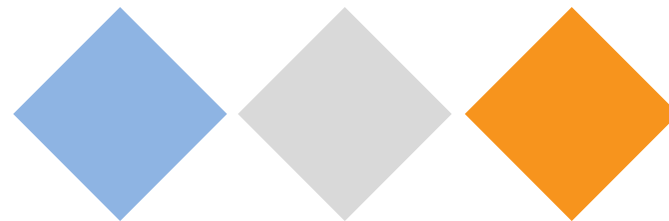


# Spatiotemporal brain dynamics underlying Attentional Bias Modifications



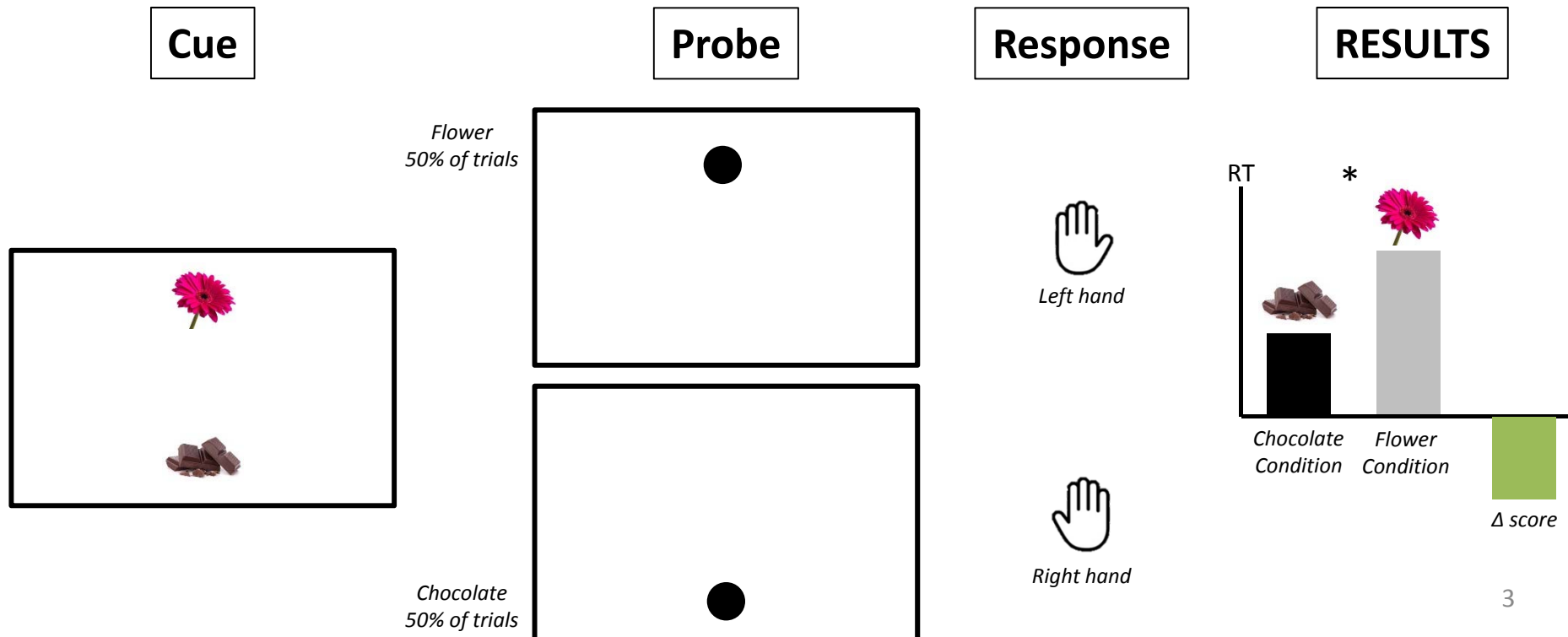
Etienne Sallard, Léa Hartmann, Lucas Spierer





