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

Helena Hartmann, Federica Riva, Markus Rütgen, & Claus Lamm

Social, Cognitive and Affective Neuroscience (SCAN) Unit
Department of Cognition, Emotion, and Methods in Psychology
Faculty of Psychology, University of Vienna

universität wien

Introduction

- First-hand experience and empathy for pain rely on similar neural functions: shared representations account[1]
- Placebo analgesia reduces both one's own pain as well as empathy for pain[2,3]

Research Gap

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

Research Question

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

PREREGISTERED

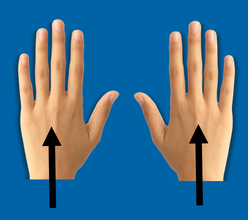
Methods

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[8] > 80)
- No doubts about study setup

Placebo analgesia induction

Values for high, medium and low pain

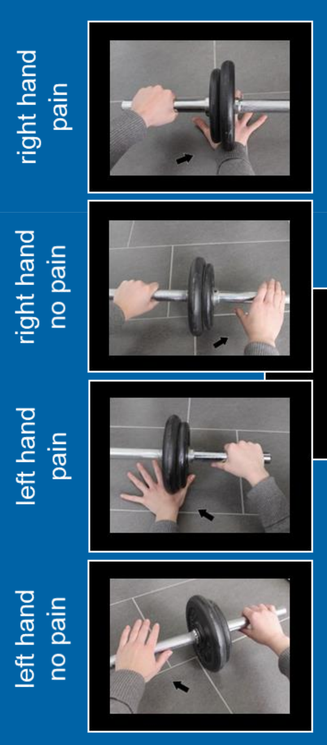


Control gel | Placebo gel

High pain | Medium pain

1. Individual pain calibration for right & left hand
2. Placebo cream application by study doctor
3. Classic conditioning procedure to amplify placebo effect (medium instead of high intensity on right hand to suggest relief)

Empathy task & fMRI



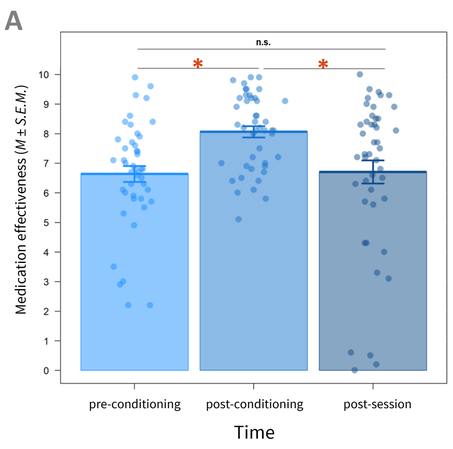
15 situations
x 2 treatments
x 2 intensities
= 60 trials (one run)

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

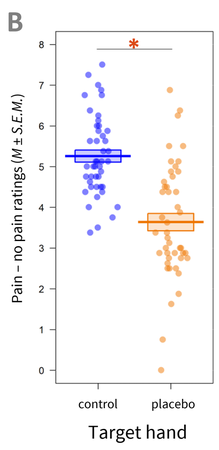
Results

Behavior

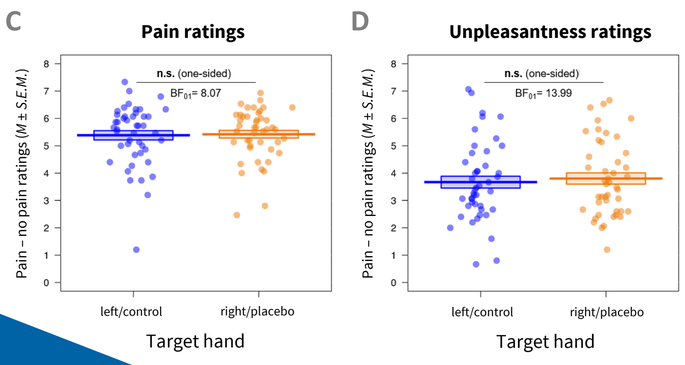
Strong belief in 'medication' effectiveness over the session



