



Research Article

Variation in the lexical distribution and implementation of phonetically similar phonemes in Catalan

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ABSTRACT

In some Romance languages with two pairs of mid vowel phonemes, it is acknowledged that these contrasts are somewhat unstable. We analyze the distribution and realization of the anterior and posterior mid vowels in Catalan to test claims (mostly based on anecdotal evidence) that these contrasts exhibit inter- and intraspeaker variability. Participants produced target words containing stressed mid vowels and, later, judged vowel height (/e/ vs. /ɛ/; /o/ vs. /ɔ/) in the same words. The results indicate that, even intradialectally, the distribution of mid vowels is somewhat variable, with speakers showing only moderate agreement in the distribution of phonemic vowels. In addition, speakers are not always consistent in their realization of mid vowels when they produce the same word (probably indicating weak phonolexical representations). Interspeaker variation was also observed in the phonetic implementation of the contrasts. The results indicate that the Catalan mid vowel contrasts, like those in other Romance languages, are weaker and less stable than other phonological oppositions.

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1. Introduction

In this paper, we investigate the strength of the phonological contrasts between two pairs of vowel phonemes, as realized by individual speakers of Central Catalan. Like other Romance languages including French and Italian, many varieties of Catalan have two pairs of mid vowels: anterior /e, ɛ/ and posterior /o, ɔ/ (Recasens, 2014, p. 15). As indicated by our symbolic representation, these four vowels are all assumed to be separate phonemes, meaning that they lie in “direct contrast” with one another, distinguishing the meanings of words (Bloch & Trager, 1942, p. 38; Bloomfield, 1933, pp. 77–79). That is, there exist minimal pairs distinguished only by [e] vs. [ɛ], or [o] vs. [ɔ] (for example, /be/ ‘good’ vs. /bɛ/ ‘lamb’; /os/ ‘bear’ vs. /ɔs/ ‘bone’).

However, the phonological status of mid vowels in Catalan is complex in several ways. First, mid vowel usage varies across dialects. For instance, a word with [e] in one variety may be realized with [ɛ] in another. Second, impressionistic descriptions point to oscillation in mid vowel assignment even within the same dialect or by the same speaker. Third, in Catalonia, no monolingual speakers of Catalan exist. All speakers, even those most dominant in Catalan, are bilingual in Spanish, whose vowel system lacks /ɛ, ɔ/. Thus, the realization of the contrasts may depend on a speaker’s exposure to Spanish (Mora, Keidel, & Flege, 2015; Mora & Nadeu, 2012). The combined effects of these factors motivate the focus of this paper, on individual speaker differences in the realization of the /e–ɛ/ and /o–ɔ/ contrasts. We investigate these differences using a method that pairs the phonetic analysis of speakers’ productions with their native intuitions of vowel quality, accessed at the word level.

1.1. Degrees of phonological contrast

A central question in phonological analysis is whether a given pair of sounds lie in opposition (e.g. Trubetzkoy, 1939), and the traditional test is to seek minimal pairs: if at least one is found, then the two sounds in question are separate phonemes. If, on the

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other hand, the two sounds appear in predictably complementary distribution, they are allophones of the same phoneme, and are not phonologically contrastive (Hockett, 1955; Hyman, 1975, Section 3.1). While the notion of phonemic categories remains highly useful in theoretical linguistics and related fields (Hall, 2013; Ladd, 2006), the idealized view of phonemic status based solely on lexical contrast is increasingly called into question. In their discussion of quasi-phonemic contrasts in Scottish English, Scobbie and Stuart-Smith (2008) make clear that not all contrasts are equally contrastive. Indeed, some contrasts are supported by many minimal pairs and salient phonetic distinctions, while others have a low functional load (Hockett, 1966; Renwick, 2011; Surendran & Niyogi, 2006), making them more susceptible to merger over time (Wedel, Jackson, & Kaplan, 2013). Some contrasts are phonetically overlapping, such as palatal glides vs. obstruents in Castilian Spanish (Hualde, 2004) or the alveolar/retroflex contrast in Arrernte (Tabain, 2009). Other weak contrasts may be partially phonologically conditioned. For instance, in English, /ð/ and /θ/ are historical allophones that gained contrastiveness due to the lenition of word-initial [θ] to [ð] in function words (*the, thy*), coupled with the appearance of [ð] under stress (Dobson, 1968; Luick, 1940; Thurber, 2011). Nonetheless, few minimal pairs exist (e.g. *either–ether*). As reviewed by Hall (2013), there are many causes of these *intermediate phonological relationships* or *marginal contrasts*. They are common across languages and have been given numerous labels.

