

# Cortical activity evoked by synchronised vs. non-synchronised peer observers as detected with fNIRS

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## BACKGROUND

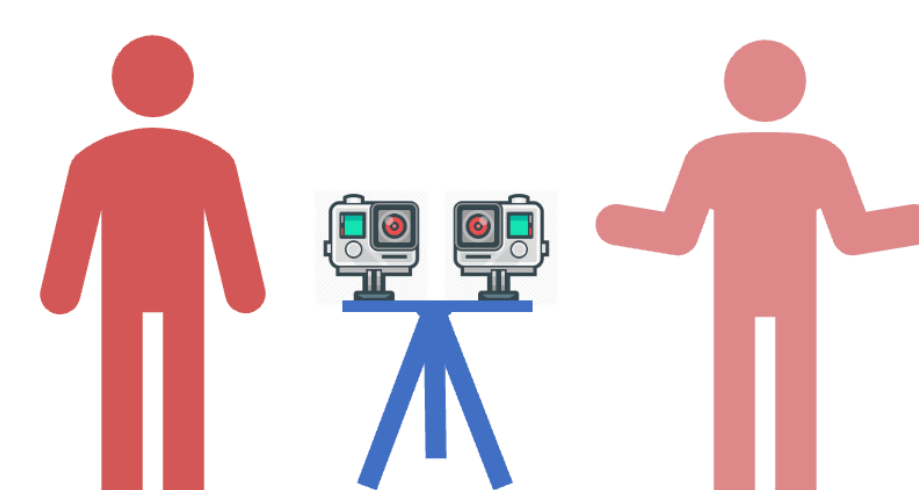
Motor synchrony with a peer and the presence of an observer can each improve inhibition of motor responses (e.g., Keisari et al., 2020, *Clinical Gerontologist*; Rauchbauer et al., 2020, *Acta Psychologica*). We examine the intersection of these two phenomena:

