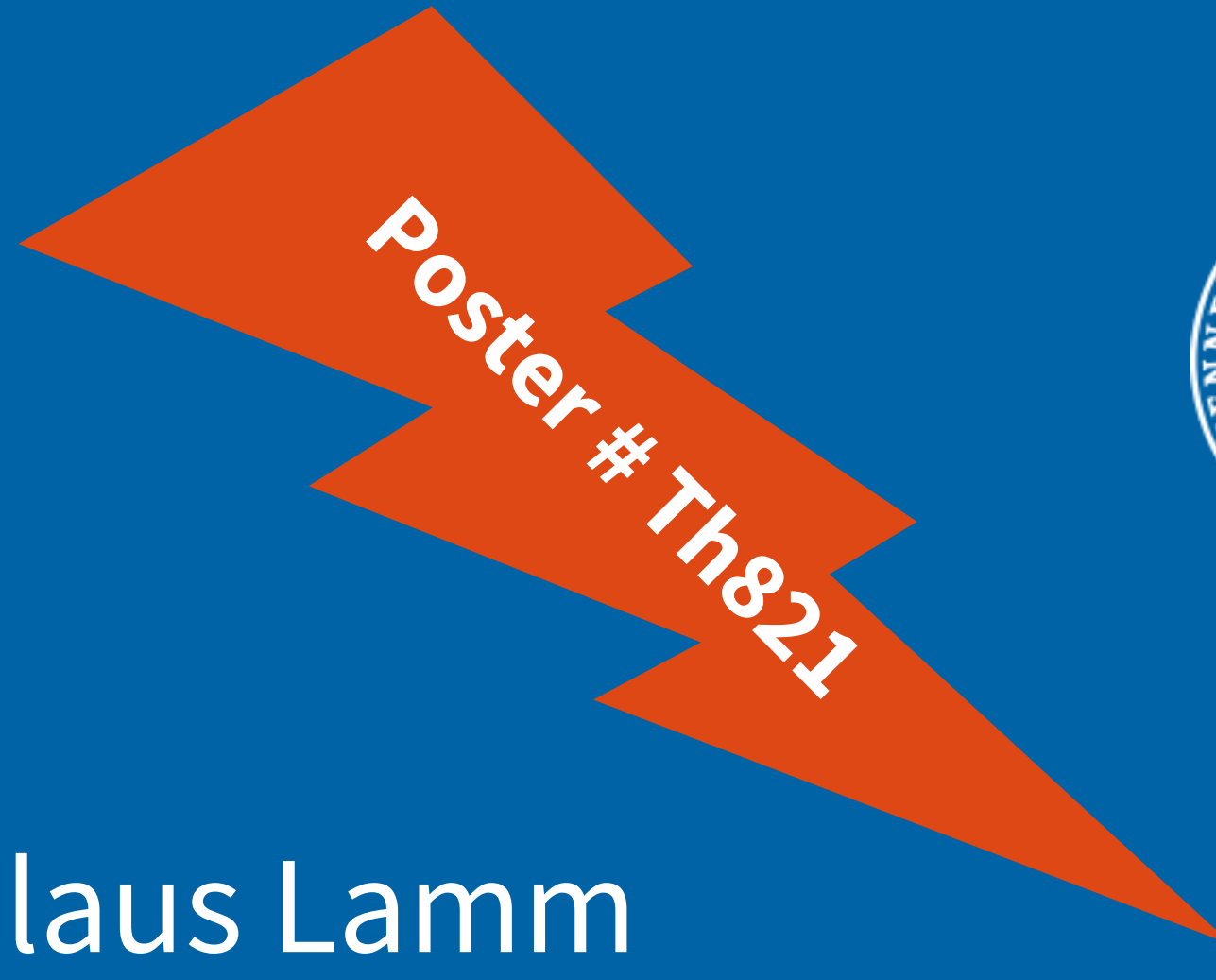


# Effects of placebo analgesia on somatosensory responses during first-hand and empathy for pain



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## BACKGROUND

- First-hand experience and empathy for pain have common mental representations: shared representations account<sup>1</sup>
- Placebo analgesia reduces both one's own pain as well as empathy for pain<sup>2,3</sup>