# Attentional bias: measure

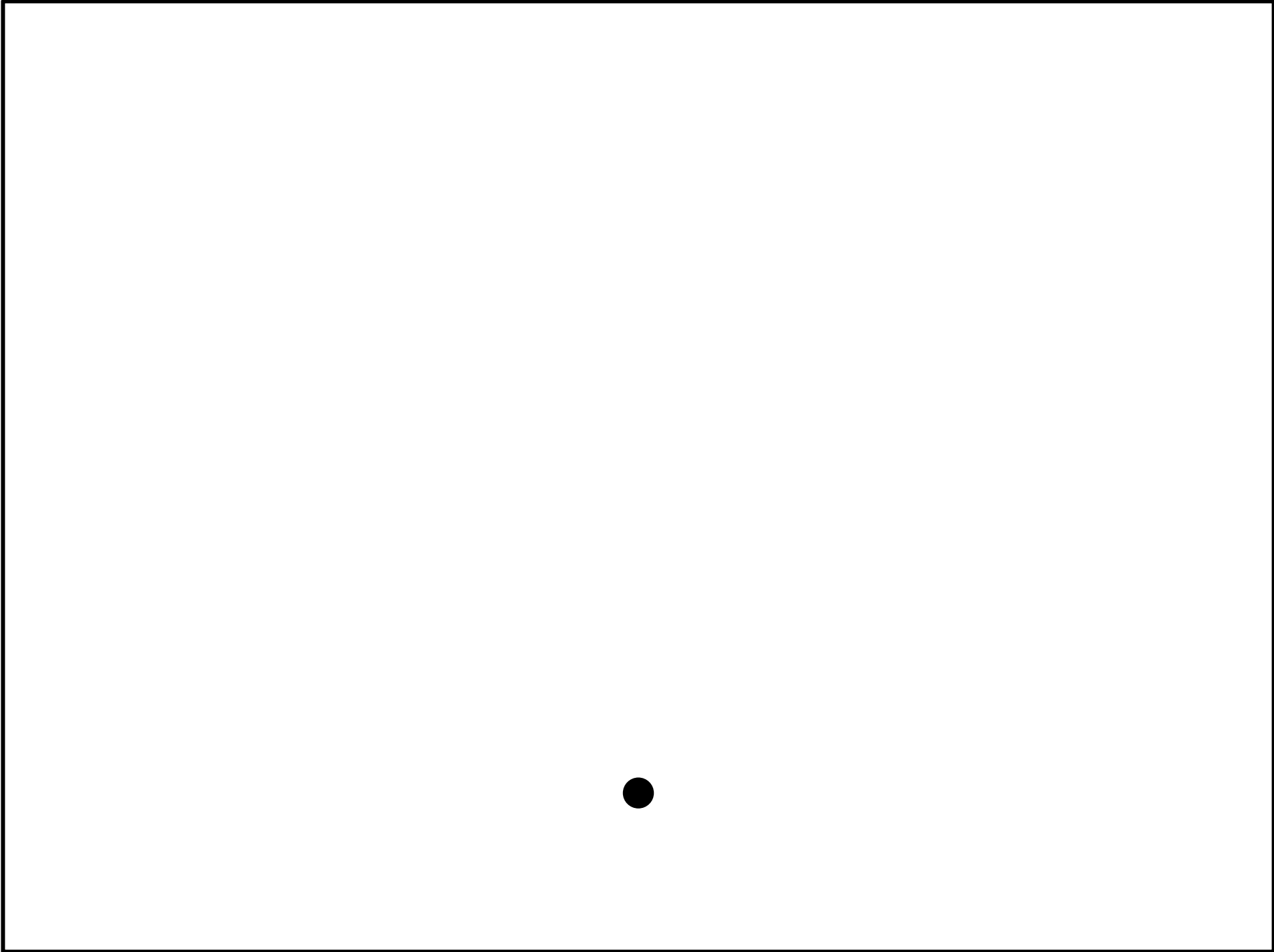
- Dot-probe task (DPT)
  - Spatial attention indexed by the speed of response to visual probes
  - $\Delta$  AB score = (RT condition 1 – RT condition 2)





