

## The mid back vowel merger in Girona Catalan: acoustic evidence

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The stressed vowel system of Central Catalan consists of [i], [e], [ɛ], [a], [ɔ], [o], and [u]. In this paper, however, I explore the hypothesis that the two mid back vowels are merged in the sub-variety spoken in Girona (North-Eastern Catalonia).

The hypothesis arises from a series of remarks made in Catalan dialectology. Since Coromines (1953) stated that 30 words with an etymologically closed mid back stressed vowel in the initial syllable were pronounced with an [ɔ] in all Catalan varieties except in the dioceses of Girona and Elna (Southern France), where it was [o], several authors have accounted for the vowel system in Girona through that theory. With each mention, though, the initial 30-word list has expanded to include over 150 items, many of which do not meet the established criteria. Additionally, Luna (1995), Julià (1986), or Recasens (1996) note that [ɔ] and [o] *sound* particularly close to each other in the area.

As a result, Herrick (2003) and Recasens and Espinosa (2009) carried out acoustic analyses and found —through 3 female speakers reading a list of non-words and 5 male speakers reading a sentence list, respectively— that [o] and [ɔ] were merged in Girona. The current study seeks to provide additional data and a deeper understanding of the phenomenon.

In this communication, I present the production data obtained for that study through 96 sociolinguistic interviews. The participants, 48 female and 48 male, were born either in 1998 or between 1947 and 1957, all from Catalan-speaking families, and at least second generation citizens and life-long residents of one of 12 survey points. Interviews included a picture naming task and a replication of the reading task in Recasens and Espinosa (2009).

From those tasks, 15,336 tokens corresponding to all 7 theoretical vowels were segmented and aligned semi-automatically with SPPAS (Bigi 2015). F1, F2, and F3 values were estimated by the LPC formant-tracking algorithm in Praat (Boersma and Weenink 2016), extracted at 7 points throughout each interval with a semi-automatic script, and then Lobanov-normalized through “vowels” (Kendall and Thomas 2012). Next, following recent research (i.e. Freeman 2014; Wassink 2014; Nycz and Hall-Lew 2013; Johnson and Nycz 2014; Johnson 2015), a series of data visualization and statistical methods were used to test the merging of [o] and [ɔ], taking into account distance and overlap, at midpoint and throughout the interval: i.e. 2D kernel density estimation, Euclidean distances, Bhattacharyya coefficient, SSANOVAs. Finally, mixed-effects regression modeling was used to test the effects of survey point, sex, age, and context on the vowel system of participants.

The results show that mid back vowels are merged for a majority of participants in all contexts, with slight variations in the scope and characteristics of the merger, as well as small geographic and age differences. At the same time, the mid front vowel pair, [e]-[ɛ], remains distinct for practically all participants, and some overlap of the merged vowels with [u] occurs.

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