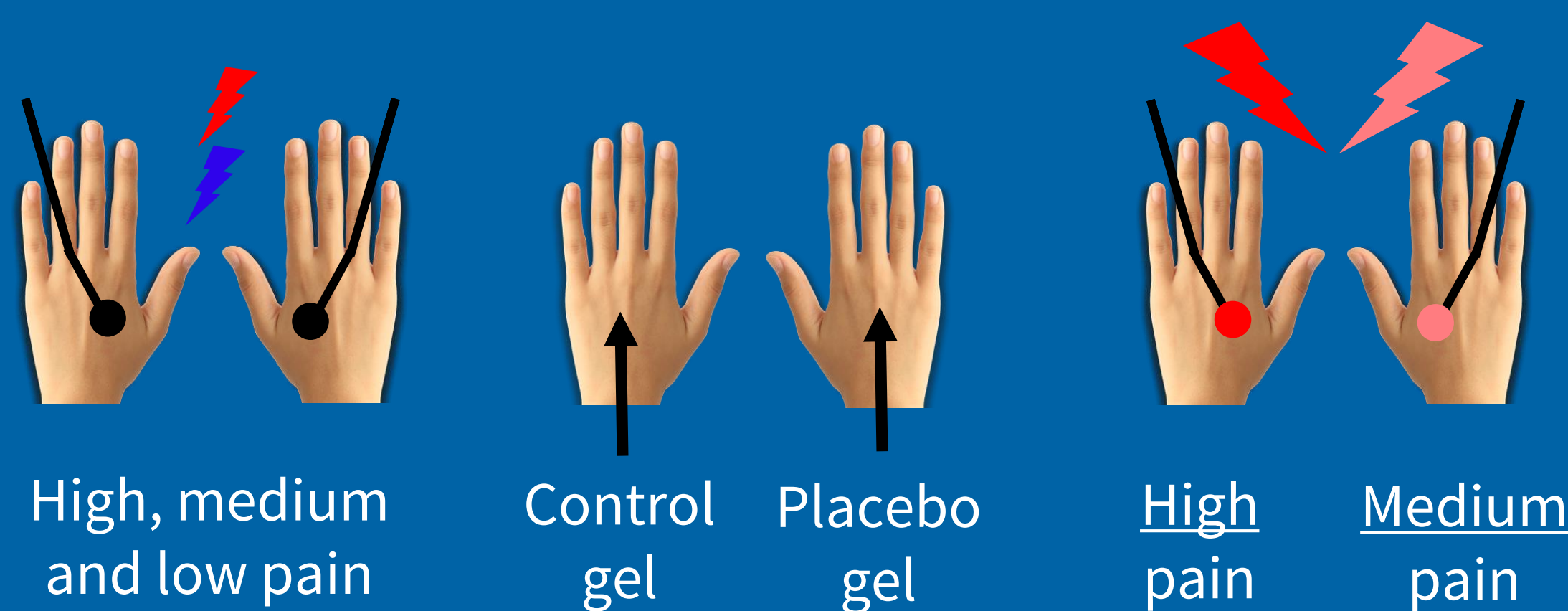
## RESEARCH GAP

- Only modulation of affective, but not sensory brain areas<sup>2,3</sup>
- This mismatch might be due to the specifics of the experimental paradigm<sup>4-6</sup> using faces with painful expressions<sup>2,3</sup>

## QUESTION

Does placebo analgesia modulate the sensory-discriminative component of pain processing?

