

# Is your pain my pain? Effects of localized placebo analgesia on empathy for everyday painful situations

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## Introduction

- First-hand experience and empathy for pain rely on similar neural functions: 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

- Reduction of empathy by placebo found in affective, but not somatosensory areas<sup>2,3</sup>
- Mismatch might be due to specifics of previous experimental paradigms<sup>4-6</sup>
- Previous study in the same project: no evidence for somatosensory sharing<sup>7</sup>

## Research Question

Does placebo analgesia modulate empathy for naturalistic depictions of others' pain in a somatotopically matched way?

## Methods

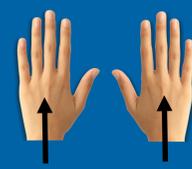
### Sample

- $N = 45$  (23 f) placebo analgesia responders (26% nonresponders)
- $M(SD)_{age} = 23.8(2.9)$ , age range = 19-31 years
- Strongly right-handed (Laterality Quotient<sup>8</sup> > 80)
- No doubts about study setup



Values for high, medium and low pain

### Placebo analgesia induction



Control gel Placebo gel

- Individual pain calibration for right & left hand
- Placebo cream application by study doctor



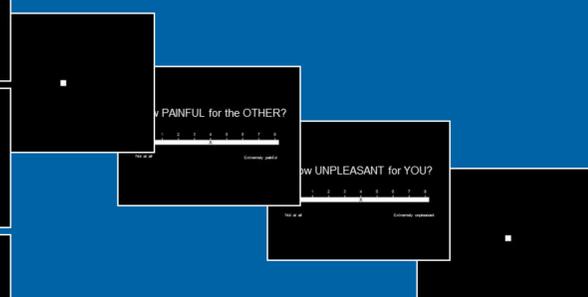
High pain Medium pain

- Classic conditioning procedure to amplify placebo effect (medium instead of high intensity on right hand to suggest relief)

### Empathy task & fMRI



15 situations x 2 treatments x 2 intensities = 60 trials (one run)



Picture 3.5 s Fixation dot 5 ± 2 s Two ratings of 4 s each (randomized order) Fixation dot 5 ± 2 s

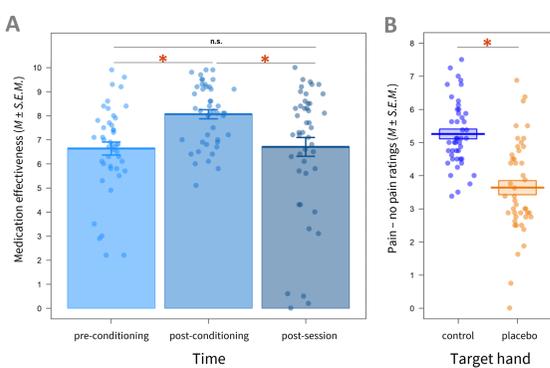


## Results

### Behavior

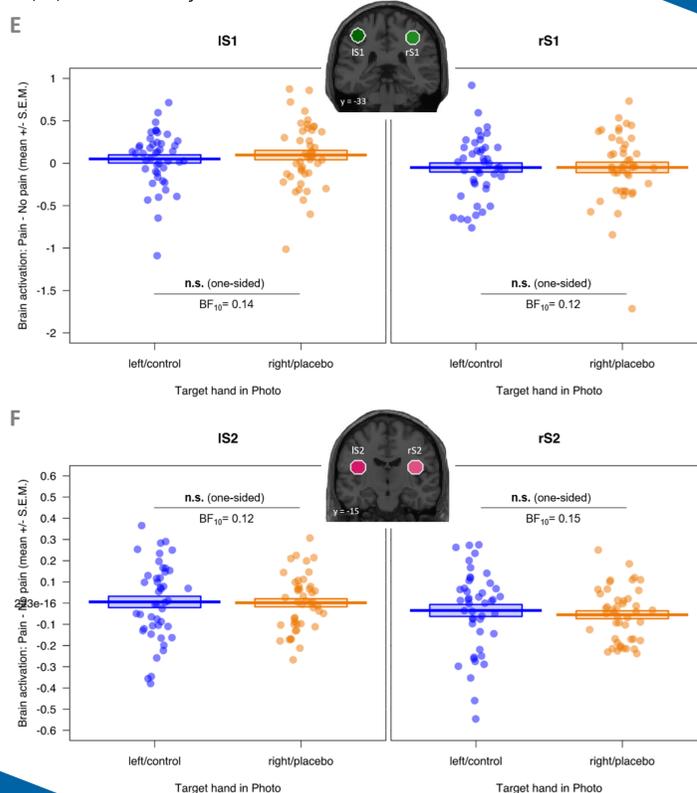
Strong belief in 'medication' effectiveness over the session

Self-reported difference in average pain in a first-hand electrical pain task

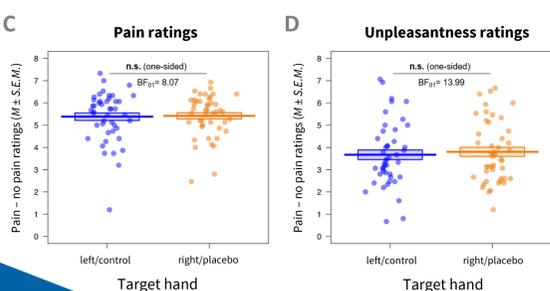


### Brain

No somatotopically matched modulation of somatosensory responses during empathy for pain in bilateral primary (S1) or secondary (S2) somatosensory cortex



No localized transfer of placebo effect to empathy for naturalistic depictions of others' pain



- First-hand placebo analgesia effect
- No transfer of this effect to somatosensory responses related to empathy for pain
- Matching results in behavioral and brain data

## Conclusion

No evidence for somatosensory specific matching during empathy for naturalistic depictions of others' pain

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Preregistration: [osf.io/uwzb5](https://osf.io/uwzb5)

bioRxiv Preprint: [tinyurl.com/y9uezw3q](https://tinyurl.com/y9uezw3q)

## References

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