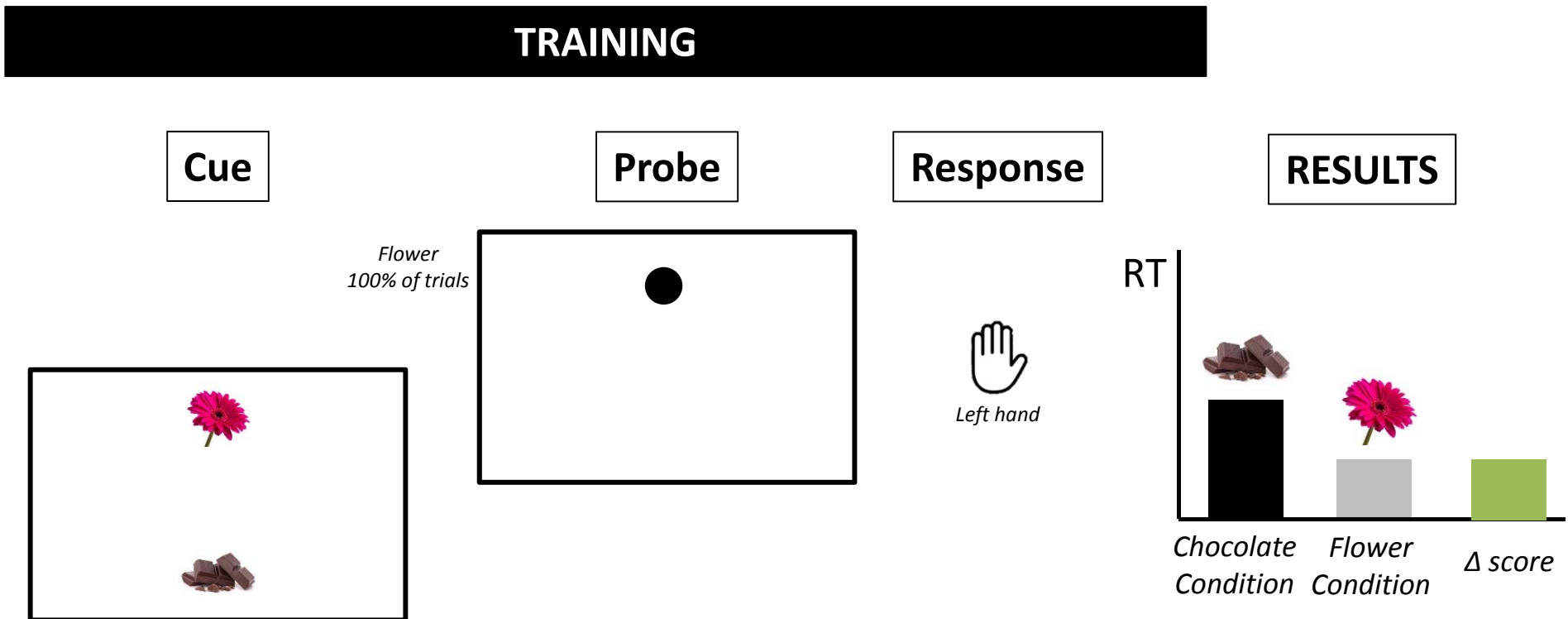






# Attentional bias: modification

- Modified DPT → AB modification (ABM):

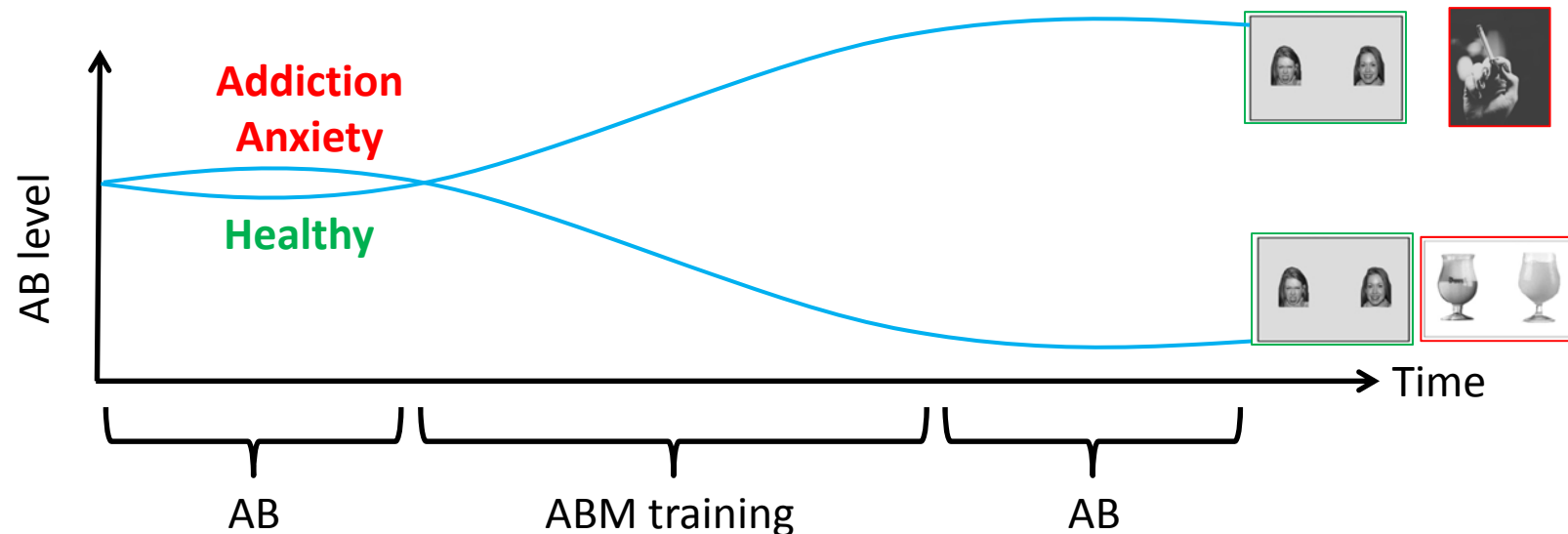




# Attentional bias: modification

- ABM:

