Dibris

Scheda di Offerta Tesi

Titolo (provvisorio): Neural correlates of perceptual learning following physical interaction with sensory stimulations

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Descrizione

Motivazione e campo di applicazione

Perceptual capabilities rely on proper calibration of sensory and motor systems mediated by exploration and interaction with the environment. Calibration is still working beyond the critical developmental period, allowing continuous adaptation throughout lifetime. Knowing to what extent motor and sensory areas interact each other, and unveiling their early reciprocal influences have a key impact on monitoring and conditioning developmental disorders and in sensory/motor rehabilitation.

Obiettivi generali e principali attività

Adaptation of perceptual thresholds can be observed during perceptual learning task with ambiguous stimulations. In particular, we show that including an explicit (i.e., active) physical interaction with a visual stimulus yields more effective results than those obtained in passive conditions, suggesting a mutual influences of sensory and motor areas. The goal of this project thesis is to develop novel experiments to observe neural correlates of perceptual learning processes that occur following physical interactions with the sensory stimulus. The experimental set-up will integrate an LCD monitor, a haptic device, and a HD-EEG system.

Under the hypothesis that altering how we can interact with the environment (motor planning and execution) influences its perception (i.e., what I perceive about the environment), we expect early links between "how" and "what/where" cortical areas, suggesting the existence of supramodal sensory-motor contingency circuits that operates at short latencies.

Obiettivi di apprendimento (strumenti tecnici e analitici, metodologie sperimentali)

The work will have an experimental part with healthy volunteers (visual psychophysics, EEG recordings and visuo-haptic interaction) and technical part (analysis of EEG data).

Specific training objectives are:

- Integration and synchronization of different components of the experimental apparatus
- Design simple visual stimulations for haptic interaction
- Conducting experiments with healthy subjects and data recordings
- Analysis of perceptual and neural data with MATLAB.

Luogo/i in cui si svolgerà il lavoro: DIBRIS

Informazioni aggiuntive

Abilità e capacità richieste: basic knowledge of neurophysiology and interest in experimental activities with human subjects; programming skills in MATLAB are highly desirable.

Numero massimo di studenti: 2