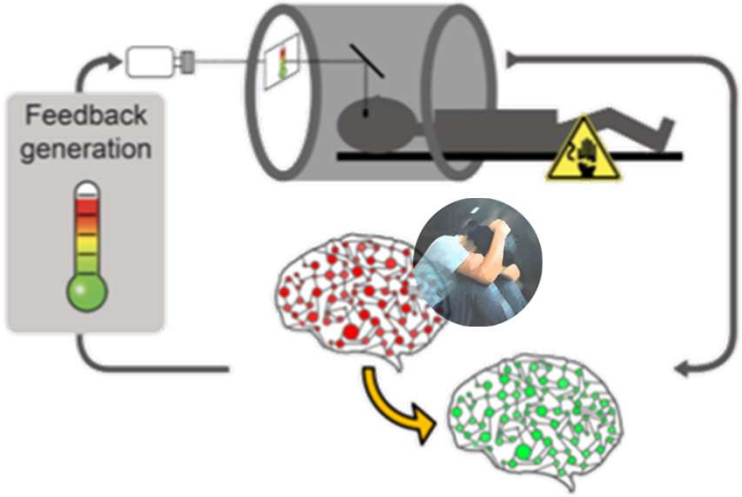


Self-regulation of stress-related large-scale brain network balance using real-time fMRI neurofeedback

