

Activation of Mirror Neuron System Response to Drumming Training: A Functional Magnetic Resonance Imaging Study

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Abstract : Many rehabilitation strategies exist to aid persons with neurological disorders relearn motor skills through intensive training. Evidence supporting the theory that cortical areas involved in motor execution can be triggered by observing actions performed by others is attributed to the function of the mirror neuron system (MNS) indicates that activation of the MNS is associated with improvements in physical action and motor learning. Therefore, it is important to investigate the relationship between motor training (in this case, playing the drums) and the activation of the MNS. To achieve this, 15 healthy right-handed participants received drum-kit training for 21 weeks, during which time blood oxygen level-dependent (BOLD) signals were monitored in the brain using functional magnetic resonance imaging (fMRI). Participants were required to perform action-observation and action-execution fMRI tasks. The main results are that BOLD signals in classical regions of the MNS such as supramarginal gyri, inferior parietal lobule, and supplementary motor area increase significantly over the training period. Activation of these areas indicates that passive-observation of others performing these same skills may facilitate recovery of persons suffering from neurological disorders, and complement conventional rehabilitation programs that focus on action execution or intense training.

Keywords : fMRI, mirror neuron system, magnetic resonance imaging, neuroplasticity, drumming, learning, music, action observation, action execution

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