Boundary Strength and its Effect on Coda Liquid Production in Puerto Rican Spanish
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Prosodic boundaries come in different strengths [1,2] and stronger boundaries correlate with articulatory lengthening and strengthening [3,4]. This study looks at the effect of proximity to prosodic junctures of different strengths on the production of coda liquids by 4 Puerto Rican Spanish (PRS) speakers using a real-time magnetic resonance imaging (rtMRI) protocol specifically developed to study the dynamics of speech production [5]. The sagittal view of the entire vocal tract provided by rtMRI is ideal for examining the dynamics of liquid production. An additional coronal view is collected simultaneously for qualitative analysis of the shaping of the sides of the tongue.

The prosodic junctures considered are the word-medial syllable boundary; word-final, phrase-medial boundary and the phrase-final, pre-pausal boundary. Specifically, I ask if boundary strength influences the rate of lateralization of etymologically expected coda taps. Rate of lateralization is determined by a perception experiment carried out in tandem to the articulatory study. I also measure movement of tongue tip and tongue body articulators (magnitude, timing) during coda liquid production and compare them with the movements during production in onset position. Onsets serve as a control condition since no lateralization is reported for taps in onsets and onset liquid production in Spanish has been previously characterized [11].

The articulatory basis of coda tap lateralization is not known. However, two general hypotheses can be posited. They are not mutually exclusive.

1. Lateralization is a reduction effect.
   A plausible story in this view is that in leniting coda contexts, tongue body constrictions required for tap production undershoot their target. If said target constrictions normally block lateral airflow in onset position, then their undershoot in the coda could explain lateralization.

2. Lateralization is a blending effect, due to distinct modes of temporal coordination in onset and coda positions.
   A plausible story in this view is that the dynamics of tongue tip and tongue body coordination during coda—and not onset—tap production interacts with the constantly changing conditions in the vocal tract permitting lateral airflow during some period of time.

If (1) is true, then proximity to a strong boundary and concomitant decrease in the rate of reduction is predicted to lead to a lower rate of lateralization when compared to a weak boundary.

If (2) is true, then proximity to a strong boundary and concomitant decrease in the amount of gestural overlap is predicted to lead to a higher rate of lateralization when compared to a weak boundary.

Traditional phonological accounts [6,7] concluded that lateralization of coda taps is total and that coda liquid neutralization in PRS is complete. However, other research [8,9,10] showed coda tap production to be distinct from phonemic lateral production. Here, I use the known effects of proximity to strong boundaries—namely a decrease in both reduction and gestural overlap—to probe the nature of lateralization. It is the first time, to my knowledge, that the articulation of PRS liquids will be directly observed and measured under different prosodic conditions.
References