Nikos Kogias

PhD candidate

Donders Institute for Brain Cognition and Behaviour

Radboud University Medical Centre

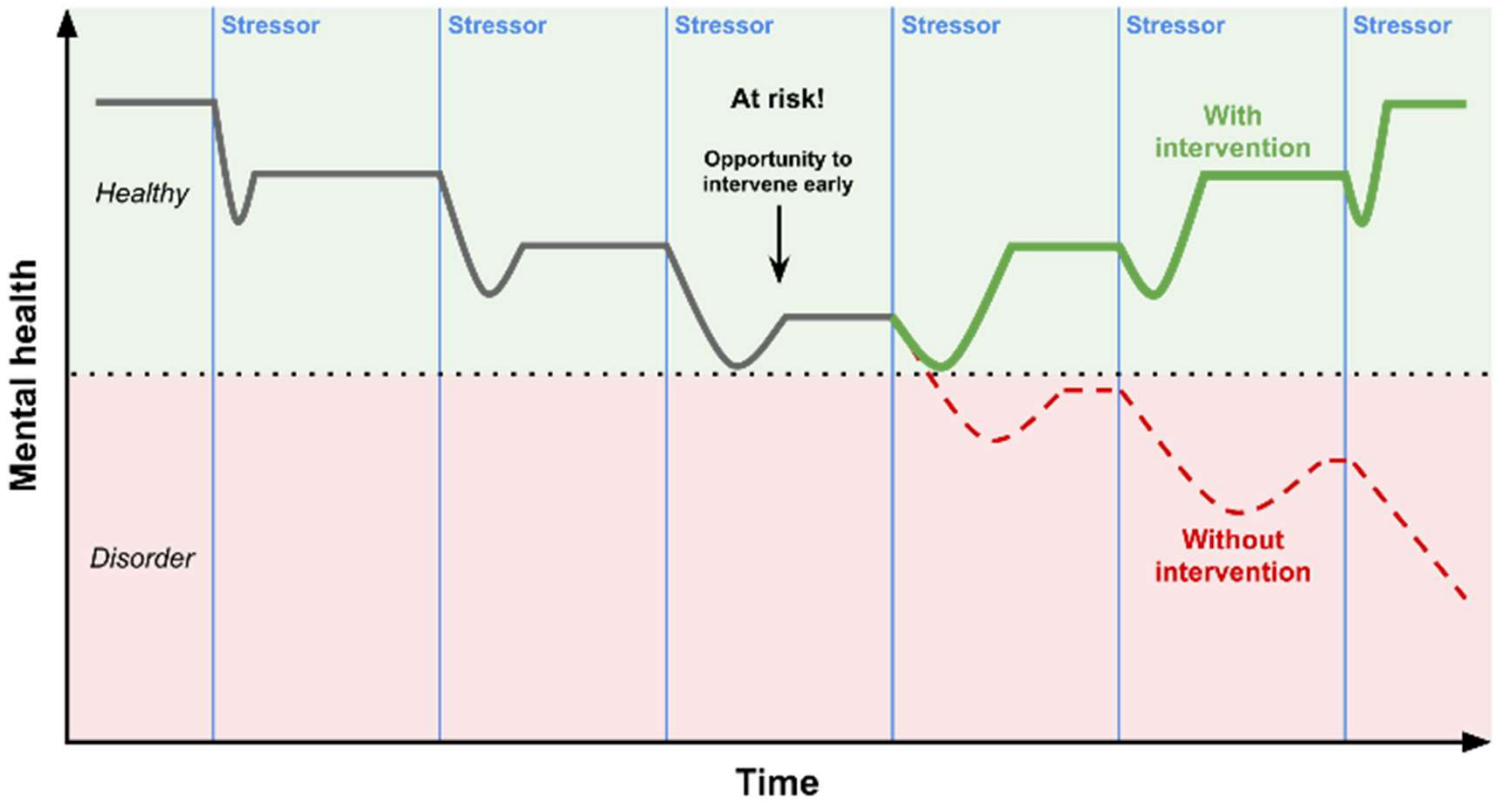
Resilience to Stress

Depression…

Anxiety…

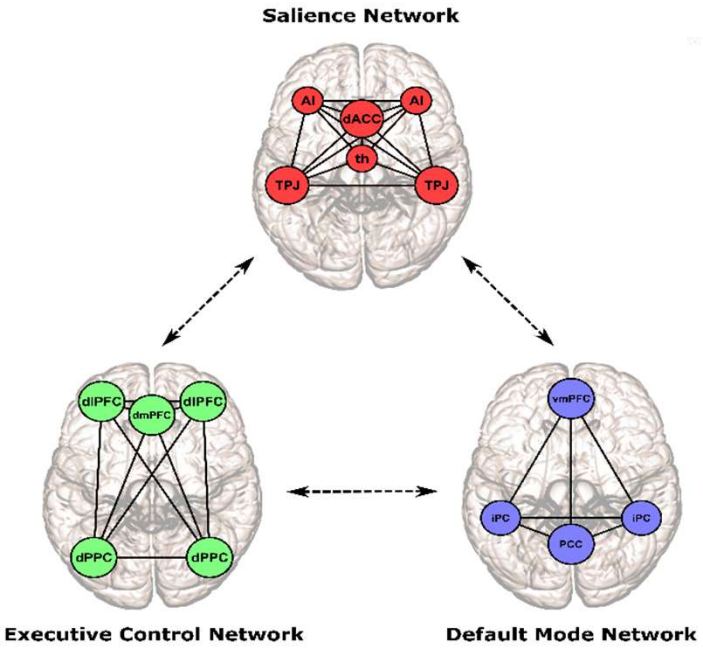
PTSD…

