

Plasticity in Auditory-Visual Integration

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Visual contrast detection learning is known to be very slow and needs several sessions or thousands of trials to be apparent. Previously, we showed that training with sound-coupled visual stimuli, where the sound is presented simultaneously with the visual contrast stimulus, can improve contrast detection within a single session. The improvement effect was found to be significant only for sound-coupled visual stimuli. Therefore, this sound-dependent training effect maybe due to cross-modal plasticity. Yet another possibility is that sound might serve simply as a timing cue, learned by repeated exposure and utilized to predict the onset of the stimuli in the two-alternative forced-choice intervals. Also, it was unclear whether the training effect reflected long-lasting perceptual learning, or a short-term modification. To examine the characteristics of the training effect we tested contrast detection of the five most successful learners, 6-10 weeks following the sound-coupled training session, and compared their performance in different timing and sound conditions. Four out of the five subjects had maintained their significant improvement in detection. In addition, performance in trials where stimulus timing was variable (within a 500ms time window) was not significantly different from performance in fixed-timing trials, rejecting the role of sound as a timing cue. Also, no clear specificity of learning to sound frequency was found. Altogether, these preliminary results suggest that the training effect reflects a long-term learning in auditory-visual interactions, and that learning is not specific to sound frequency.