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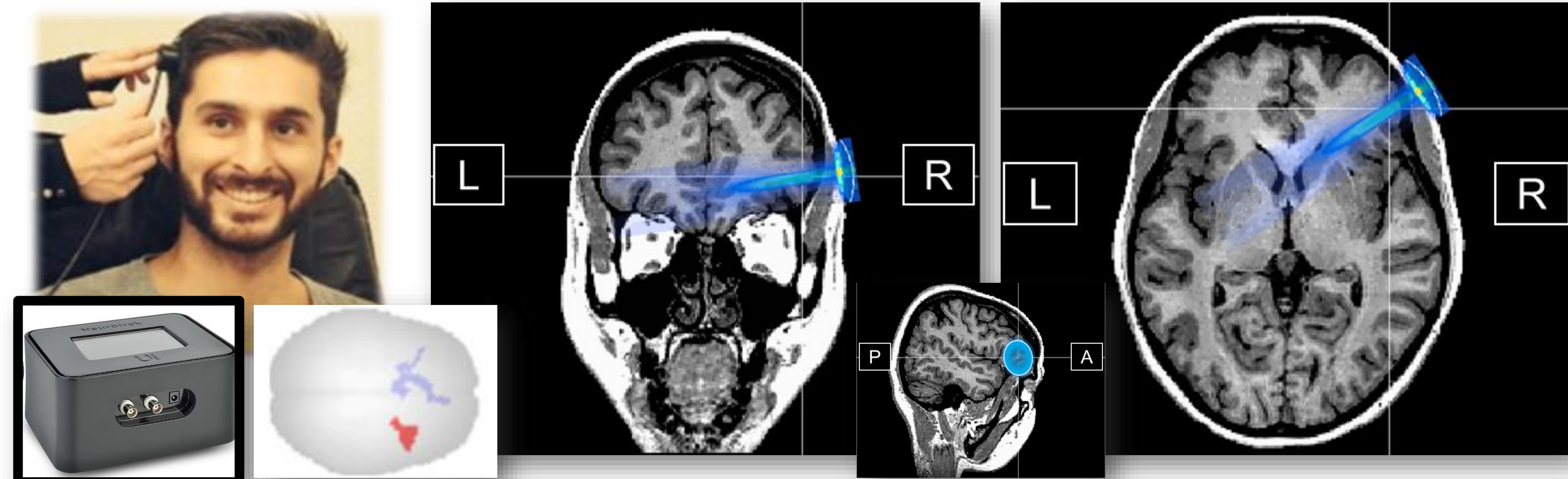
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Introduction

Earlier studies: Low-intensity transcranial focused ultrasound (LITFUS) to the right prefrontal cortex (RPF) can change subjective mood experiences

- Visual analogue scale (VAS) global affect (= happy + calm – sad – tense) ↑ + emotion and mood network functional magnetic imaging activity ↓ [1]
- VAS global affect ↑ + Penn State Worry Questionnaire ↓ [2]