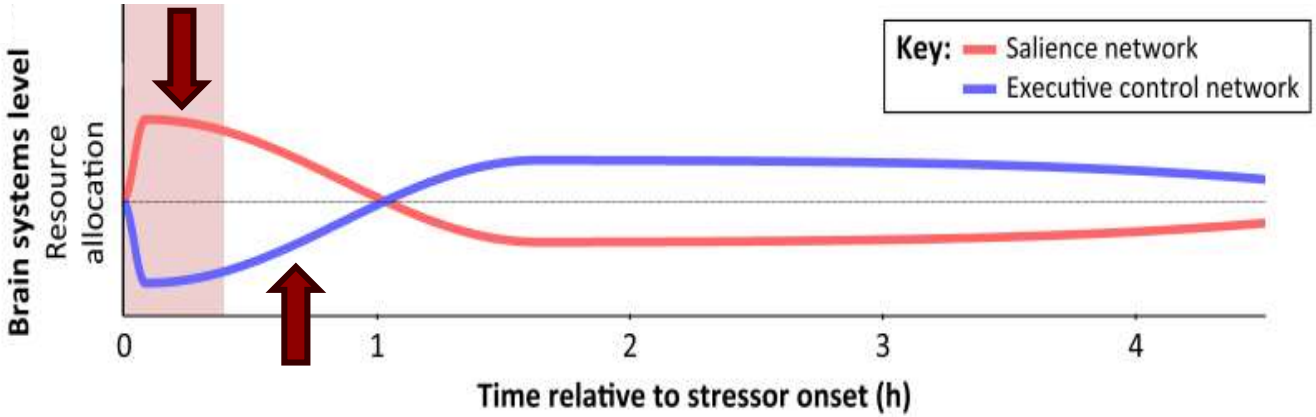
…



Krause et al., 2022

Neurobiology of Stress

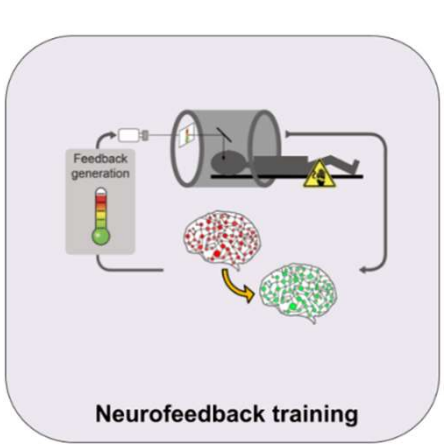


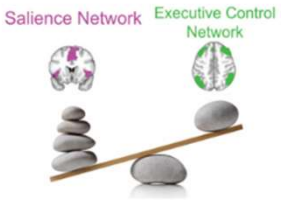


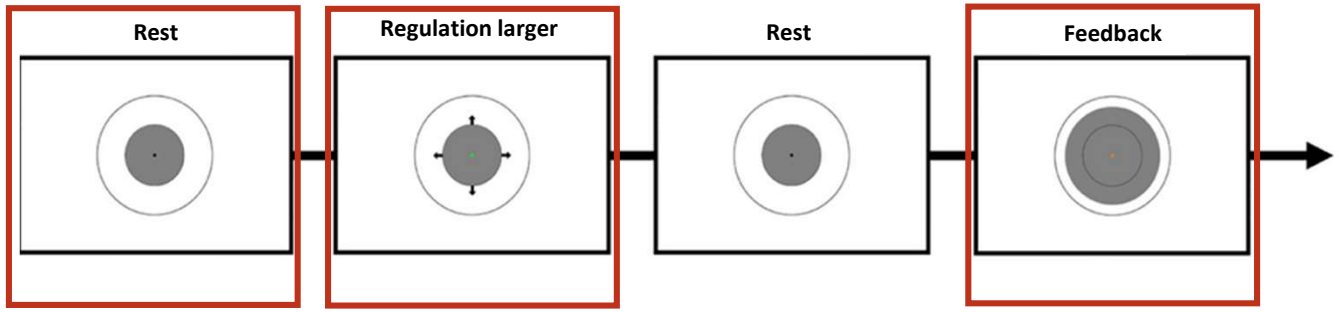
Goal:
Enhancing direct and voluntary control of these brain networks.

