Exploring tempo and modality effects on modulation of brain oscillations during rhythm perception.

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Rhythm is defined as the repetition of external stimuli occurring at regular intervals. Some studies showed that brain oscillations are modified during perception of rhythmic stimuli by either their tempo (low, medium, fast) or their sensory modality (auditory, visual, audio-visual). Moreover, electroencephalographic (EEG) studies highlighted a desynchronization in central electrodes in the mu-rhythm frequency band (~10Hz) during perception. Using EEG, this study explores the combined effects of tempo and sensory modality on cerebral responses when perceiving rhythmic stimuli.

Our main hypothesis is higher desynchronization of EEG signal over the central electrodes in the mu-rhythm frequency band for audio-visual modality, even more for the tempo supposed to be near the spontaneous motor tempo.

22 healthy right-handed adults (age: 23.9 ± 1.7 years) sat in a standardised position – i.e., holding a glasses case – wearing a 32 electrodes EEG headcap (Biosemi, Inc., Amsterdam, The Netherlands). A pre-test "resting state" condition corresponded to a one-minute passive eyes open recording of the brain activity. Then, 12 experimental conditions were presented to the participants while perceiving rhythmic stimuli, with three tempi (500, 700 and 900 ms) and four modalities (Visual, Auditory, Audio-Visual Congruent and Audio-Visual Incongruent stimuli). For analysis, task-related spectral EEG power is calculated as spectral power of EEG in mu-rhythm frequency band over the sensorimotor area, normalised by the power spectral of the resting state condition. Two-way repeated measures ANOVA will test the effects of tempo and modality on cerebral responses.

Data processing is ongoing, results will be presented during the congress.

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