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Stable patterns of articulatory movements across inter-subject variability

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The goal of the present study was to test whether models of portions of curves, representing movements of the crucial articulator for production of place in syllables containing labiodental and alveolar consonants ('iceberg' portions of demisyllables), that had previously been found to be stable across different prosodic conditions (Bonaventura, 2003; 2005; 2006; Bonaventura and Fujimura, 2007), a) remained stable across different subjects pronunciations, for each consonantal class b) were significantly different for the two different consonantal movements. Curves were previously extracted from microbeam articulatory data.

Curve fitting models were obtained, by using a best fit fourth order polynomial, from 592 curves representing lower lip displacement for production of [f] in 'five' (3 subjects) and from 299 curves representing tongue tip displacement for production of [n] in 'nine' (3 subjects). Coefficients were statistically compared; results showed a) significant difference for all coefficients between subjects pronouncing same consonant, except for the 3rd coefficient, both in initial and final demisyllable, representing stability of slope around a position threshold. These results might indicate stable patterns across inter-subject variability; b) coefficients were significantly different for [f] vs. [n] models across speakers, within initial vs. final demisyllable, possibly indicating properties of an identifiable articulatory gesture.