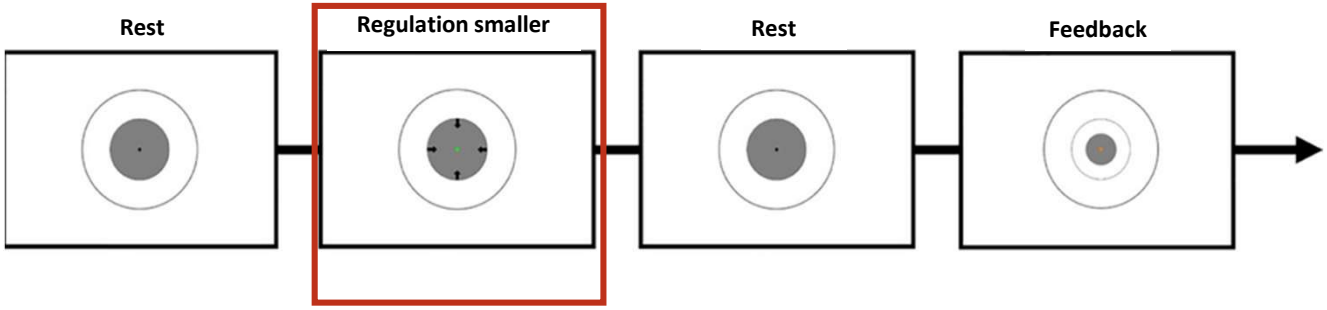
Krause et al., 2022, McEwen et al., 2015, Menon 2011, Hermans et al. 2014

