The data used in this poster was collected in the Ter-Brugent deanery (*TB*), the most western of the 13 deaneries in the diocese.

2.2 Participants

Participant	Gender	Age
TB-FE1-D1	*Female*	15
TB-FE1-H1	*Male*	16
TB-FE2-D1	*Female*	58
TB-FE2-H1	*Male*	65

- N=4 → **Pilot study!**
- Catalan-speaking families
- 2nd generation citizens of the TB deanery

2.3 Interviews

- *Recordings:*
  - Marantz PMD 620 MK II, 4.1kHz SR
  - Pioneer DM-DV15 dynamic microphone
- *Tests:*
  - Visual test (T1): 7 vowels x 7 contexts
  - Reading task (T3): 7 vowels x 4 contexts x 3 repetitions

2.4 Data processing and analysis

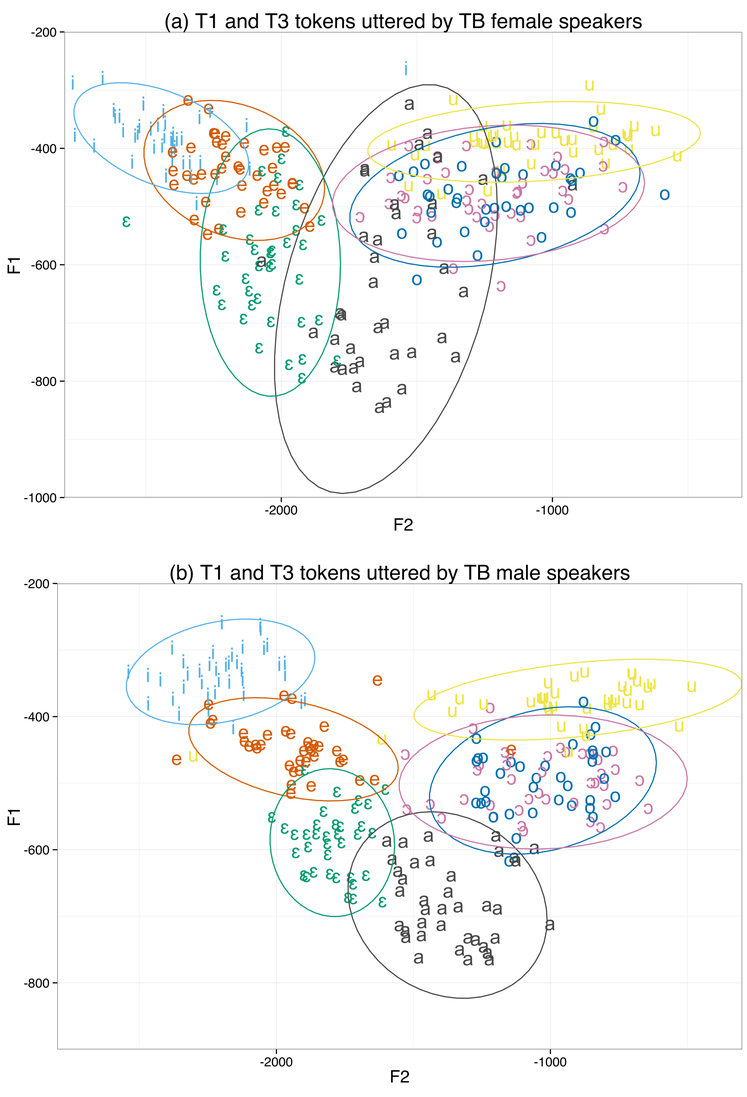
- Orthographic transcription: Praat
- Adjusted automatised alignment: SPPAS
- Formant values extracted with a semi-automatic Praat script
- Normalisation, analysis and plotting: R

3. Results

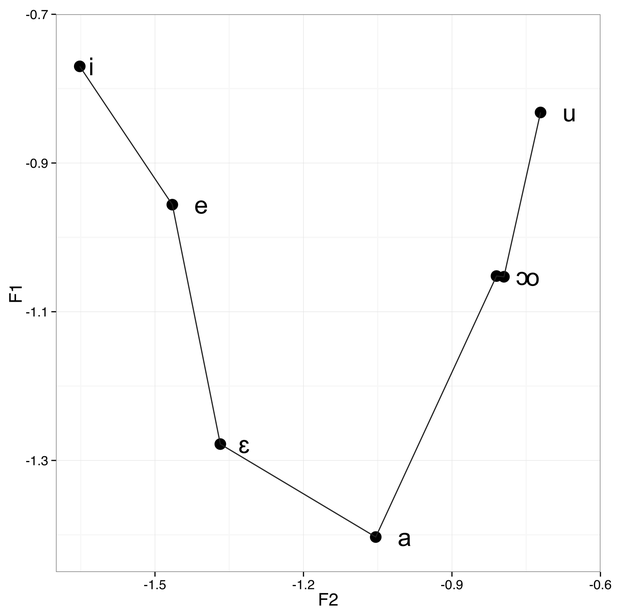
(1) Unnormalised F1, F2, and F3 mean values at midpoint