Marginal contrasts occur among vowels across the Romance languages. In Romanian, the phonemic contrast between /i, ɨ/ has a low functional load maintained by only a handful of minimal pairs; otherwise, these historical allophones remain in nearly complementary distribution (Renwick, 2014). Turning to Romance languages with /e, ɛ/ and /o, ɔ/, several authors have noted the instability of these contrasts, variability in their realizations, neutralization in certain varieties, or a different behavior with respect to other vowel contrasts (for French: Fagyal, Kibbee, & Jenkins, 2006; Landick, 1995; Trubetzkoy, 1939; for Italian: Renwick & Ladd, under review; for Portuguese: Escudero, Boersma, Rauber, & Bion, 2009; Wetzels, 1992). The fact that not all contrasts are equal is buoyed by recent work on Romanian (Renwick, 2014) and French (Hall & Hume, 2015), showing that marginal contrasts among vowels are less perceptually distinct than more robust contrasts, even when the segments are acoustically distinct.

The mid vowel distinctions in Catalan, similarly, are demonstrably weaker than other vowel contrasts in the language. Some researchers have anecdotally observed variation involving these pairs of vowels and have compiled lists of words that seem to be prone to vowel substitutions. In addition, based on the results of psycholinguistic experiments, Mora et al. (2015) hypothesized that, due to language internal and external factors, the mid vowel contrasts are phonologically weakened, even in Catalan-dominant bilinguals.

Regardless of the source of this variation, the primary focus of the present study is on whether speakers' intuitions match their production, a correspondence not previously investigated for Catalan. Our study, with respect to earlier work, begins with a methodological acknowledgment that individual speakers vary in assigning vowel height to particular lexical items. While previous studies have demonstrated effects of language dominance on production and perception in Catalan, they have not taken into account the possibility that two speakers, even with equivalent Catalan dominance levels, may possess different lexical representations for the same word. In fact, the mapping between individual words and the category in which they are realized is rarely considered. An exception is Bosch and Ramon-Casas' (2011) study, which in calculating a production "error rate" assumes a "correct" phonological form to which speakers should adhere to achieve native-like speech. Instead, we probe each speaker's phonological intuitions, to create an individual standard of comparison based on the speaker's judgments. Against this backdrop, we evaluate the strength of Catalan mid vowel contrasts in speech production. We hypothesize that if speakers' mid vowel contrasts are robust, then their productions will match their native intuitions of vowel quality; and that vowel tokens from repetitions of a single lexical item will cluster together acoustically. If mismatches are found, either between speakers' production and intuition or across repetitions of a word, we take this as evidence of fuzziness, or weakness, in the phonological category boundaries between Catalan mid vowels.

In the remainder of the Introduction, we provide a brief historical sketch of Catalan mid vowels, their synchronic distribution, and review previous experimental work on which our study builds. The rest of the article is organized as follows: Section 2 summarizes the goals and hypotheses. Section 3 describes the methodology. Section 4 presents the results, while the discussion and conclusions are found in Section 5.

1.2. Origin and distribution of the mid vowels

Like Vulgar Latin (VL; Alkire & Rosen, 2010, p. 13), Central Catalan displays a seven-vowel system with two pairs of mid vowels (Fig. 1),¹ although these seven vowels are only possible in stressed syllables. Due to the existence of stress-conditioned vowel alternations, only three vowels, [i ə u], are possible in unstressed syllables (Mascaró, 2002). Despite the similarity between Latin and Catalan in their stressed vowel systems, the evolution of the anterior mid vowels is actually quite complex.

Fabra (1906) observed that VL /e/ (<Ē, Ī, OE) lowered to present-day Catalan /ɛ/ (with an intermediate step /ə/, preserved only in some varieties of Majorcan Catalan; Rasico, 1993), whereas /ɛ/ (<Ē, AE) evolved into /e/, with some exceptions.² Specifically, /ɛ/ was preserved unchanged before /l/, /r/ + vowel, /r/ + non-labial consonant, [w], and before the VL group N'R (see also Rasico,

¹ To simplify, we focus on the Central variety of Eastern Catalan only. While the seven-vowel system is quite common across Catalan varieties, smaller and larger vowel systems are found (e.g. Majorcan Catalan has eight stressed vowels, Girona Catalan has six, and Roussillonais Catalan has only five; Recasens, 2014, p. 15). In addition, the diachronic evolution and, therefore, contemporary synchronic distribution of mid vowels is not shared by all dialects of Catalan (Badia i Margarit, 1981, p. 138; Moll, 1991, p. 72ff; Wheeler, 2005, p. 38). Catalan varieties also differ importantly in their patterns of phonological vowel reduction (Mascaró, 2002).

² The change from Vulgar Latin /e/ to Central Catalan /ɛ/ is not without exceptions, but these seem to lack a systematic character (Rasico, 1981).

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