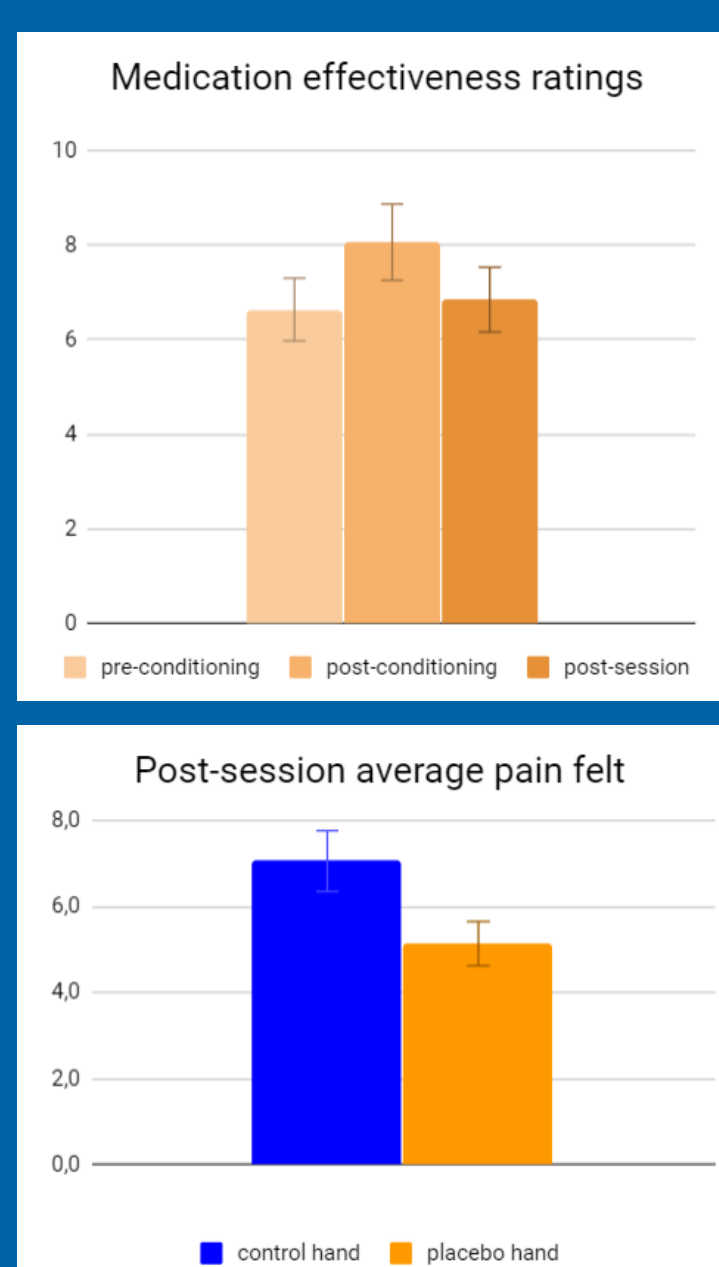
## METHODS



- Individual pain calibration for right & left hand
- Placebo cream application by medical cover
- Classic conditioning procedure to amplify placebo effect

## SAMPLE

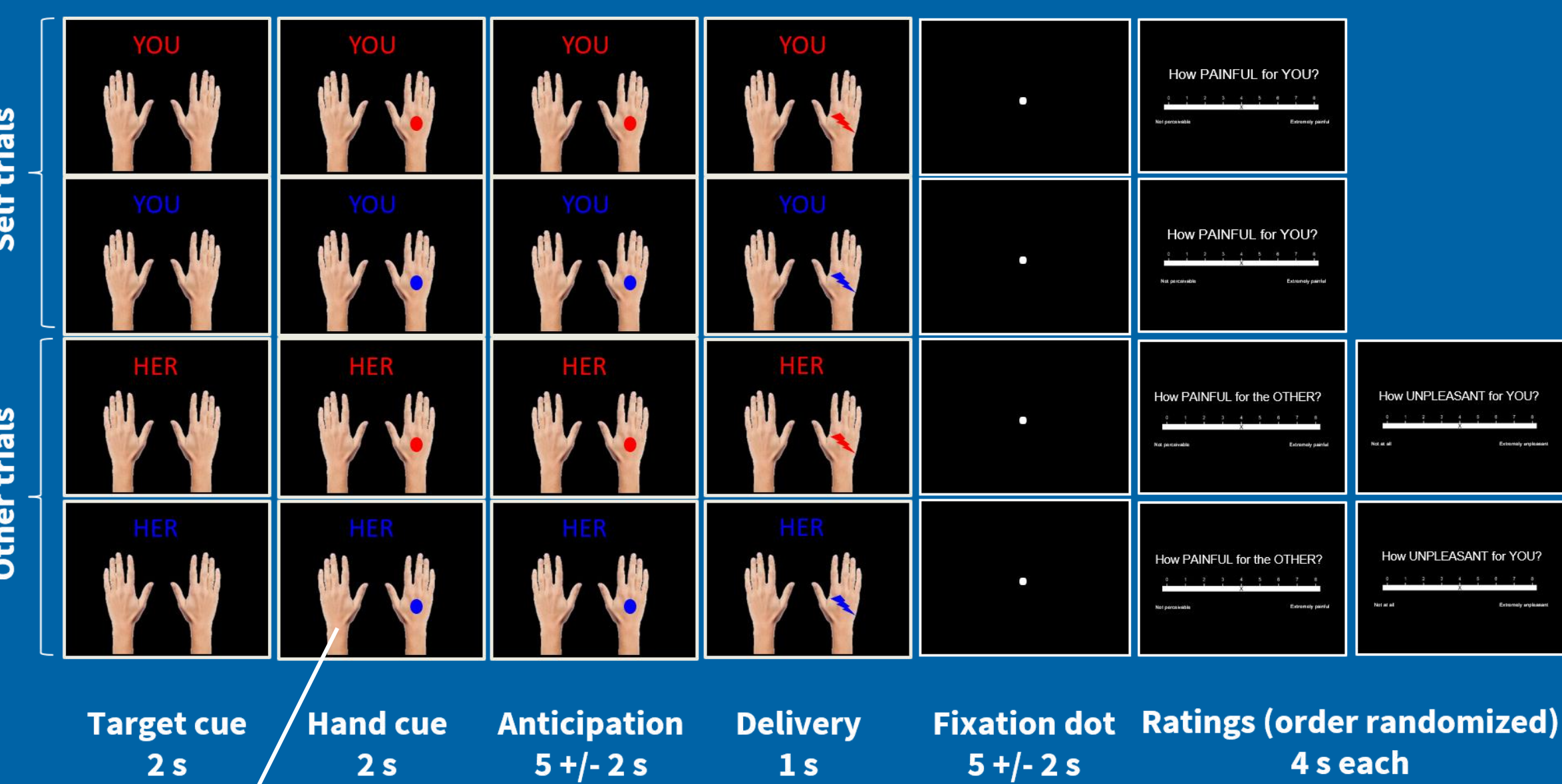
- $N = 45$  (23 f) placebo analgesia responders (26 % nonresponders)
- $M(SD)_{age} = 23.84(2.73)$ , range = 19-32 years
- Strongly right-handed (Laterality Quotient<sup>7</sup> > 80)