	Female			*Male*			
	F1 (Hz)	F2 (Hz)	F3 (Hz)	F1 (Hz)	F2 (Hz)	F3 (Hz)	
i *(n=40)*	379	2422	3005	334	2200	2840	i *(n=39)*
e *(n=39)*	441	2175	2866	446	1926	2664	e *(n=38)*
ɛ *(n=39)*	598	2044	2940	589	1792	2644	ɛ *(n=36)*
a *(n=38)*	629	1595	2728	678	1362	2494	a *(n=38)*
ɔ *(n=41)*	**479**	**1231**	**2733**	**498**	**1043**	**2454**	**ɔ** *(n=40)*
o *(n=36)*	**480**	**1202**	**2702**	**496**	**1029**	**2478**	**o** *(n=36)*
u *(n=39)*	391	1072	2650	380	948	2530	u *(n=37)*

(2) Unnormalized F1xF2 midpoint values of all vowel tokens uttered by (a) female and (b) male TB speakers



(3) Mean F1xF2 NEAREY1-normalised values at midpoint



(4) Euclidean Distances (*d*) between the NEAREY1-normalised mean values of the (a) mid back and (b) mid front vowel pairs at midpoint

$$d(\bar{x}_{v1}, \bar{x}_{v2}) = \sqrt{(F1_{v1} - F1_{v2})^2 + (F2_{v1} - F2_{v2})^2}$$

(a) $d(\bar{x}_{\text{o}}, \bar{x}_{\text{ɔ}}) = 0.015$

(b) $d(\bar{x}_{\text{e}}, \bar{x}_{\text{ɛ}}) = 0.336$

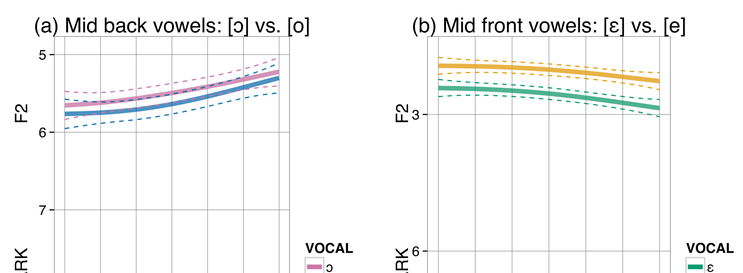
(5) Pillai scores for NEAREY1-normalised mean values of the (a) mid back and (b) mid front vowel pairs at midpoint

(a) $[\text{o}]\ and\ [\text{ɔ}] = 0.002$

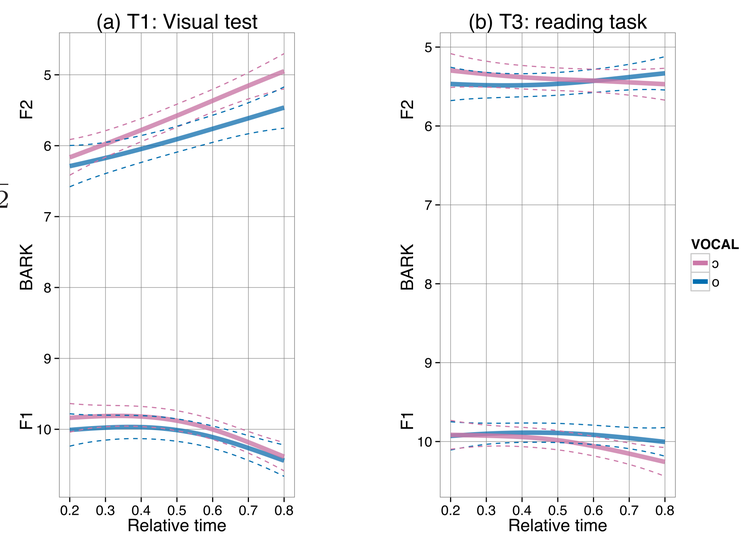
(b) $[\text{e}]\ and\ [\text{ɛ}] = 0.665\ (***)$

- The **Pillai-Bartlett** trace is an output of a MANOVA which tells us about the difference between two clusters.
  - The **smaller** the Pillai score, the **more similar** the dispersion areas of two vowels are.

(6) SS-ANOVAs performed on Bark values for all (a) mid back and (b) mid front vowels



(7) SS-ANOVAs performed on Bark values for all (a) T1 and (b) T3 mid back vowels



- **SS-ANOVAs are used to compare curves**, statistically. They tell us whether two formant trajectories are significantly different or not.
  - Mean formant values measured at the **20, 30, 40, 50, 60, 70, and 80%** of the vowel interval; curves fitted through the model.
  - Dashed lines: **95% confidence intervals; if they overlap, the vowels are not significantly different**.

4. Discussion

- Results point at a complete merger of [o] and [ɔ] for our speakers in the area of Ter-Brugent.
  - Difference between [o] and [ɔ] raw and normalized formant values are negligible and Euclidean distances are clearly smaller for the mid back than for the mid front vowel pair.
  - Raw dispersion shows a clear overlap of the two mid back vowels, and Pillai-scores show that the difference between the [o] and [ɔ] clusters is not significant.
- Formant trajectories show that speech styles may have an effect on the merger.
- Neither age nor gender seem to affect the merger, though female speakers seem to present less clear boundaries for all vowels.
- The mid back vowel resulting from the merger seems to be placed towards the higher end of the vowel space, and its overlap with [u] may have some relevance.

References

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