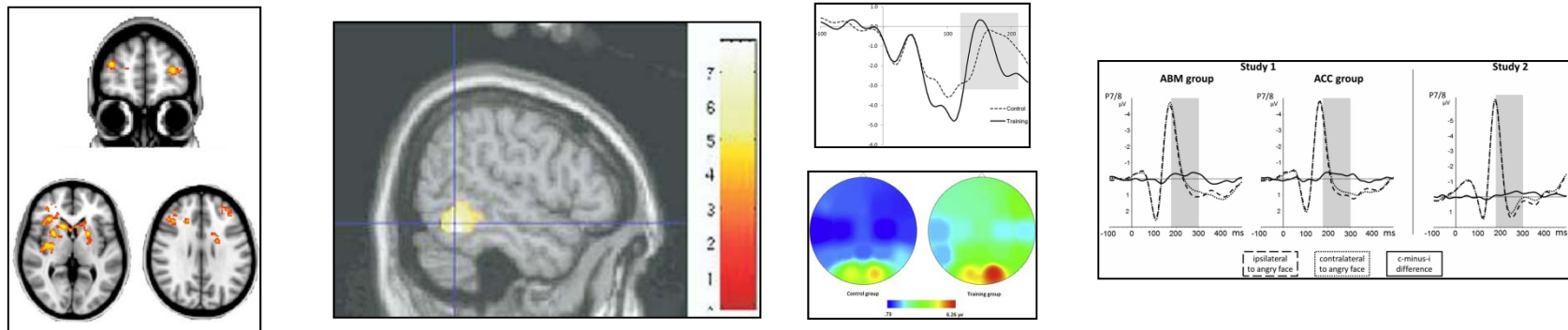
- Increased/decreased in healthy (MacLeod et al., 2002; Eldar et al., 2008; Browning et al., 2010)
- Increased/decreased in addictions and anxiety disorders (Attwood et al., 2008; Amir et al., 2009)



➔ Neural underpinnings of ABM unclear

# ABM: neurophysiological level

- Lateral pre-frontal cortex, temporo-occipital and parietal areas from 100-300ms post-cue onset (Monk et al., 2004; Browning et al., 2012, Suway et al., 2013; Osinsky et al., 2014)



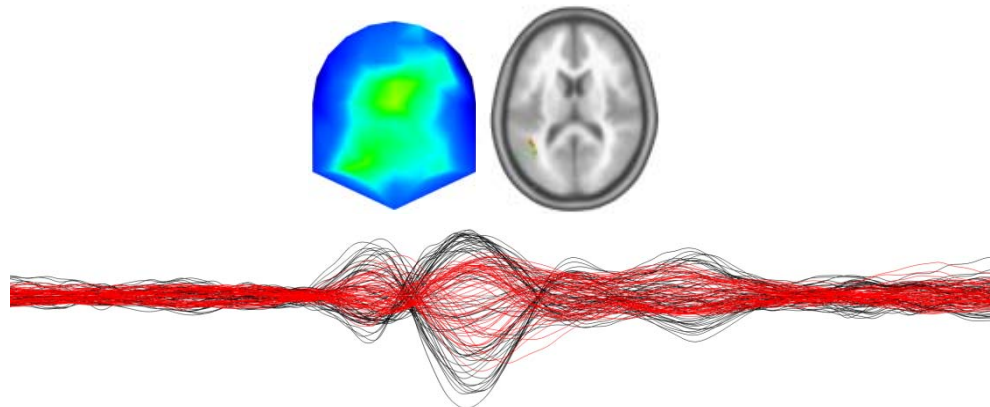
➔ Temporal resolution (MRI) and low level analyses of the signal (EEG) limit the neurophysiological interpretation

# ABM study. Aims

- Act with specific training on the AB balance in healthy adults with dot-probe task using basic stimuli (i.e. abstract representation)