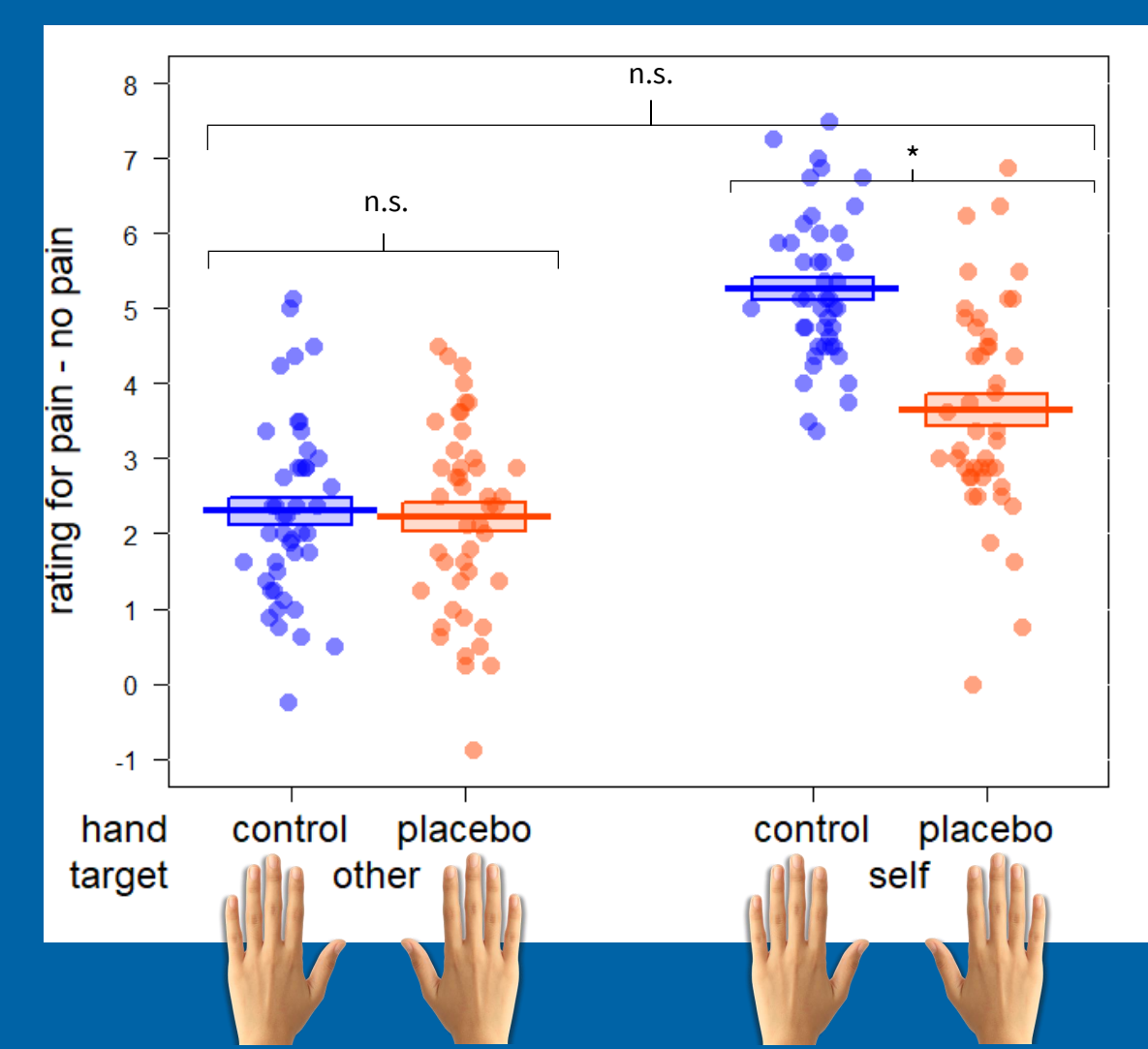
Stable belief in effectiveness of medication over testing session  
No doubts about setup and setup (placebo, confederate)

## TASK

16 shocks (8 rated) x 2 targets x 2 treatments x 2 intensities = 128 trials (two runs)

