

Do individual differences predict learning outcomes in biofeedback training?

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Abstract

Visual-acoustic biofeedback and ultrasound biofeedback technologies have been suggested to be beneficial in speech training for L2 learners and individuals with speech disorders. However, there are large individual differences in response to biofeedback that are not well-explained by current research. Inspired by the DIVA model, we hypothesized that acuity in auditory-acoustic and somatosensory domains could influence an individual's responsiveness to different types of biofeedback when learning L2 sounds. This study tests our hypothesis by measuring auditory and somatosensory acuity in individuals who will be randomly assigned to receive either visual-acoustic or ultrasound biofeedback. Forty monolingual English speakers will be trained to produce two Mandarin vowels over one hour of training in their randomly assigned biofeedback condition. Auditory acuity will be assessed with an AXB staircase discrimination task and oral somatosensory acuity with a letter-form recognition task. Accuracy in production before and after training will be measured by acoustic distance from a native-speaker target in F1-F2 space. A multiple linear regression model will be used to analyze the predictive power of auditory perceptual acuity, somatosensory acuity and phonological awareness for learning success in each of the biofeedback training conditions.