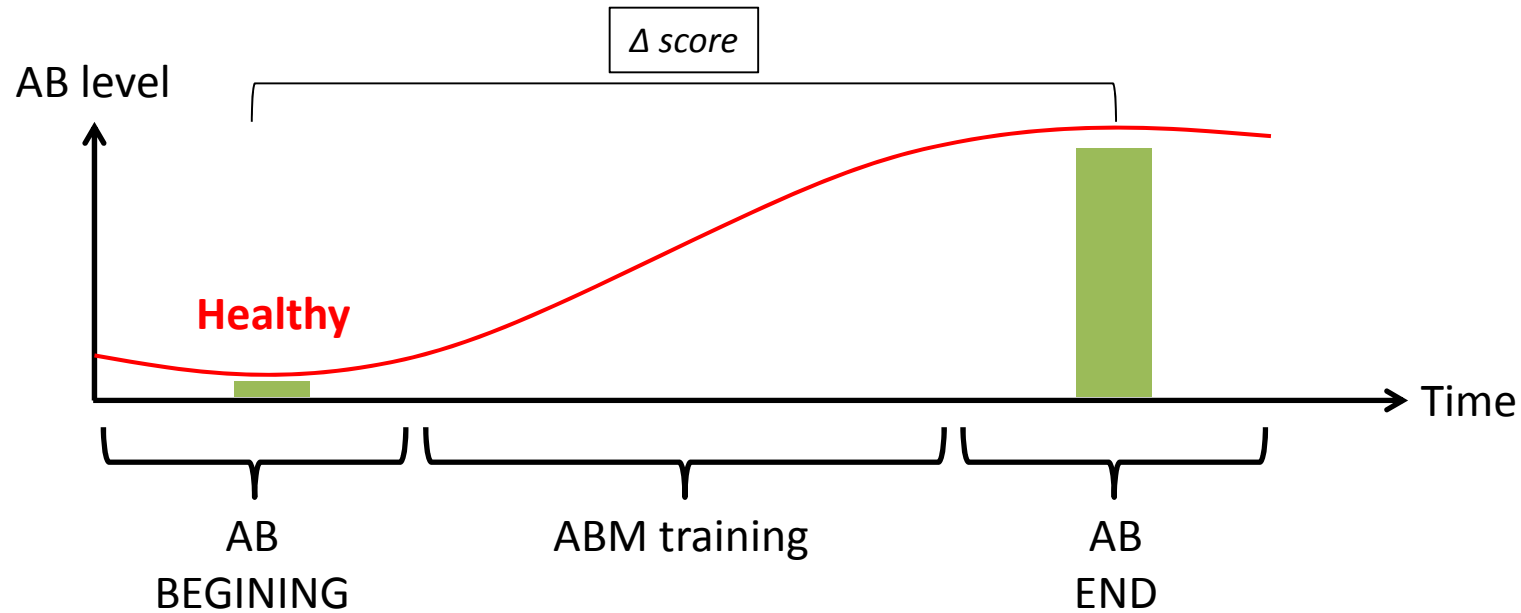


- Investigate the spatiotemporal brain dynamics underlying ABM



# Hypothesis

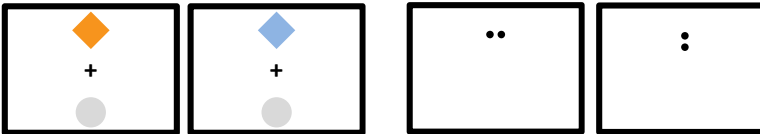
- If ABM training increase AB using basic stimuli

