Auditory Discontinuities and the Perception of Vowel Height in Spanish Back Vowels

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A wide-spread approach to the study of speech perception entails binding phonological categorization to some sort of auditory discontinuities. Consistent with this view, some authors made an attempt to connect the "center of gravity effect" (CGE) (Chistovich and Lublinskaya, 1979) to the perception of vowel height, suggesting that the [+/- high] boundary might be based around a "quantal" region of the auditory space. In particular, Syrdal and Gopal (1986) found that productions of American vowels could be divided into the phonological categories [+/- high] by a boundary at 3-3.5 Bark F1-f0 distance (which corresponds to the limit of integration of the CGE). Later, in a perceptual study using front vowels, Hoemeke and Diehl (1994) found that the boundary for the phonological feature [+/- high] was indeed at 3-3.5 Bark F1-f0 distance. However, Fahey and López-Bascuas (1994) and López-Bascuas et al. (1995) found that the 3-3.5 Bark F1-f0 boundary does not seem to be effective for Spanish front vowels neither in production nor in the perception of the [+/- high] phonological contrast. Moreover, in English, results obtained with back vowels do not seem to support clearly the 3-3.5 Bark hypothesis (Fahey, Diehl and Traunmüller, 1996). In this study, our previous results with front vowels are extended to Spanish back vowels. F1 and f0 were measured from Spanish vowel productions in order to estimate the F1-f0 Bark value that separates out the [+/- high] back vowel categories. Our acoustic analyses agree well with our perceptual results and do not support the hypothesis of a 3-3.5 Bark F1-f0 integrator playing a significant role in the psychological organization of the [+/- high] distinction.

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