

Exploring Emotion Processing in the Human Brain through Positive and Negative Affect-inducing GIFs



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Background

- Emotions determine how humans make important decisions, organize memories, and perceive the world⁽¹⁾
- The underlying mechanisms of emotion processing are yet to be fully elucidated
- Previous study⁽²⁾ validated emotion categories using short video GIFs. See chromatic map of emotional categories here: 

Aim

- Establish a machine learning algorithm capable of classifying positive and negative affect markers in brain signals

Experiment

Measure positive and negative emotional affect of 144 previously validated short video GIFs using Magnetoencephalography (MEG)

Stimuli



Positive and Negative affect-inducing GIFs



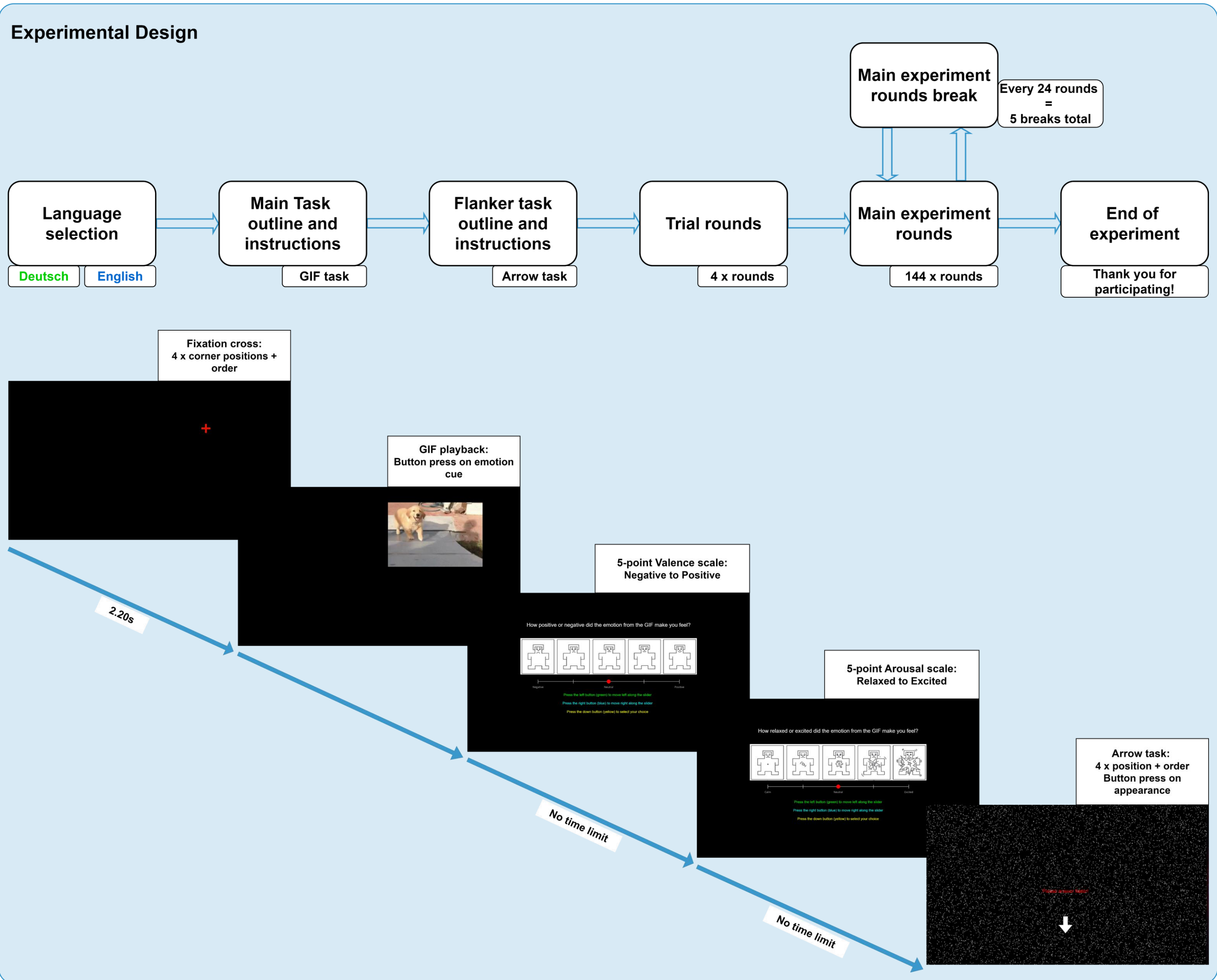
- GIFs obtained from Cowen & Keltner⁽²⁾ study
- Eight distinct emotion categories were initially picked
- Highest-rated GIFs were selected
- Summarized into two overall categories

Participants

- n = 32 (Mean age = 24.125 ± 4.612 years; 22 females)
- Inclusion/exclusion: Right-handed, non smokers, no psychological disorders, no specific phobia, no MRI contraindications
- Before session, participant filled out online questionnaires of: Exclusion criteria, Biodata, STAI – short, PERS, & PANAS