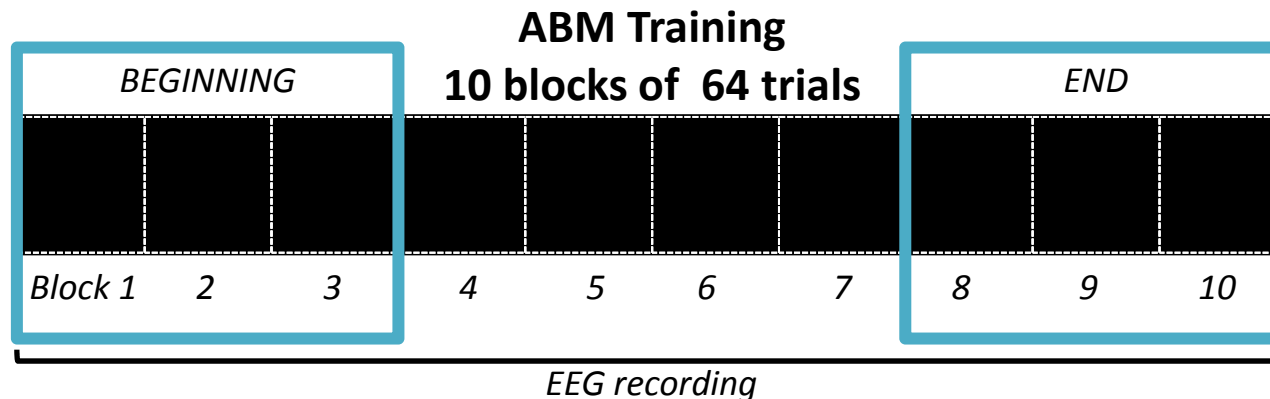
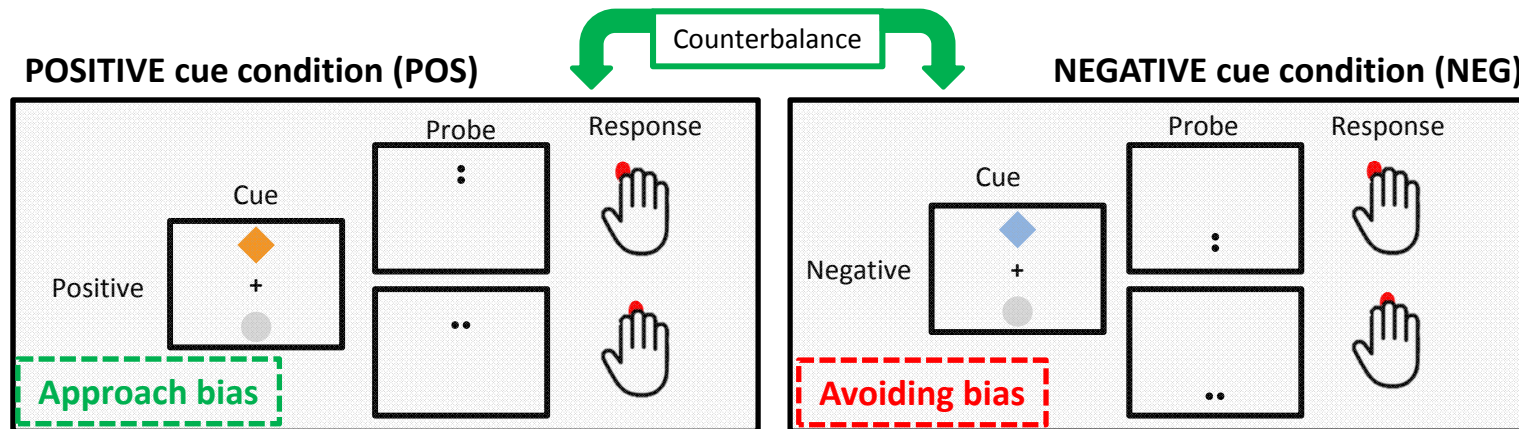


- Then AB should manifest at the end of the training

# Methods

- Participants: N=24 (16 females; 23±3 years)

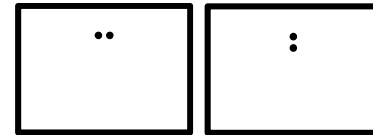
- Dot-probe task: 



# Methods

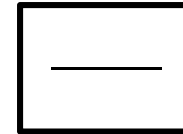
- Behavioral measures:

- RT: RT POS-NEG  $\rightarrow$   $\Delta$  AB: BEG-END  $\rightarrow$   $\Delta$  ABM



- Questionnaires:

- State of anxiety, stress and mood (VAS)
    - Traits of impulsivity (BIS11), anxiety and depression scale (HADS)



- Electrophysiological measures: ERPs modulations

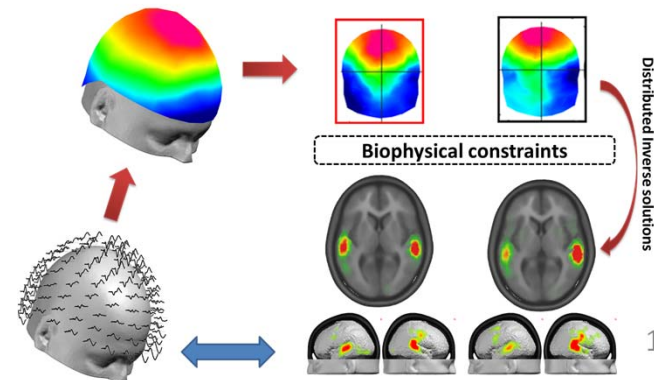
- Global Map Dissimilarity (GMD)



- Inverse Solution (IS)

