Interaction of phonetic cues in dark /l/ vocalization

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Production and perception data on the vocalization of dark /l/ into /w/ reported in two studies (Recasens & Espinosa, in press (a), (b)) support the notion that speakers use different sources of information for replacing the alveolar lateral by the glide.

In one study, we attempted to elicit whether the vocalization of dark /l/ results from contact loss at the alveolar place of articulation or else should be attributed to spectral similarity between strongly dark /l/ and /w/, which share a low F2 about 800-1000 Hz. For that purpose, a series of /l/ stimuli which varied in degree of alveolar contact as measured with electropalatography and in F2 formant frequency were presented for identification as /l/ or as /w/ in /VlbV, VldV, VlsV, VlkV/ sequences excised from real speech sentences. There were four conditions overall, i.e., 'low F2' (650-950 Hz), 'high F2' (850-1150 Hz), 'low alveolar contact degree' (minimal or no contact at closure location) and 'high alveolar contact degree' ((almost) complete contact at closure location). Stimuli specified for four combinations of these EPG-F2 conditions were submitted to perceptual testing: 'low alveolar contact degree'-'low F2'; 'high alveolar contact degree'-'high F2'; 'high alveolar contact degree'-'low F2'; 'low alveolar contact degree'-'high F2'. Results suggest that /l/ vocalization may be triggered by both alveolar contact loss and acoustic equivalence (e.g., percentages of /w/ responses were highest for the 'low alveolar contact degree'-'low F2' combination in the case of the cluster /lb/), or need to be attributed to other causes (e.g., /l/ in the cluster /ld/ did not exhibit any alveolar contact loss and yielded practically no /w/ responses for the 'low F2' condition).

The second study investigates the relative power of acoustic cues in dark /l/ vocalization. Results from identification tests with synthetic speech stimuli performed on Catalan speaking informants reveal that both the formant frequency characteristics at the consonant steady-state period (which depend on the overall articulatory configuration for dark /l/), and the onset or onset/offset time of the vowel transitions (which is determined by the degree of anticipatory tongue dorsum lowering and backing for the alveolar lateral), may play an active role in the vocalization process. Glide identification was triggered almost exclusively by formant frequency variations at the steady-state period for moderately dark realizations of /l/ showing an F2 frequency about 800-900 Hz, and by both the steady-state frequency characteristics and the timing of the vowel transitions for strongly dark realizations of /l/ with an F2 below 800 Hz. In conjunction with descriptive language data, these results suggest that there may be different paths to the same sound change, i.e., /Vl/ > /Vw/ whenever the transitions play no role in glide identification, and /Vl/ > /Vwl/ > /Vw/ whenever the transitions are integrated as an on-glide in the first place and the glide gets deleted at a later stage.

Results from these perceptual studies suggest that sound changes may be implemented through different evolutionary paths by articulatory and (static and dynamic) acoustic characteristics acting in isolation or in combination. The contribution of these potential cues will be evaluated in the light of current theories on the phonetic causes of sound change.

References

Recasens, D., and Espinosa, A. (in press (a)). A perceptual analysis of the articulatory and acoustic factors triggering dark /l/ vocalization. In Recasens, D., Sánchez Miret, F. & Wireback, J. (eds.), *Experimental phonetics and sound change*, Lincom Europa, München

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