Consistency and bias: characterizing individual variability in the production of American English /æ/ and /ɑ/

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Abstract (max 300 words)

Differences in individual behavior can be evaluated by describing the outcome of movements in relation to a reference target or to another performer in the same environmental condition (Schmidt et al. 2018). Error scores are a set of measures which can assess bias and consistency of movement outcomes. Constant Error (CE) relates to performance tendency indicating the amount of deviation in movement relative to a target; Variable Error (VE) measures the inconsistency in movement outcome, indicating how precise individuals are in their performance (Henry, 1974). Combined, these measures can characterize variation in speakers' behaviors. In this study, we computed CE and VE scores of tongue blade and dorsum kinematic variables (TBy, TBx, TDy, TDx) and the first two formants (F1, F2) measured at five equidistant points to investigate differences in the production of the vowels /æ/ and /ɑ/ by 20 native speaker's of American English selected from the EMA-MAE corpus (Ji et al., 2014). Preliminary results of CE and VE scores of acoustic and kinematic variables revealed that variation in error scores seems to be larger in the acoustic than in the articulatory dimension. Furthermore, for F1, TBy, TDy, and TDx there was a significant effect of vowel in CE scores, which were less dispersed in /æ/, indicating that speakers tended to remain closer to the mean values of this vowel and were, therefore, more target oriented in their production of /æ/. Differences between speakers are less straight-forward, however error scores of the kinematic and acoustic variables indicated that some speakers tended to be consistently short of the target (low VE and negative CE scores), while others were inconsistently overshooting the target goal (high VE and positive CE scores). Ultimately, error scores are valuable tools to characterize speakers' tendencies and consistencies in speech production.

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