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## The diagonal movement: Electrophysiological effects and clinical implications

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Diagonal movements have previously been used in rehabilitation protocols in order to promote cerebral plasticity and motricity. For example, diagonal arms movements have been used since they have more intrinsic complexity compared to vertical movements because they involve the crossing of sagittal body midline and the active processing of both left and right peri-personal hemi-space. Recently, Adele Diamond (2015) has supported the idea that rehabilitation protocols that focus on diagonal movements, eye-hand coordination and bimanual coordination could be effective on cognitive rehabilitation as well. Still, the neural mechanisms that underlie these rehabilitation benefits are not clear. Diagonal movements have been associated to specific changes in absolute fronto-parietal alpha and beta (9-13 and 14-30 Hz, respectively) power using a pre and post training design. Yet no study that we are aware of assessed cerebral activity during actual movements. Consequently, in the current study, we examined the neural correlates of diagonal arm movements by recording cerebral electrophysiological activity during task performance, comparing diagonal and vertical arm movements. In line with previous studies, time-frequency analysis showed differences between the diagonal and vertical movements in fronto-parietal alpha and beta, as well as theta (6-7 Hz) activity which are known to be related to working memory, motor planning and cognitive and memory task performance, respectively. The current data, together with aforementioned theoretical models, suggest that future applications of diagonal movements in rehabilitation protocols could lead to improvement in mental well-being, ranging from improved sports performances and to clinical setting.

### Biography

Fabio Marson has obtained his Master's degree in Cognitive Neuroscience and Psychological Rehabilitation at Sapienza University of Rome. He has started as working as Post-graduate Assistant in the Psychology Department at Sapienza University of Rome, Italy. His works were focused on spatial attention and different forms of numerical cognition.

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