**Can the presence of a synchronised peer improve inhibition more than a non-synchronised peer?**

## METHOD

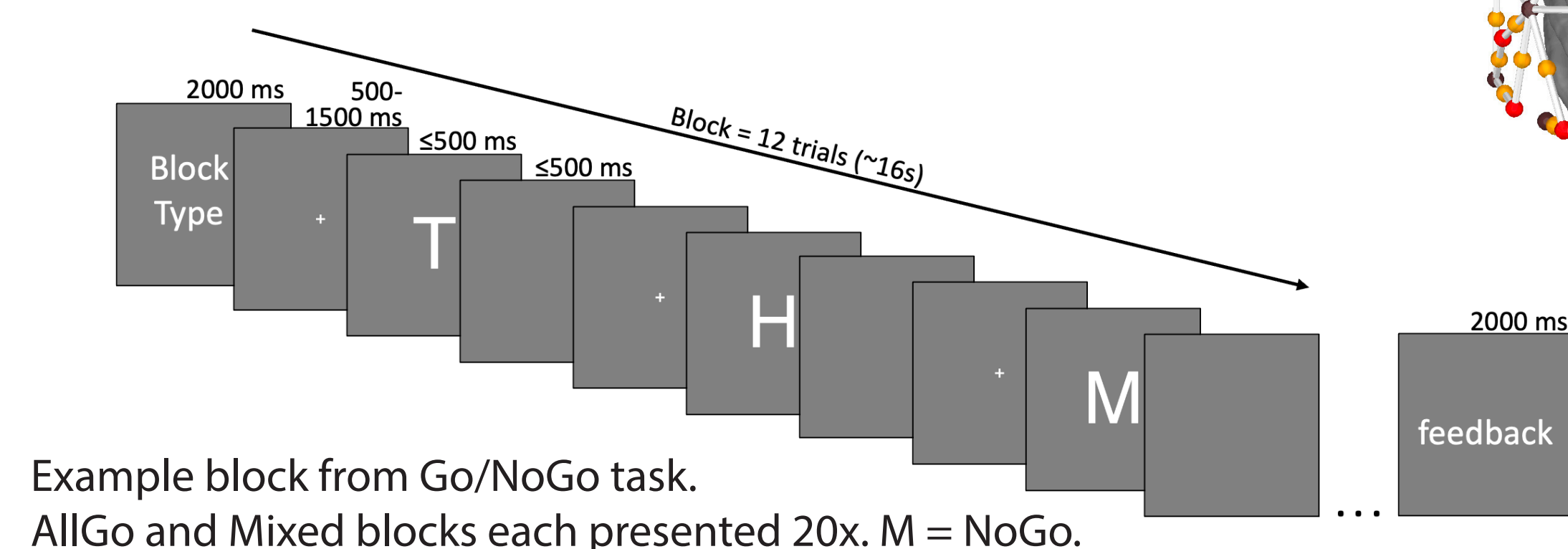