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

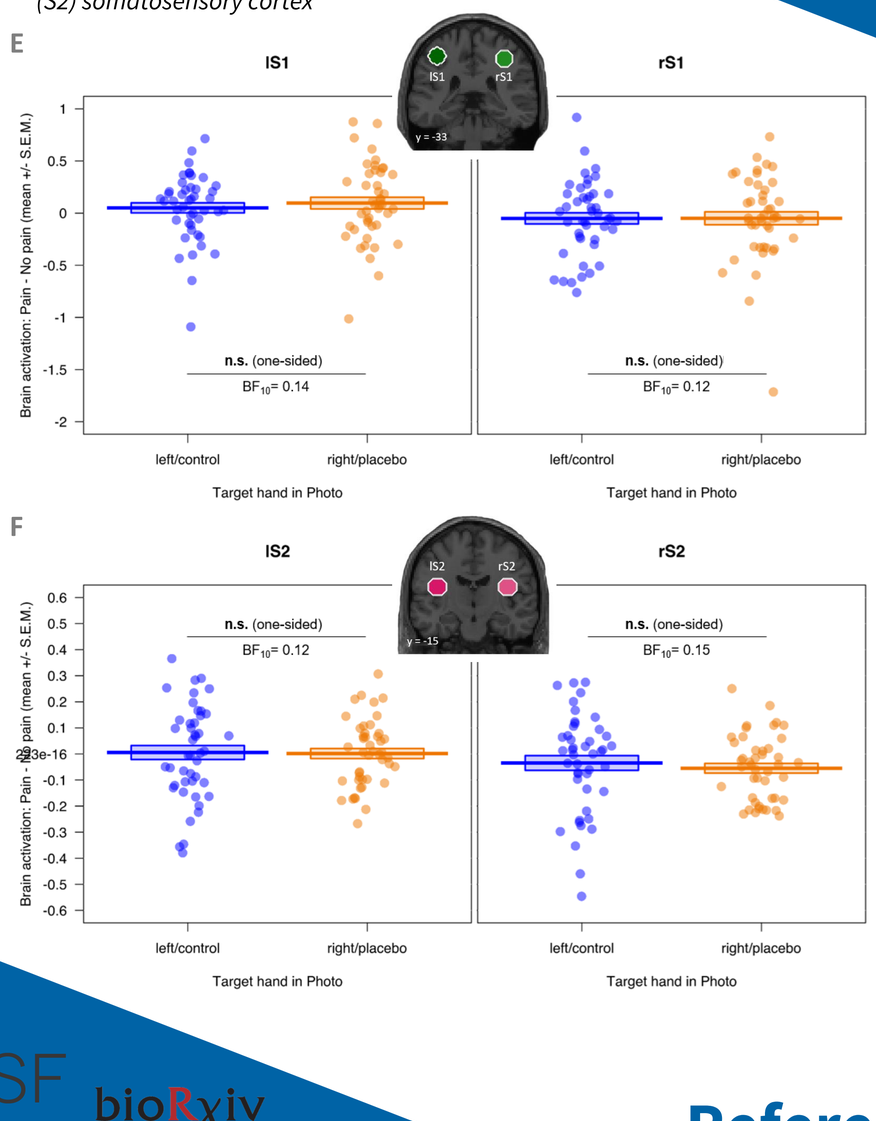


No localized transfer of placebo effect to empathy for naturalistic depictions of others' pain



Brain

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



- 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

Contact

0000-0002-1331-6683
@helenahhartmann
helena.hartmann@univie.ac.at

SCAN Unit

Vienna Doctoral School Cognition · Behaviour · Neuroscience

FWF Der Wissenschaftsfonds.

Preregistration: osf.io/uwzb5

Preprint: tinyurl.com/y9uezw3q

References

1. Lamm, et al. (2011)
2. Rütgen et al. (2015, PNAS)
3. Rütgen et al. (2015, JNeurosci)
4. Benedetti et al. (2005)
5. Wager & Atlas (2015)
6. Keysers et al. (2010)
7. Hartmann et al. (2021)
8. Tran et al. (2014)