Understanding and improving neurofeedback-guided self-regulation

Propositions of the thesis

Understanding and improving neurofeedback-guided self-regulation:
On the neuropsychological mechanisms of neurofeedback
across mental tasks and time

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1. By increasing the difficulty of a neurofeedback task incrementally, self-regulation behaviour can be influenced and outcomes of a neurofeedback training can be improved.

2. During neurofeedback-guided self-regulation a specific brain network is recruited that can be detected reliably across different self-regulation tasks and training timepoints.

3. Neurofeedback allows researchers and clinicians to reinforce neural target states by stimulating the reward system and thereby induce feedback learning.

4. Feedback loops constitute a fundamental mechanistic property of the human nervous system.

5. Disorders as well as therapies that alter neural feedback loops can induce profound changes in the brain.

6. Neurofeedback constitutes an effective tool for studying and improving feedback learning and self-regulation.

7. If a valid neural marker of a mental state can be extracted, neurofeedback can be applied to reinforce or diminish it, even without awareness of the person receiving the neurofeedback.

8. Identifying neural markers of mental representations therefore does not only have potential for 'reading' the content of the human mind, but also for changing its content through neurofeedback.

9. Brain systems that encode mental representations, or that are involved in self-regulation and reward processing, can be modulated with neurofeedback to treat prevalent psychopathologies as mood disorders or addictions.

10. Neuroscientific, psychological and psychopharmacological treatment approaches should be combined strategically in order to create more effective treatment schemes for neuropsychiatric disorders.