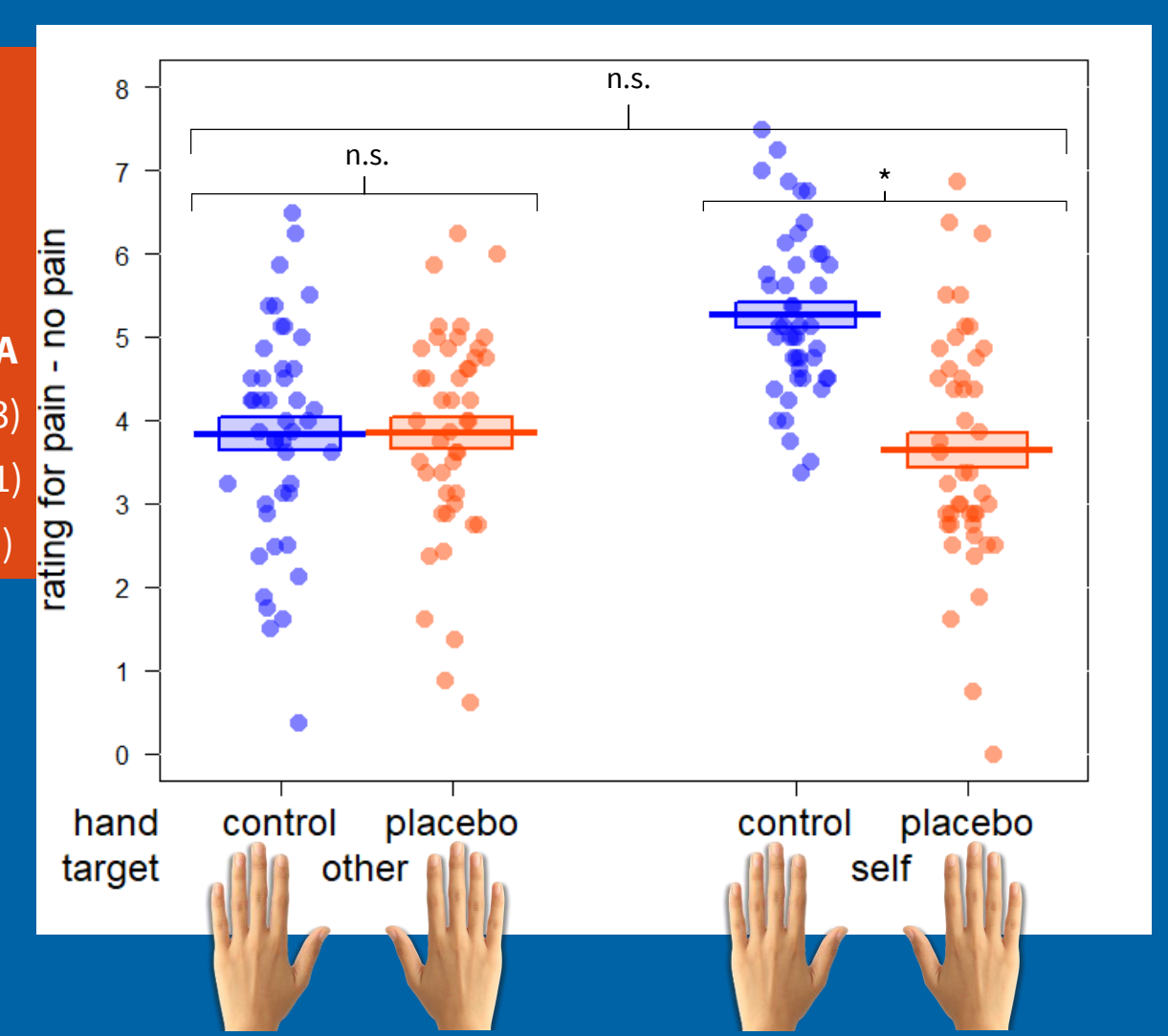


## RESULTS



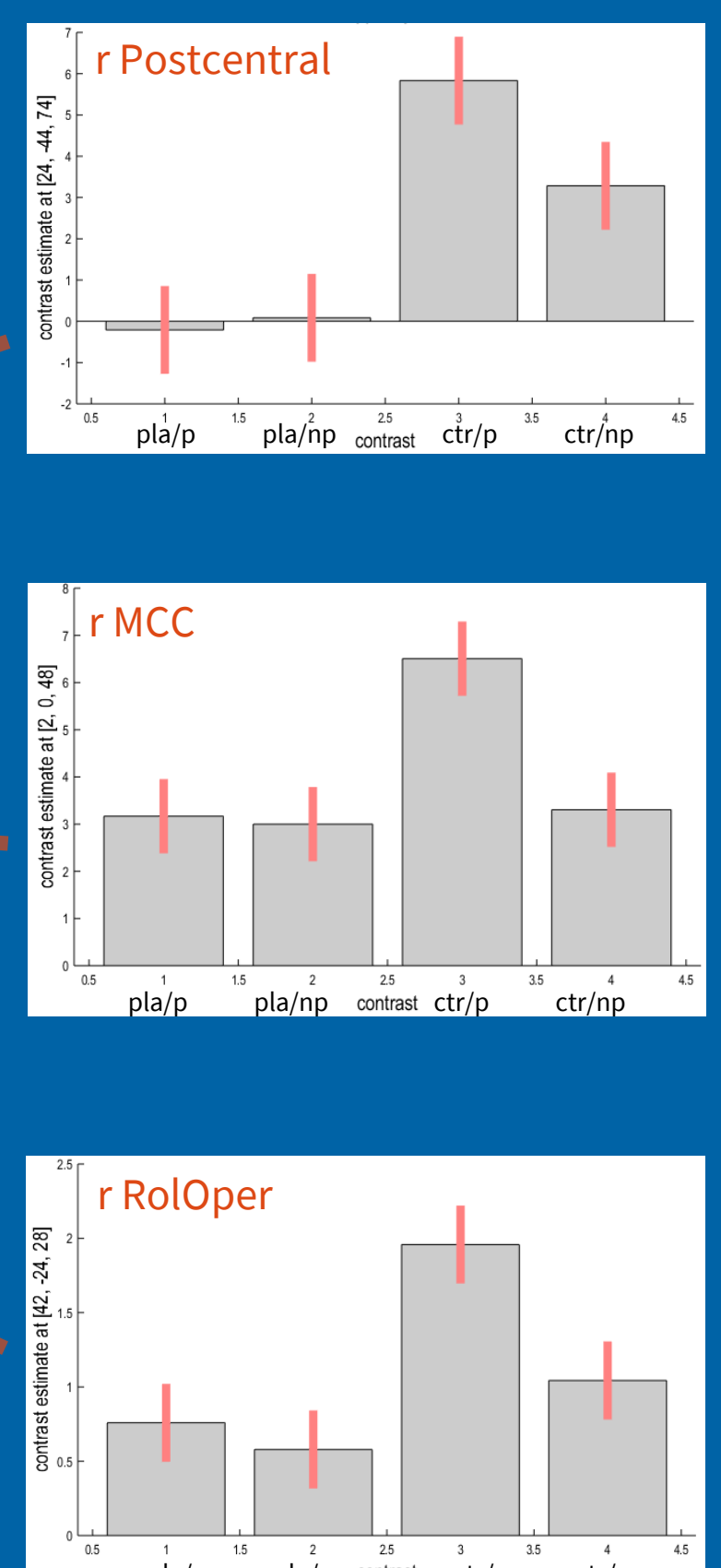