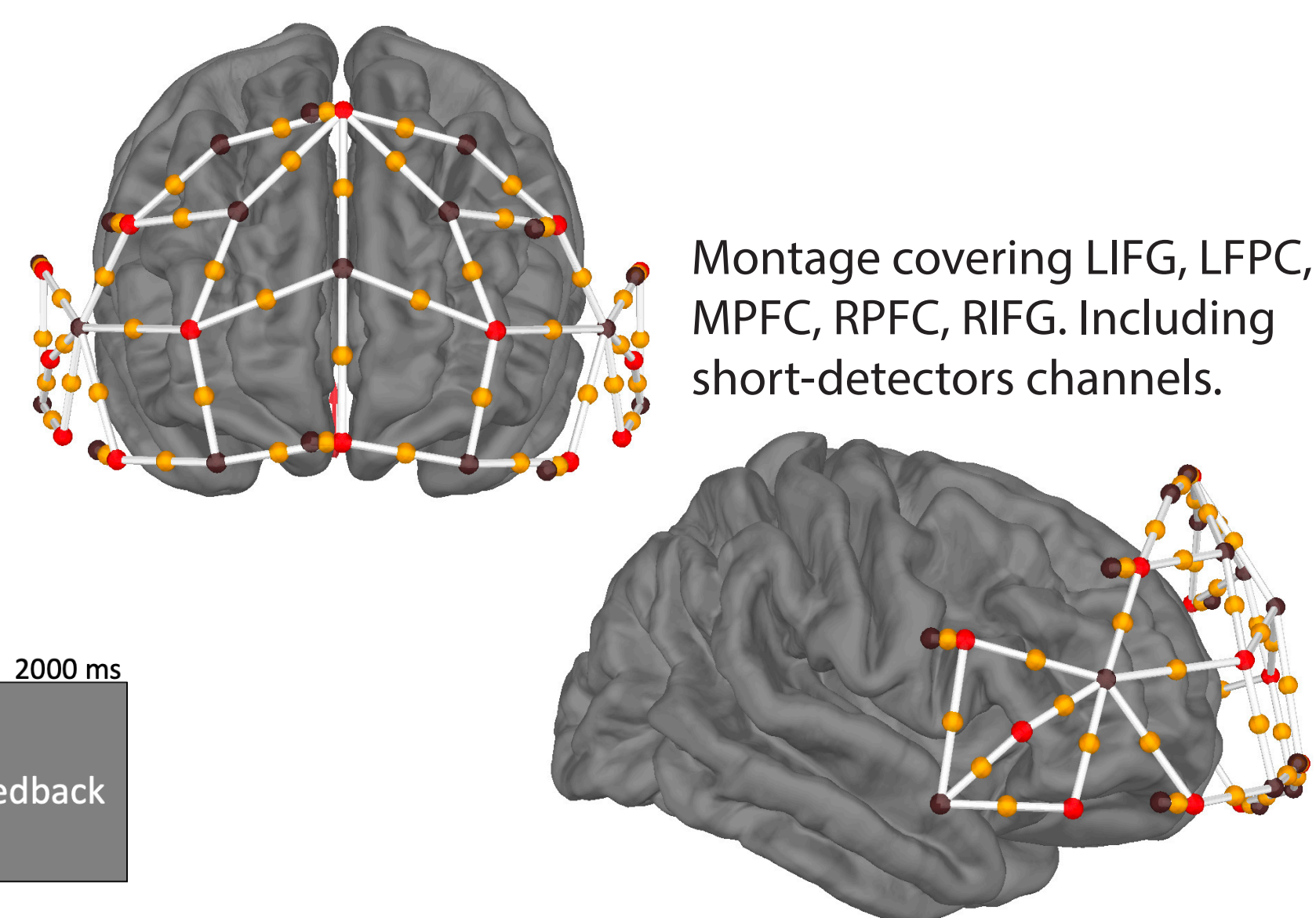
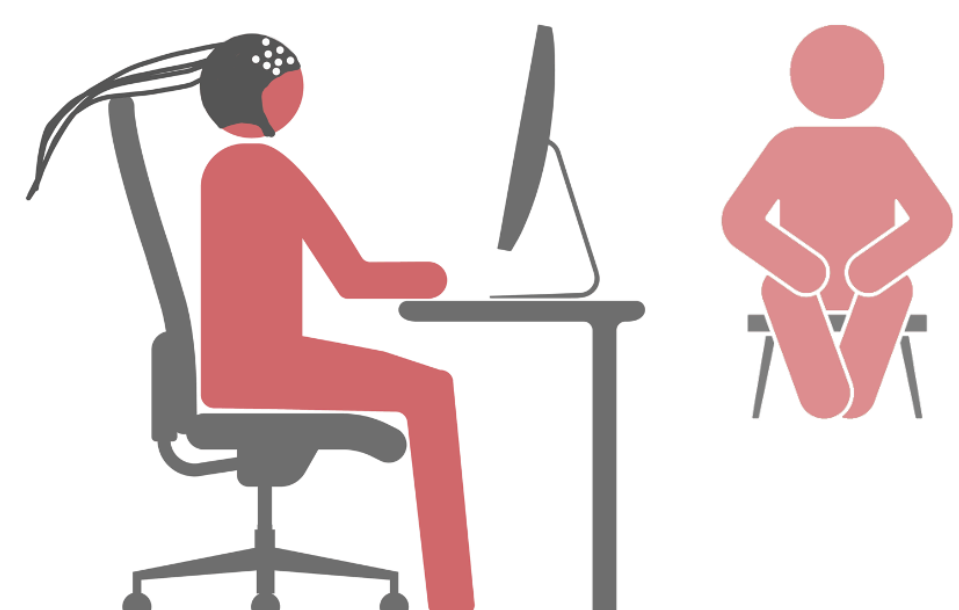
### 1. Mirror game/observation task