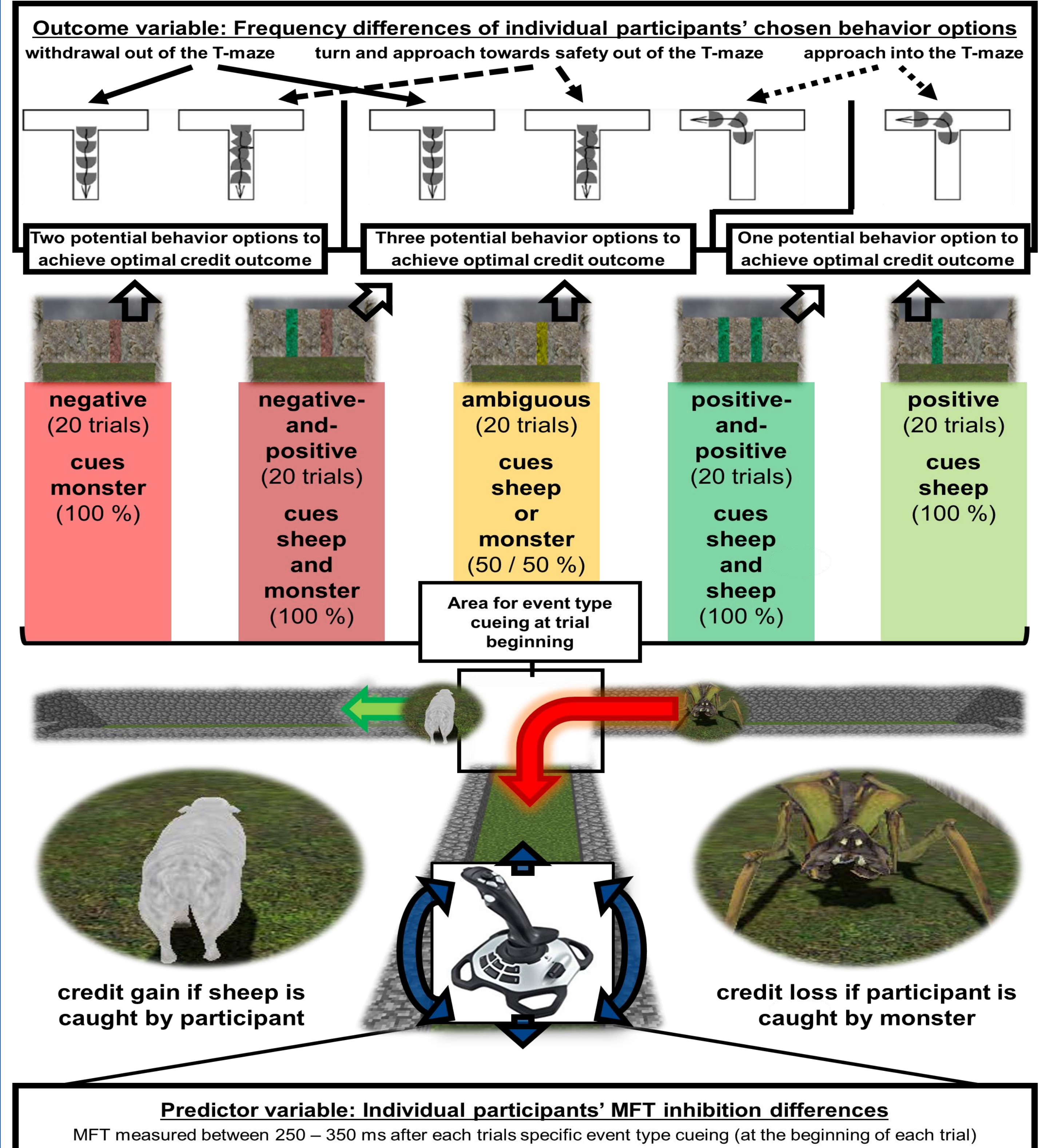
Current study, preregistered at Open Science Framework [3]: Exploration of electroencephalography (EEG) and behavior as objective measures in a desktop virtual reality T-maze task paradigm

- EEG: 64 channels + current source density transformation for optimal effect localization
- EEG + behavior: **Prediction of approach versus withdrawal based on LITFUS-induced conflict-related EEG midfrontal theta (MFT) inhibition**
- Background: MFT decreases have been related to decreased conflict experience / withdrawal-like negative affect and behavior, e.g. decreased anxious anticipation of social threat / more risky gambling decisions [4 – 7] – based on these findings and aforementioned earlier studies, RPF LITFUS should lead to: MFT ↓ + withdrawal ↓ / approach ↑