Self-regulation of stress-related networks training







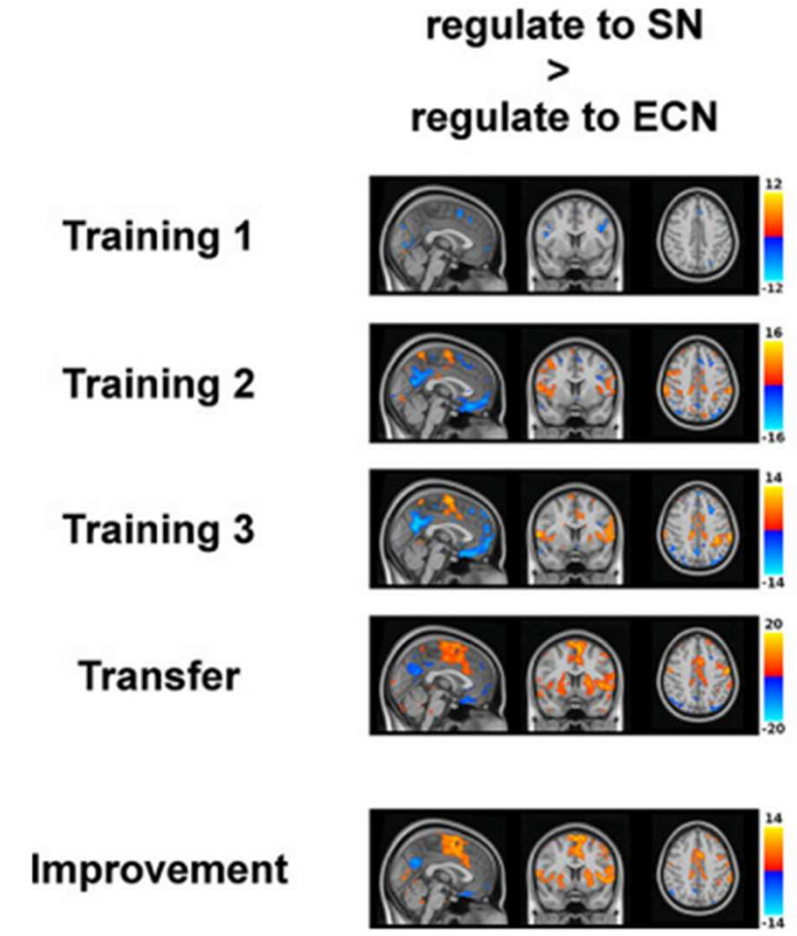


Krause, Kogias et. al, 2021

StressNF: A feasibility study

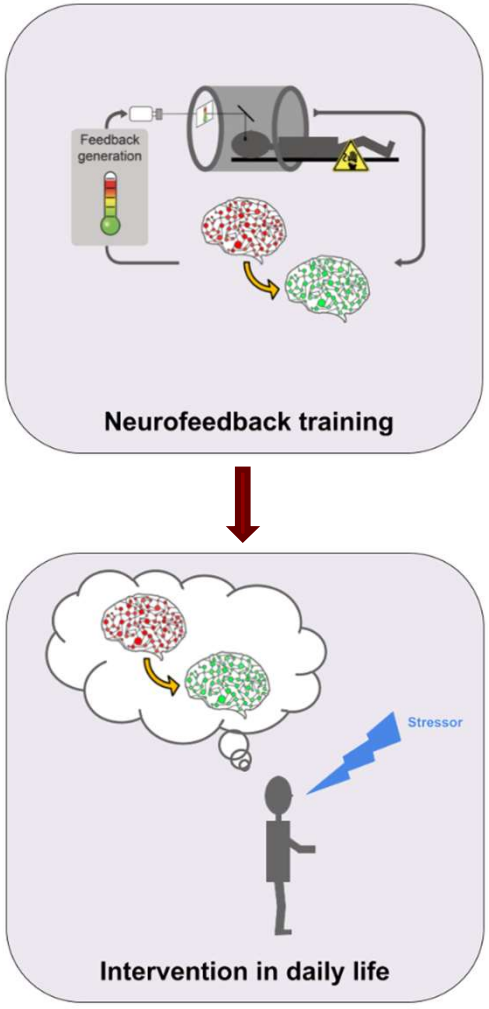
Summary

- Self-regulation of brain networks is feasible
- Self-regulation in the absence of feedback (transfer) and in response to a stressor
- Participants learn to regulate using mainly SN upregulation and suppression.

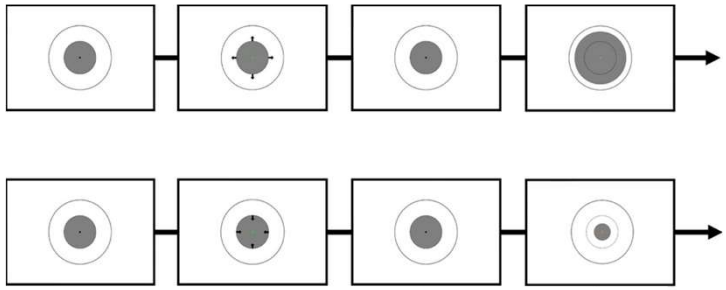


Krause, Kogias et. al, 2021

BraNeReg: Cognitive effects and real-life stress



Neurofeedback training

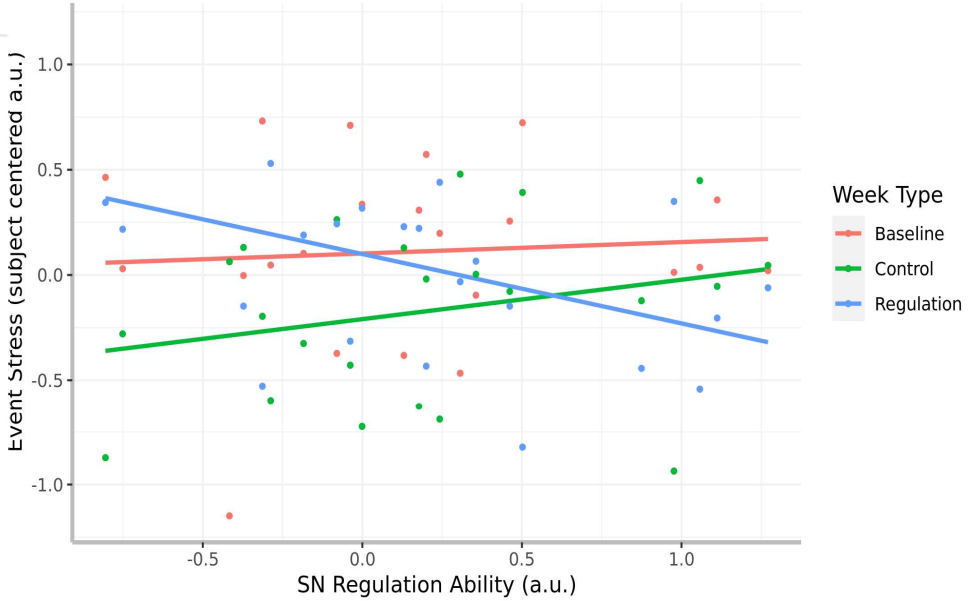


Cognitive tasks

Measures of real-life stress

Krause et al., 2021; Krause et al., 2022, Krause et al., (in preparation)

