UltraFest V abstract

Planning strategies governing selection of kinematic flap/tap variants in North American English
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Using a B/M ultrasound measurement method for capturing high-speed articulatory data from low-speed ultrasound recordings, Derrick and Gick\(^1\), \(^2\) demonstrated that English flap/tap singletons are produced using up to four kinematic variants: up-flaps, down-flaps, postalveolar taps and alveolar taps.

Using more of this data collected from 18 native English participants, we argue that planning strategies govern the selection of kinematic variants based on individual variation and a set of phonetic, motor, physiological and psychological constraints.

In single flap sequences, the variations relate to the *phonetic constraint* of tongue tip position in neighboring rhotic and non-rhotic vowels for 17 of 18 subjects.

In double flap sequences, two *motor constraints* also apply. One motor constraint is the “end-state comfort hypothesis”\(^3\), or a tendency toward ending a sequence of flaps with the tongue tip in a preferred position for articulating the vowel proceeding the final flap. Among 5 of 18 subjects, ‘edit the’ has an alveolar tap or down-flap, but ‘edit a’ has an up-flap, down-flap sequence, suggesting that some subjects will change the flap in the word ‘edit’ to accommodate an ideal tongue position for the vowel at the end of the flap sequence.

The second motor constraint is an avoidance of ending a flap sequence with an up-flap, such that ‘edify’ has an alveolar tap or down-flap, but, for 14 of 18 subjects, ‘editor’ has a high-flap, postalevolar tap sequence.

In both single and double flap sequences, the remaining individual variation may be partially explained by a *physiological constraint* of tongue tapping speed. In all cases, faster tongue speed correlates with an increased likelihood of alveolar tap and a decreased likelihood of up-flap production. In short, those with slower tongues are more likely to produce flaps instead of taps.

Future analysis will also examine the effects of a fourth *psychological constraint*. Preliminary evidence suggests that proximity to a preceding speech error is directly related to the likelihood that participants will change their flap variants the next time they use the same phrase.

2 D. Derrick and B. Gick “Identification of four kinematic variations among English flaps and taps.”, in prep