psy280 - Transcranial Brain Stimulation

Module label Transcranial Brain Stimulation
Module code psy280
Credit points 6.0 KP
Workload 180 h
Used in course of study
- Master's Programme Neurocognitive Psychology > Master module
Contact person
Module responsibility
- Christoph Siegfried Herrmann

Entry requirements Enrolment in Master’s programme Neurocognitive Psychology.
Skills to be acquired in this module
Goals of module:
Students will gain theoretical and practical knowledge on various non-invasive brain stimulation techniques.

Competencies:
++ Neuropsychological / neurophysiological knowledge
++ experimental methods
+ statistics & scientific programming
+ scientific literature
+ ethics / good scientific practice / professional behaviour

Module contents
In this module, we will introduce the theoretical concepts, neurophysiological underpinnings and neurocognitive as well as clinical applications of various non-invasive brain stimulation techniques such as transcranial magnetic stimulation (TMS), transcranial direct current stimulation (tDCS), transcranial alternating current stimulation (tACS), and transcranial random noise stimulation (tRNS). A focus will be tACS, because it is especially suited to modulate brain oscillations which have been shown to correlate with cognitive processes.

Part 1: Introduction to transcranial brain stimulation (lecture)

- Historical overview of brain stimulation
- Different techniques (TMS, tDCS, tACS, tRNS)
- Physiological mechanisms (entrainment, after-effects etc.)
- The use of transcranial brain stimulation in cognitive neuroscience - Experimental parameters (intensity, electrode montage, etc.)
- Pros and cons of TMS vs. tACS
- Technical aspects (artefact correction, modelling current flow, etc.)
- Safety issues
- Ethical considerations of brain stimulation

Part 2: Effects of tACS on physiology and cognition (seminar)

- Physiology of tACS (on-line and after-effects)
- Modulating cognitive functions (e.g. memory, attention, and perception)
- Clinical applications of tACS
- Hands-on experience in the lab

Reader’s advisory


Links
- Language of instruction English
- Duration (semesters) 1 Semester
- Module frequency The module will be offered every summer term.
- Module capacity 10
- Reference text We strongly recommend to take either psy170, psy270, psy275, psy280, or psy220 to gain methodological competencies (EEG, fMRI, TBS, HCI) that are needed for most practical projects and Master's thesis!
- Modullevel MM (Mastermodul / Master module)
- Modulart Wahlpflicht / Elective
**Lern-/Lehrform / Type of program**  
Part 1: lecture; Part 2: seminar

**Vorkenntnisse / Previous knowledge**

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<td>during summer term</td>
<td>Oral presentation in the seminar.</td>
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**Total time of attendance for the module**  
56 h