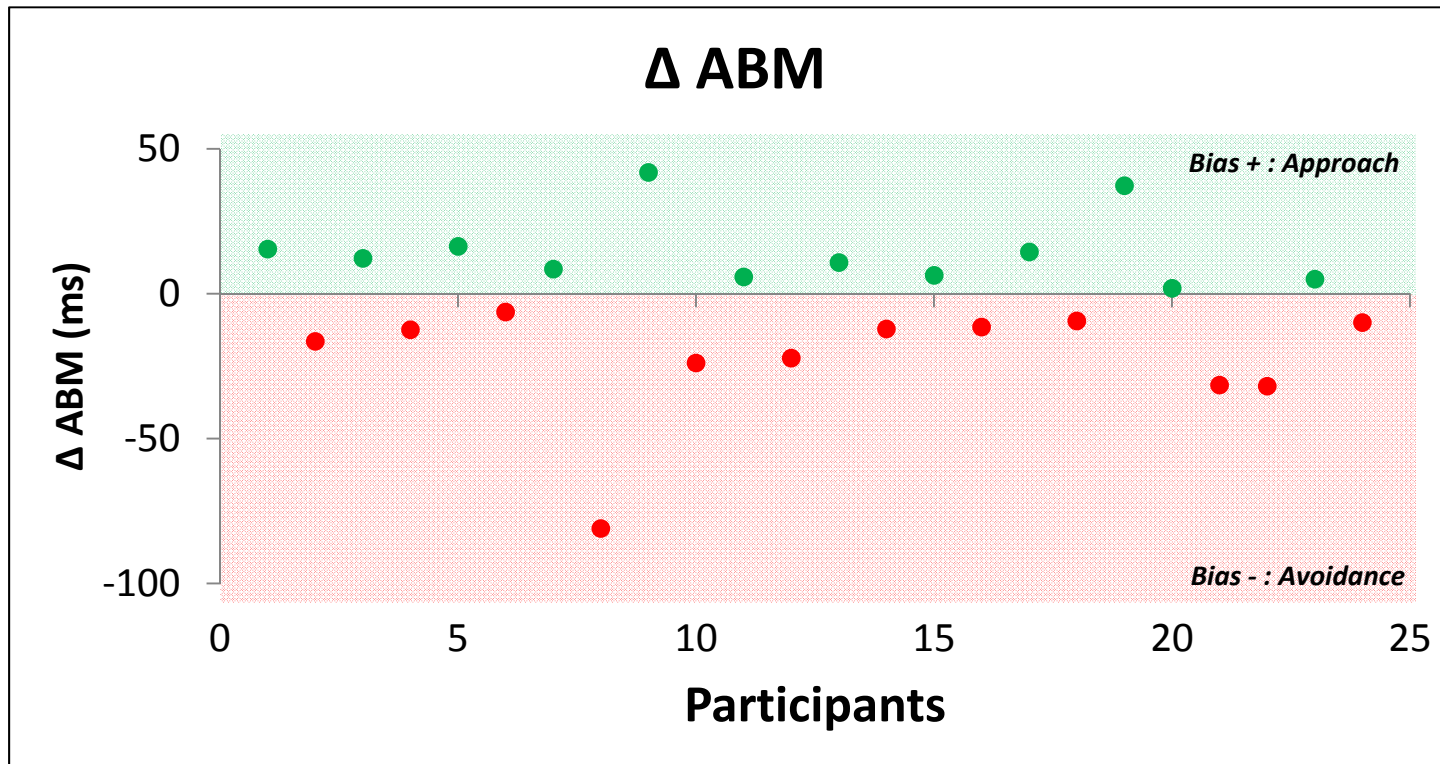
- Pre-processing:

- No AB at the BEG of the training



# Behavior: group splitting

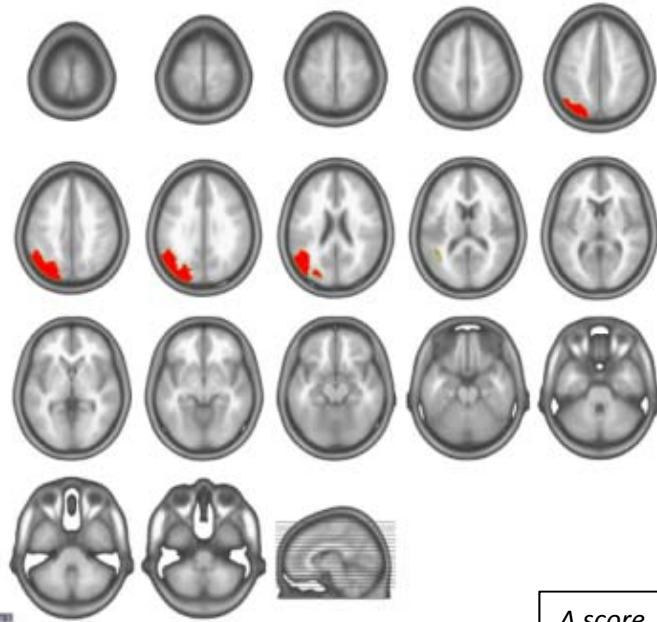
- $\Delta$  ABM (RT POS-NEG): BEG – END =
  - Positive difference: Toward group (N=12)
  - Negative difference: Away group (N=12)