BraNeReg: Relation to real-life stress



Summary

- Self-regulation is confirmed in larger sample
- Self-regulation is a long-lasting skill
- SN self-regulation is associated with lower stress in real-life

Better SN self-regulation performance

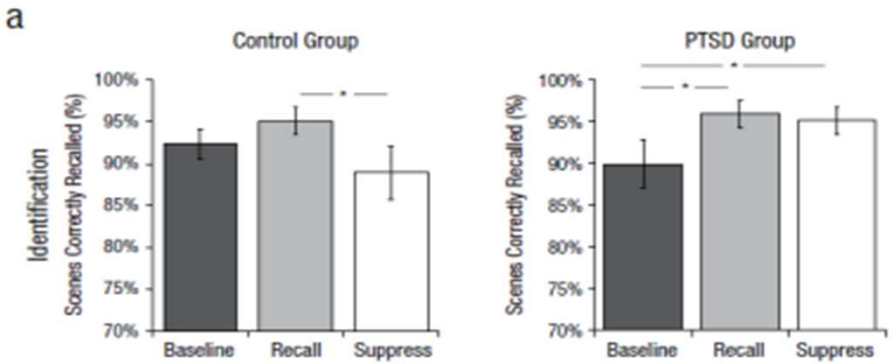
Lower reported stress in real-life

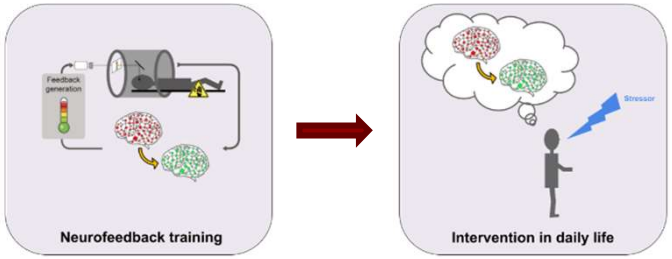
Krause et. al, (in preparation)

What is next?

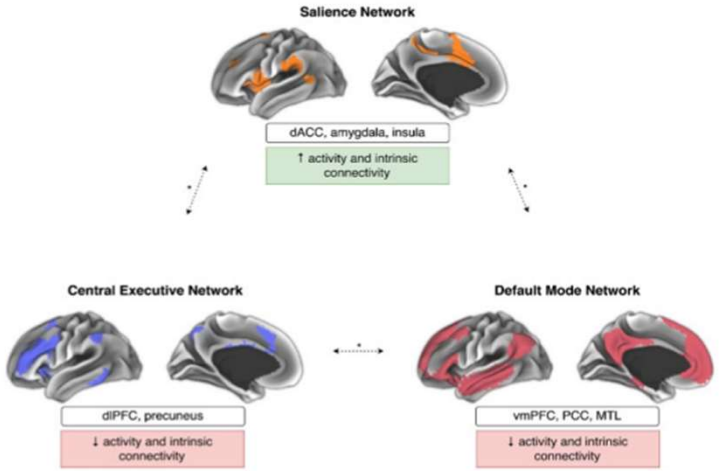
TraumaCtrl: Gaining back control in PTSD