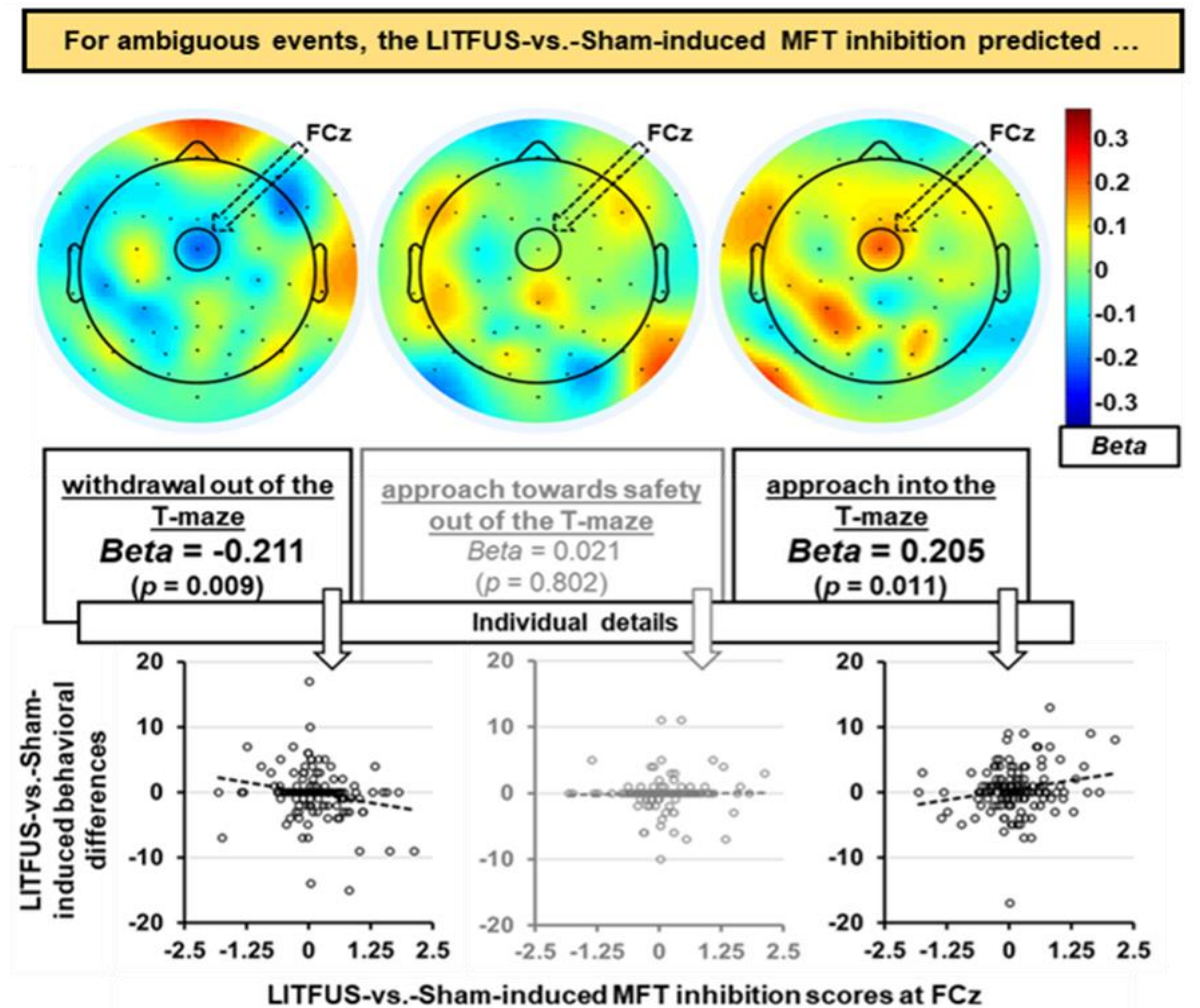
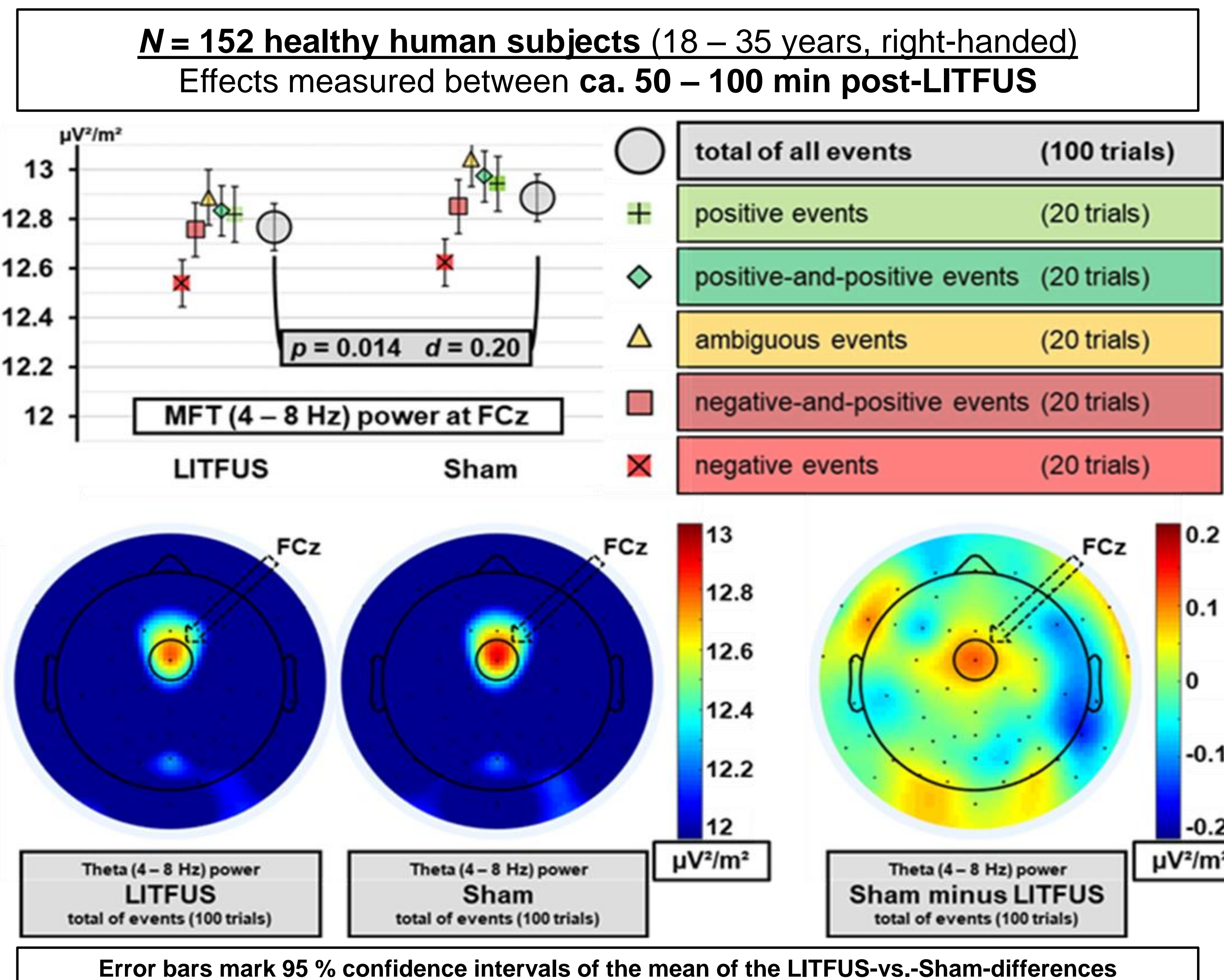
Keywords / Descriptors

Approach vs. Withdrawal Electroencephalography
Low-Intensity Transcranial Focused Ultrasound
Midfrontal Theta Neuromodulation

Methods



Results



Discussion

Summary of results: RPF LITFUS can inhibit conflict-related MFT, predicting greater approach versus withdrawal behavior in a virtual T-maze

Limitations and future directions: LITFUS is a rapidly growing field, promising for research and practical applications [1, 2, 8 – 10]

- Benefits: Non-invasive + ease of application + avoidance of side effects like headache or skin irritation + high precision for target selection and energy dosage
- Further exploration of responder/non-responder-characteristics (e.g. gender differences, personality patterns, skull thickness) and adaptation of LITFUS parameters
- Potential implementation of LITFUS as a supportive intervention, e.g. before psychotherapy sessions for emotional and motivational disorders

References

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