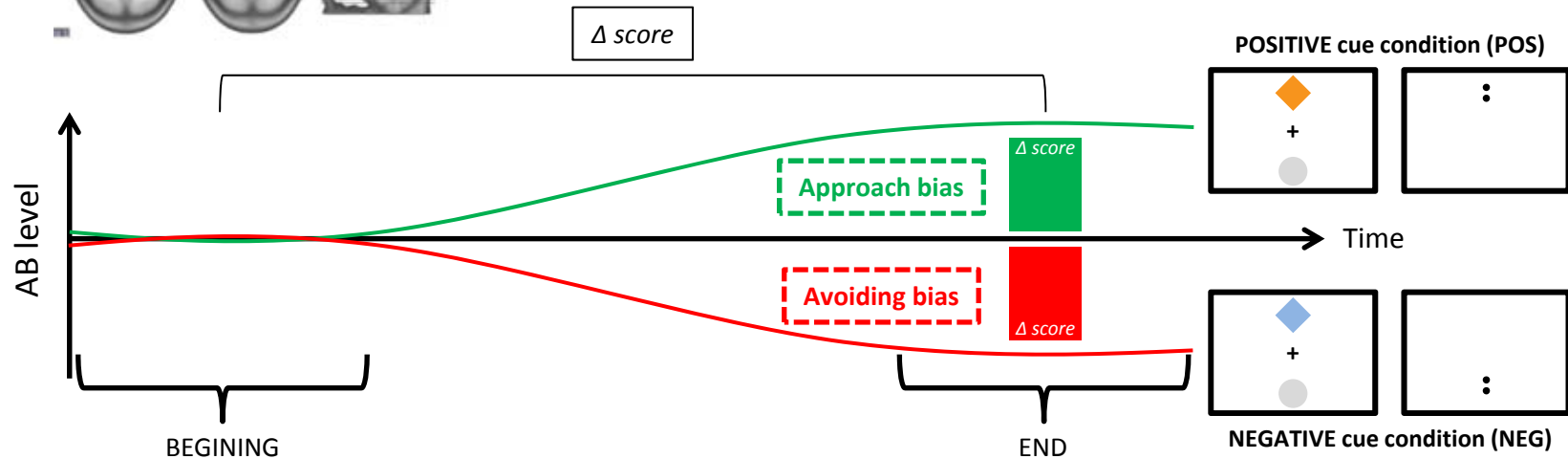
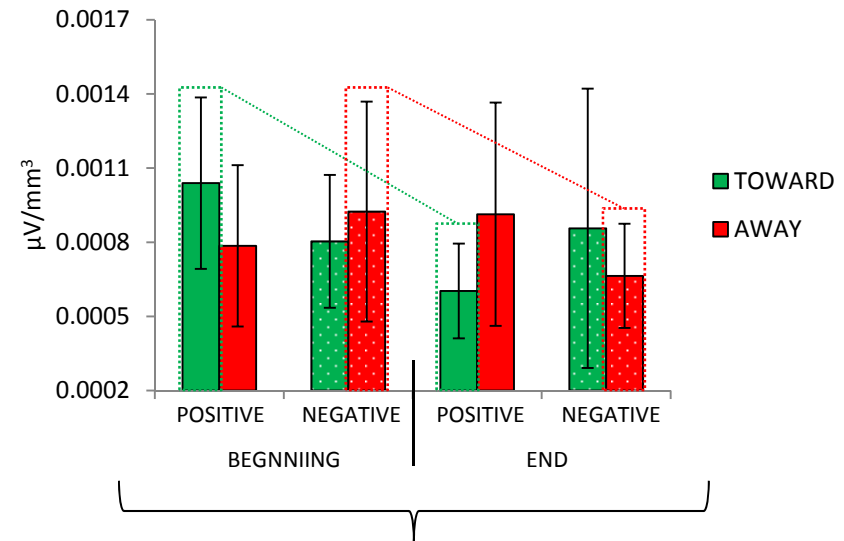
# Electrical Neuroimaging

GMD  
POI 50-84ms

*Group\*Cue\*Session interaction*  
Left temporo-parieto-occipital junction



*Brain activity within left temporo-parieto-occipital junction*





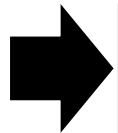
# Discussion

- AB is modified either in favor of the positive cue (approach) or in favor of the negative cue (avoidance)



**Inter-individual difference in the sensibility to positive or negative associations between cue and task-relevant information**

- Development of AB toward or away initially neutral stimuli was associated with electrophysiological modulations to the cue at 50-84 ms within left temporo-parieto-occipital junction



**ABM depend on the left ventral visual pathway involved in the processing of stimulus saliency**

(Ramautar et al., 2006; Stillova et al., 2013)

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