Experimental Design and Task

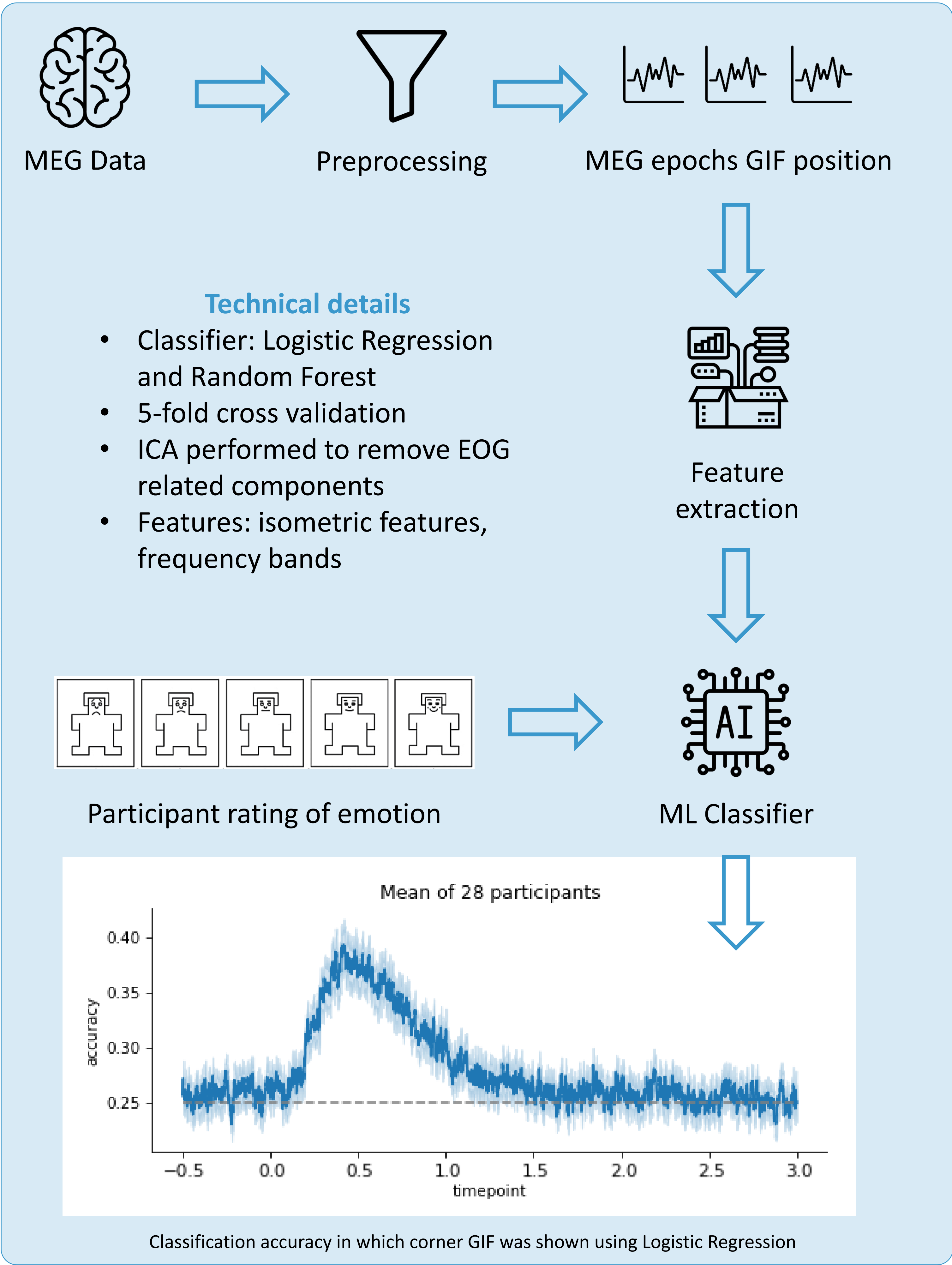
- Head position digitized
- 306 channel MEG (Neuromag TRIUX) + EOG + ECG
- Experimental task:



Data Analysis

- Can we correctly classify different emotions?
- Which features contribute to the correct classification of emotions? (work in progress)

Pre-step to test our method: Can we correctly classify, in which corner the GIF was shown?



Future Plan

Try to extract different sets of features and use variational autoencoders

Discussion

Finding a classifier that can decode emotions:

- Could be translationally applied towards approaches against affective disorders
- Improve methods to detect affect processing in sleep or resting state memory consolidation

Literature

- Brosch, T., Scherer, K., Grandjean, D., & Sander, D. (2013). The impact of emotion on perception, attention, memory, and decision-making. *Swiss Medical Weekly*, 143(1920), w13786. <https://doi.org/10.4414/smww.2013.13786>
- Cowen, A. S., & Keltner, D. (2017). Self-report captures 27 distinct categories of emotion bridged by continuous gradients. *Proceedings of the National Academy of Sciences*, 114(38), E7900 – E7909. <https://doi.org/10.1073/pnas.1702247114>

Icons taken from Flaticom.com (22.05.2024)

Poster webpage:

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