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A psychoengineering paradigm for the neurocognitive mechanisms of biofeedback and neurofeedback

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Highlights

- A comprehensive model of the biomedical, psychological and neuroscientific models of biofeedback and neurofeedback learning
- Guidelines for the efficient design of biofeedback and neurofeedback protocols
- Research directions to investigate how biofeedback and neurofeedback works

ABSTRACT

We believe that the missing keystone to design effective and efficient biofeedback and neurofeedback protocols is a comprehensive model of the mechanisms of feedback learning. In this manuscript we review the learning models in behavioral, developmental and cognitive psychology, and derive a synthetic model of the psychological perspective on biofeedback. We afterwards review the neural correlates of feedback learning mechanisms, and present a general neuroscience model of biofeedback. We subsequently show how biomedical engineering principles can be applied to design efficient feedback protocols. We finally present an integrative psychoengineering model of the feedback learning processes, and provide new