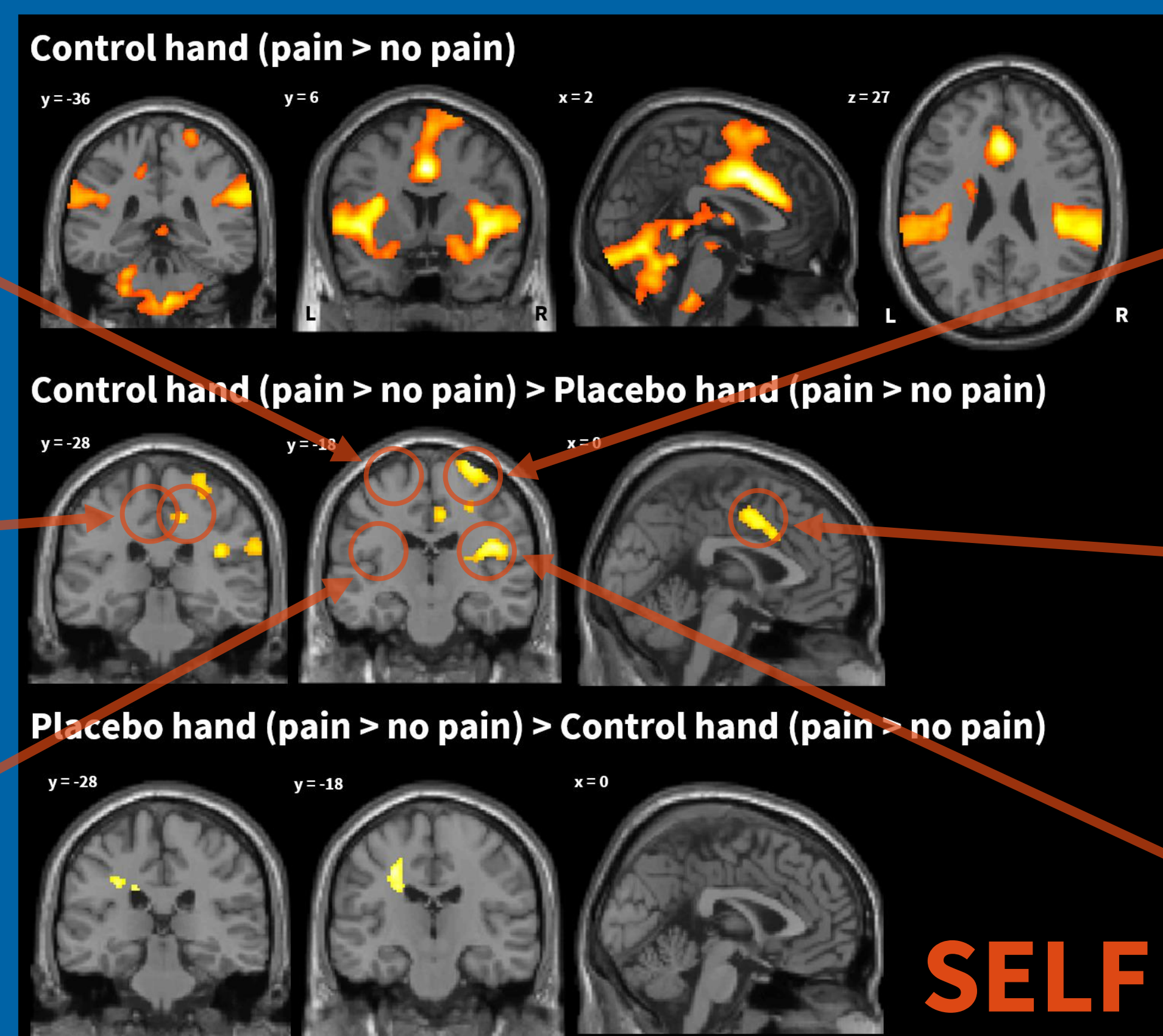
