Contribution ID: **933** Type: **Poster**

# Involvement of the mirror and the mentalizing system during self-directed and other-directed communicative intentions. An sLORETA study.

*Friday, September 12, 2025 12:30 PM (1h 45m)*

Background:
Recognizing others'intentions is pivotal for social interaction and involves the mirror neuron system (MNS) and the mentalizing system (MENT). Yet the organization and interaction of these systems during self- versus other-directed action observation are not fully understood. EEG research associates MNS activity with mu rhythms (alpha: 8–13 Hz; beta: 15–20 Hz) and has revealed distinct activations in key MNS and MENT regions across various EEG bands during self-involved social motor tasks. Using EEG source localization, this study explores MNS and MENT involvement during action observation, expecting mu suppression in MNS areas and greater MNS and MENT recruitment during self-directed communicative actions.

Methods: During 64-channel HD-EEG recordings, 35 participants watched video clips of communicative or private intentions as well as other-directed and self-directed intentions (task adapted from a previous fmri study). We used sLORETA to compute cortical 3D distribution of neuronal activity. Power spectral density (PSD) was averaged in five frequency bands: theta, lower and upper alpha/beta bands. We compared communicative and private intentions PSD values to obtain spectral activation maps.

Results: Activity elicited in theta and lower alpha bands revealed a different pattern of activation related to the kind of intention. Within self-directed perspective communicative actions showed significantly greater desynchronization in mentalizing regions than private intentions. Comparisons within communicative intentions (self-directed vs other-directed) revealed a larger desynchronization in MENT regions and in the anterior part of the MNS respectively (theta).

Conclusion:
Theta and lower alpha modulation suggest their implication during integration of socially salient information and intentions'discrimination.

## If you're submitting a symposium talk, what's the symposium title?

## If you're submitting a symposium, or a talk that is part of a symposium, is this a junior symposium?

**Primary authors:** Dr FERRARI, Elisabetta (Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Italy); RUBICHI, Sandro (Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Italy); IANI, Cristina (Department of Surgery, Medicine, Dentistry and Morphological Sciences with Interest in Transplant, Oncology and Regenerative Medicine, University of Modena and Reggio Emilia, Italy); Prof. BECCHIO, Cristina (Department of Neurology, University Medical Center Hamburg-Eppendorf (UKE), Hamburg, Germany); Prof. COLLE, Livia (University of Turin, Department of Psychology, GIPSI Research Group, Italy.); Prof. WALTER, Henrik (Department of Psychiatry and Psychotherapy, Charité-Universitätsmedizin Berlin); Ms PATARINI, Francesca (Department of Computer, Control and Management Engineering, Sapienza University of Rome,); Prof. TOPPI, Jlenia (Department of Computer, Control and Management Engineering, Sapienza University of Rome); Prof. CIARAMIDARO, Angela (Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Italy)

**Presenter:** Dr FERRARI, Elisabetta (Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Italy)

**Session Classification:** Lunch and poster 2

**Track Classification:** Action and movement