ERP Correlates of Learning to Categorize Speech-like Sounds
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INTRODUCTION
In a previous fMRI study, we found that an area extending along the left superior temporal sulcus (LSTS) was more responsive to familiar CV syllables than to comparably complex nonphonemic auditory patterns that could not be classified into discrete learned categories (Liebenthal et al. 2005). Here, we test the hypothesis that the pattern of increased activation in left ventral temporal cortex (and in particular left posterior STS) during speech perception is related to the categorical nature of this process rather than strictly to its relevance for language. In addition, we wish to describe the temporal dynamics of activation in temporal regions involved in categorization of speech phonemes.

ERPs responses are compared before (Pre- and after (Post)-training) to categorize a continuum of speech-like nonphonemic auditory patterns (NP). Subjects are also trained with a phonemic ba-da continuum (P) as a control for nonspecific training effects.

METHODS
SUBJECTS: N=25, normal hearing, no neurological symptoms; 7 subjects excluded from group analysis due to very poor NP categorization performance (CPN>0.1) or lack of improvement in Post NP (Pre-Post difference in CPN<0.1). One additional subject excluded from ERP analysis due to invasive withdrawal effects.

STIMULI
» P, T, and a linear continuum between the F1 in the syllables

CATEGORIZATION TRAINING PROTOCOL
» Four steps of categorization training from endpoint to category boundary tokens; 90% accuracy for 24-ball task required at each step (all two final steps).
» Extend protocol for P and NP sounds repeated in four sessions (last session immediately before Post-scan)

ERP ACQUISITION & ANALYSIS
» 64-channel Magstim MEG-compatible acquisition system and Scan 4.3 analysis software (Nuineux)
» 0.3-30 Hz band pass
» Both hemispheres artifact removal
» Epochs: 100-500 ms from stimulus
» Epochs with ±100, ±100, ±100 µv
» Epochs averaged according to stimulus (P, NP) and training (pre, post)

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