**Synchronised** group (n = 30) plays mirror game with confederate, leading then following  
**Control** group (n = 29) complete observation task while partner moves arms, participant takes first turn observing



### 2. Behavioural/cortical measures of inhibition

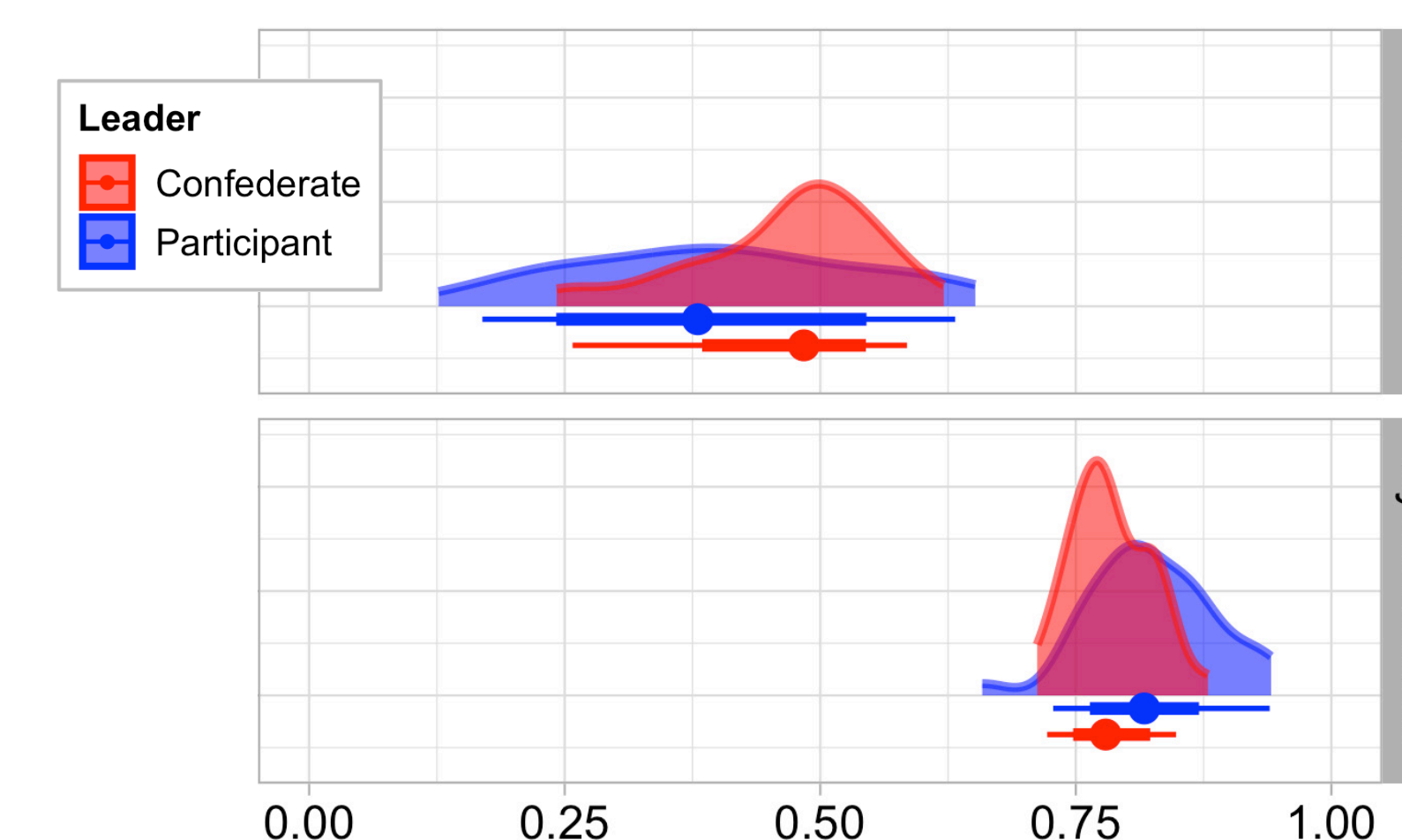
**Both** groups complete Go/NoGo task:  
• Confederate watching from ~1.5 m  
• fNIRS signals recorded from frontal brain regions