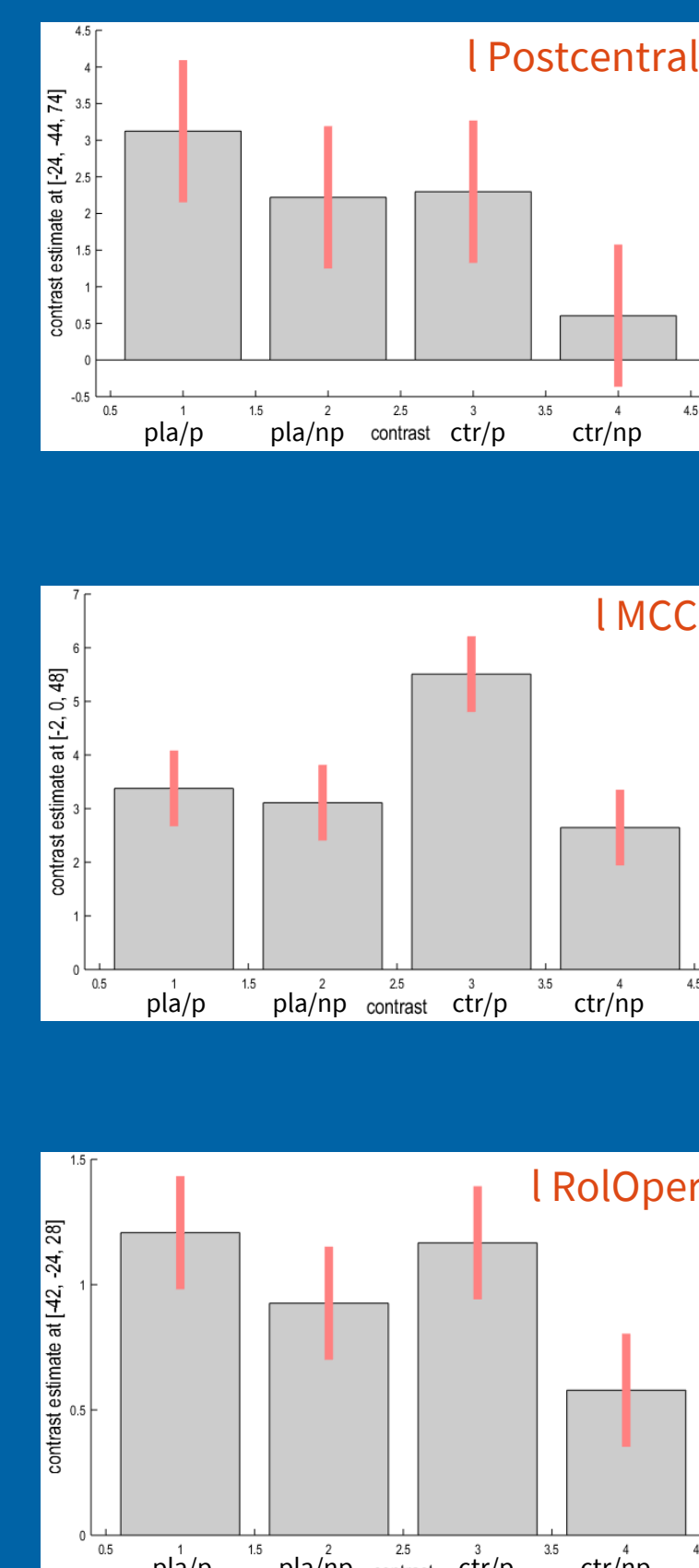
### Self- but no other-related localized placebo effect

