

Practicing an auditory working memory task recruits lower-level auditory areas in a task-specific manner

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Abstract: We studied the impact of the trained auditory task on the pattern of behavioural improvement, and its relation to the underlying neural mechanisms. Specifically, we asked whether training with tone retention and manipulation (working memory, WM) transferred to pitch discrimination and vice versa, and whether training modified the brain areas that underlie task performance. Training substantially improved performance, but did not transfer across tasks, even when using the same stimuli. Pre and post training fMRI scans revealed that WM training enhanced activity in bilateral auditory cortices, but not in frontal areas that are initially associated with higher cognitive functions. These results suggest that training-induced improvement is associated with back-tracking along the reverse hierarchy in a task specific manner, as predicted by the Reverse Hierarchy Theory of perceptual learning (Ahissar & Hochstein, 2004). Thus, low-level areas are recruited, but there is no general upgrade in WM or in auditory skills.