## MANIPULATION CHECK

### Movement similarity

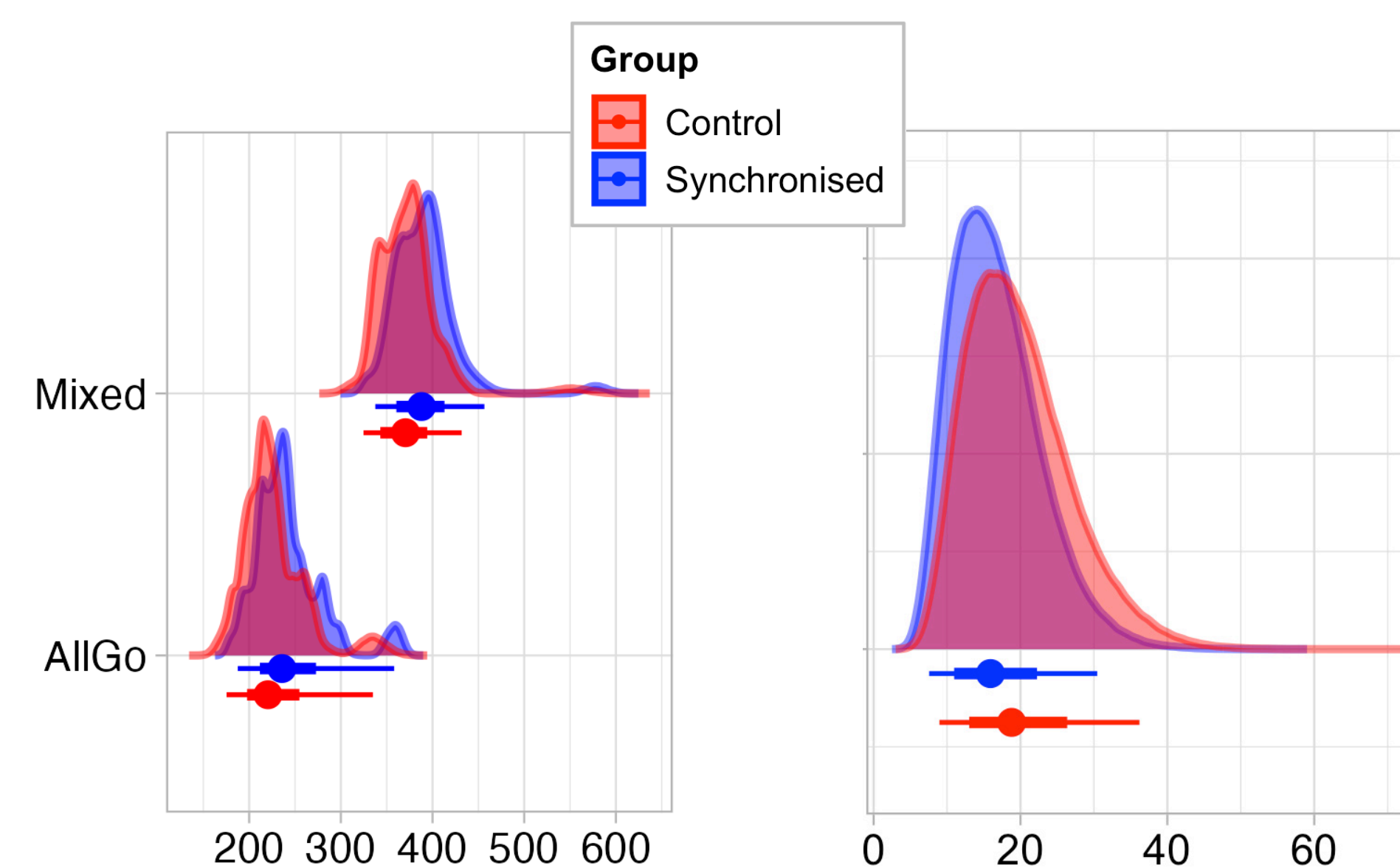
OpenPose used to estimate pose similarity  
**Synchronised > Control**  
difference between group means = 0.37