Repeated-measures ANOVA  
Target:  $F(1,44) = 101.6$  ( $p < .001$ )  
Hand:  $F(1,44) = 58.4$  ( $p < .001$ )  
T x H:  $F(1,44) = 63.1$  ( $p < .001$ )

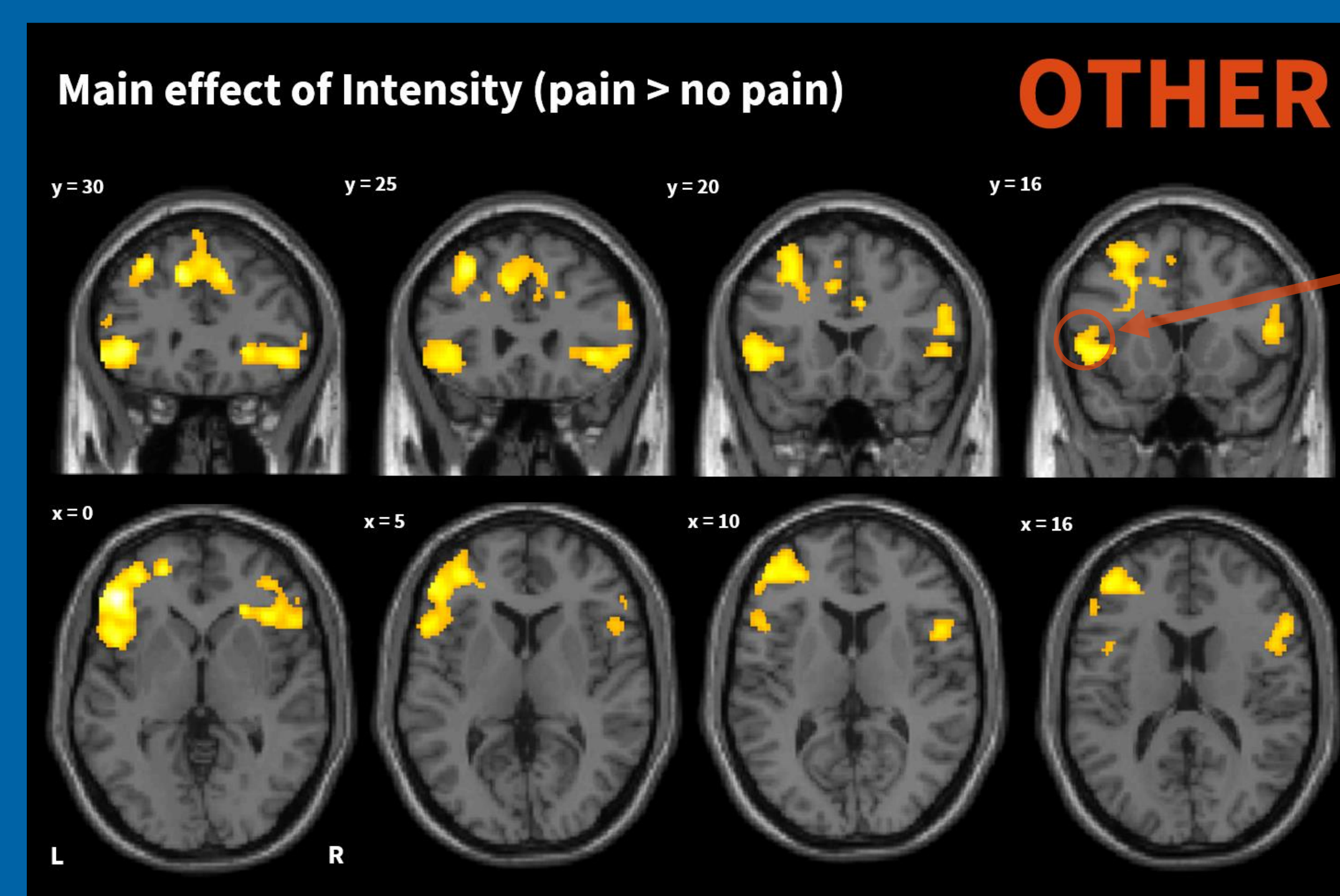


„How unpleasant for you?“

„How painful for the other?“



### First-hand placebo effect and replication of previous studies on localized & generalized analgesia<sup>2,3,8</sup>



No localized empathic sharing and no transfer of placebo effect to sensory brain areas, but intact generalized affective response to another person's pain

No significant clusters in the two contrasts comparing the hands

Other Placebo ( $p > np$ ) > Control ( $p > np$ )  
Other Control ( $p > np$ ) > Placebo ( $p > np$ )

## CONCLUSION

Placebo analgesia does not modulate the sensory-discriminative component of pain

## REFERENCES

- Lamm, et al. (2011)
- Rütgen et al. (2015, PNAS)
- Rütgen et al. (2015, JNeurosci)
- Benedetti et al. (2005)
- Wager & Atlas (2015)
- Keysers et al. (2010)
- Tran et al. (2014)
- Bingel et al. (2006)

Imaging results are displayed using a preliminary whole-brain analysis (combining anticipation and delivery phase) with an initial threshold of  $p < .001$  (Self) /  $p < .005$  (Other) uncorrected and a FWE-corrected cluster-forming threshold (Self = 231 voxels, Other = 540). Anatomical regions were labelled with SPM's Anatomy toolbox (Version 1.5).

