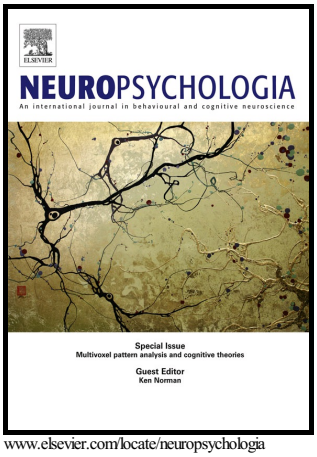

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Giovanna Lagravinese, Ambra Bisio, Piero Ruggeri, Marco Bove, Laura Avanzino

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Learning by observing: the effect of multiple sessions of action-observation training on the spontaneous movement tempo and motor resonance

Giovanna Lagravinese, Ambra Bisio, Piero Ruggeri, Marco Bove, Laura Avanzino*

Department of Experimental Medicine, Section of Human Physiology and Centro Polifunzionale di Scienze Motorie, University of Genoa, 16132, Genoa, Italy

*Corresponding author: Dr. Laura Avanzino, Department of Experimental Medicine, Section of Human Physiology, Viale Benedetto XV 3, 16132, Genoa, Italy. Tel: +39 0103538172; Fax: +39 0103538194. lavanzino76@gmail.it

ABSTRACT

The present study was designed to explore the changes in motor performance and motor resonance after multiple sessions of action observation (AO) training. Subjects were exposed to the observation of a video showing finger tapping movements executed at 3Hz, a frequency higher than the spontaneous one (2Hz) for four consecutive days. Motor performance and motor resonance were tested before the AO training on the first day, and on the last day. Results showed that multiple sessions of AO training induced a shift of the speed of execution of finger tapping movements toward the observed one and a change in motor resonance. Before the 3Hz-AO training cortical excitability was highest during the observation of the 2Hz video. This motor resonance effect was lost after one single session of 3Hz-AO training whereas after multiple sessions of 3Hz-AO training cortical excitability was highest during the observation of the 3Hz video. Our study shows for the first time that multiple sessions of AO training are able not only to induce performance gains but also to change the way by which the observer's motor system recognizes a certain movement as belonging to the individual motor repertoire. These results may encourage the development of novel rehabilitative protocols based on multiple sessions of action observation aimed to regain a correct movement when its spontaneous speed is modified by pathologies or to modify the innate temporal properties of certain movements.