Intrusions - Memory suppression deficits



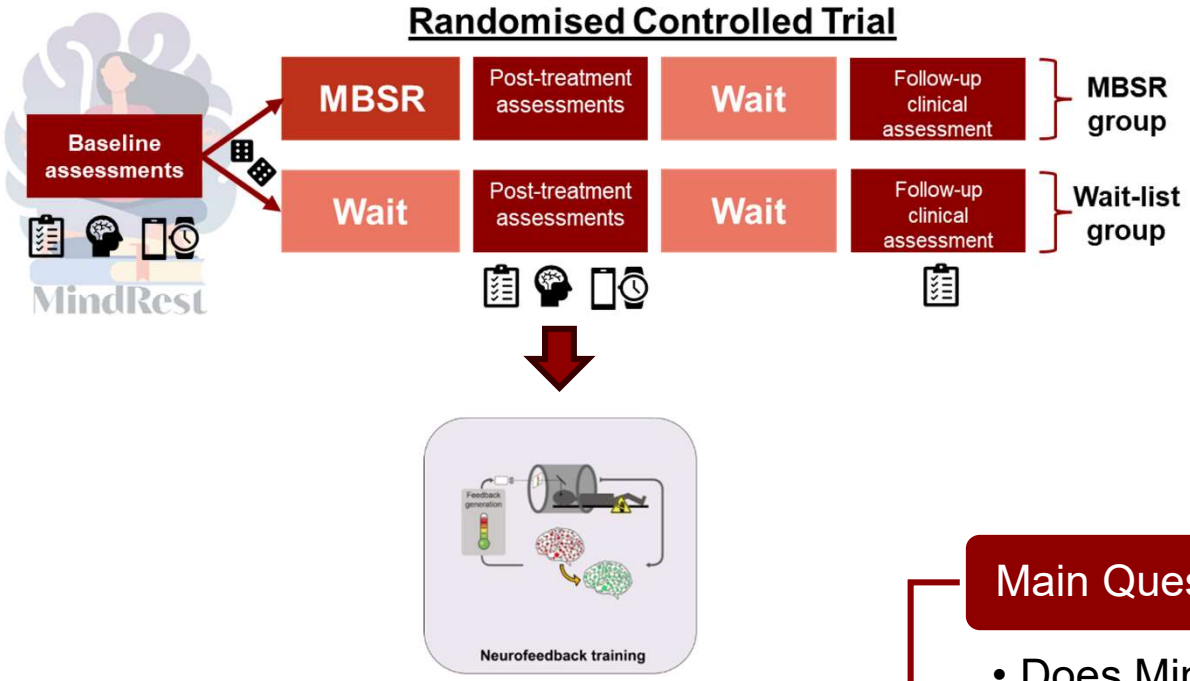


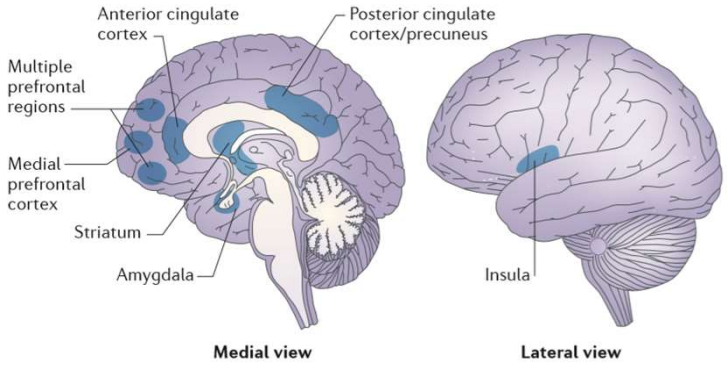
PTSD network changes



Catarino et al., 2015, Akiki et al., 2017, Szeszko & Yehuda, 2019, Mary et al., 2020

MindRest: Mechanistic insight using neurofeedback

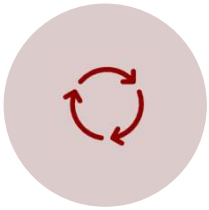




Main Question:

- Does Mindfulness training (MBSR) affect large-scale network regulation?

Kogias et. al, 2023; Tang et al. 2015



DEVELOPMENT

FEASIBILITY

EFFECTS IN REAL-LIFE

EFFECTS ON COGNITION

CLINICAL APPLICATION

MECHANISTIC INSIGHTS

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Thank you for your attention!