

An Ultrasound Investigation of Covert Articulation in Rapid Speech

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Word-final /t,d/ deletion in English has been linked to many factors, including morpho-phonological processing and phonotactic constraints, lexical frequency, and social identity. This study examines not just deletion but lenition and other types of reduction in word-final /t,d/ from an articulatory standpoint. We hypothesize that the variability in /t,d/ deletion can be at least partially accounted for by temporal gestural overlap, or “covert articulation”, rather than categorical phonological deletion. In this account, perceived deletion is in fact due to masking of the coronal gesture by subsequent gestures, and therefore may have a small but perceptible acoustic or visual consequence.

Our study employs a game-like experimental paradigm called the Map Task, where target words on the maps are designed to elicit casual utterances of phrases that promote deletion or retention of the word-final coronal stop. Participants’ speech was recorded using both audio and sagittal lingual ultrasound imaging to examine the time-dependent gestures that accompany the stops. From the ultrasound traces of the tongue tip, a trace of the constriction aperture over time is extracted and analyzed. Comparisons between phrases indicate that /t,d/ deletion is indeed variable or gradient, rather than categorical, and that covert articulations do play a role in the perceived deletion of /t,d/ in conversational speech.