## RESULTS

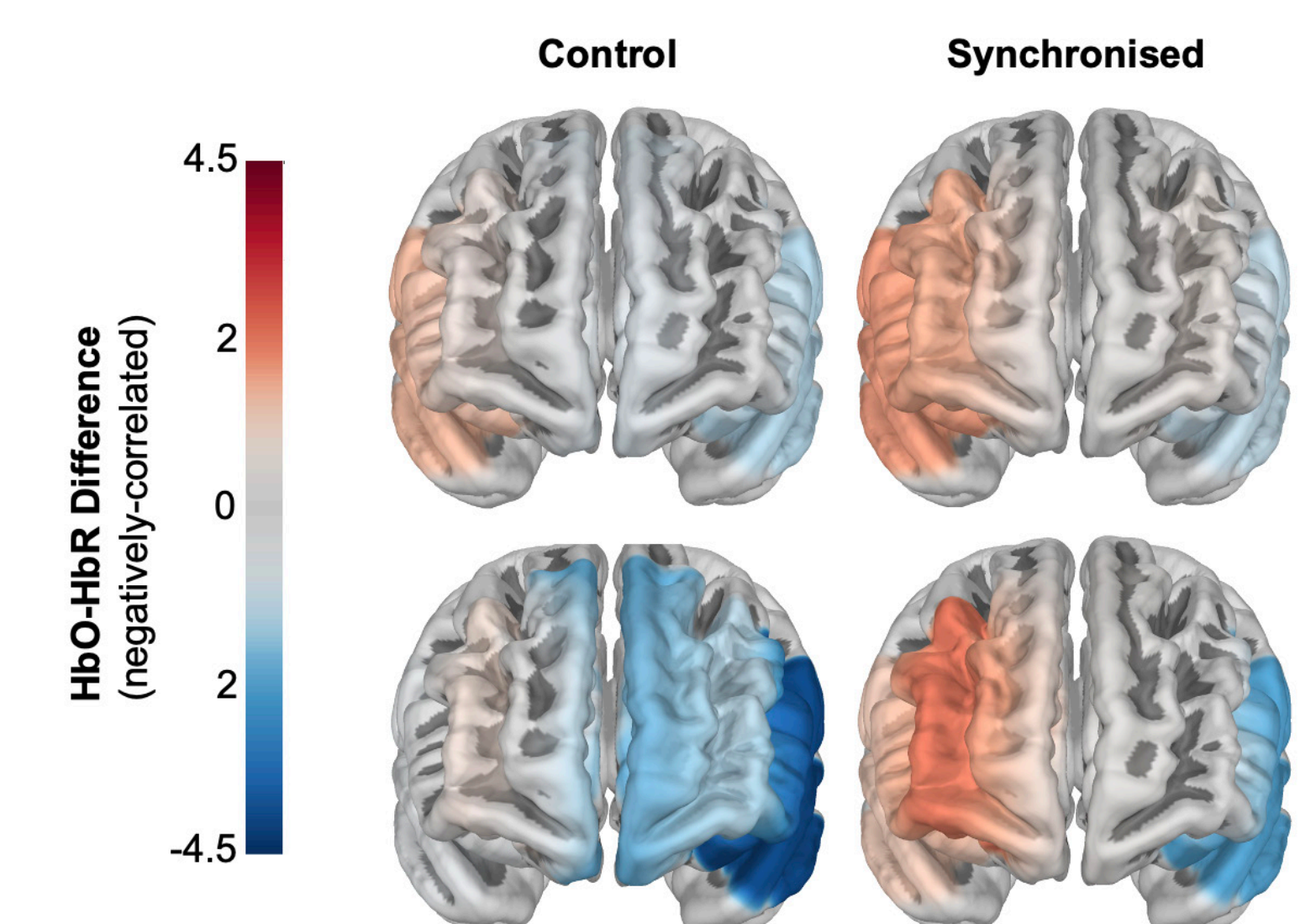
### Errors, RTs, Cortical oxygenation

Bayesian multilevel models with weakly informative priors



**Reaction times:** **Synchronised > Control** 18 ms [15.8, 20.4]  
**Commission errors:** **Control > Synchronised** 3.66% [0.95, 6.33]

**HbO-HbR difference;** negatively correlated pairs kept on theoretical basis (neurovascular coupling)



**Cortical oxygenation:** **Synchronised > Control**  
• positive HbO-HbR differences  
• stable between Mixed and AllGo

More HbO/HbR, HbO-HbR difference figures:



## DISCUSSION

1. A synchronised observer yields:  
• **speed-accuracy trade-off** favouring accuracy  
• **stable frontal activity:** LIFG differences in attention-related suppression/semantic processing

2. Synchrony may enhance **inhibition training-protocols** and benefit **clinical populations with decreased motory synchrony and inhibition** (e.g., ASD, ADHD, bipolar, substance addition; McTeague et al., 2017, *American Journal of Psychiatry*)

## CONTACT INFO

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