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Acute pain attenuates emotional experience in the body

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Emotions are felt in the body

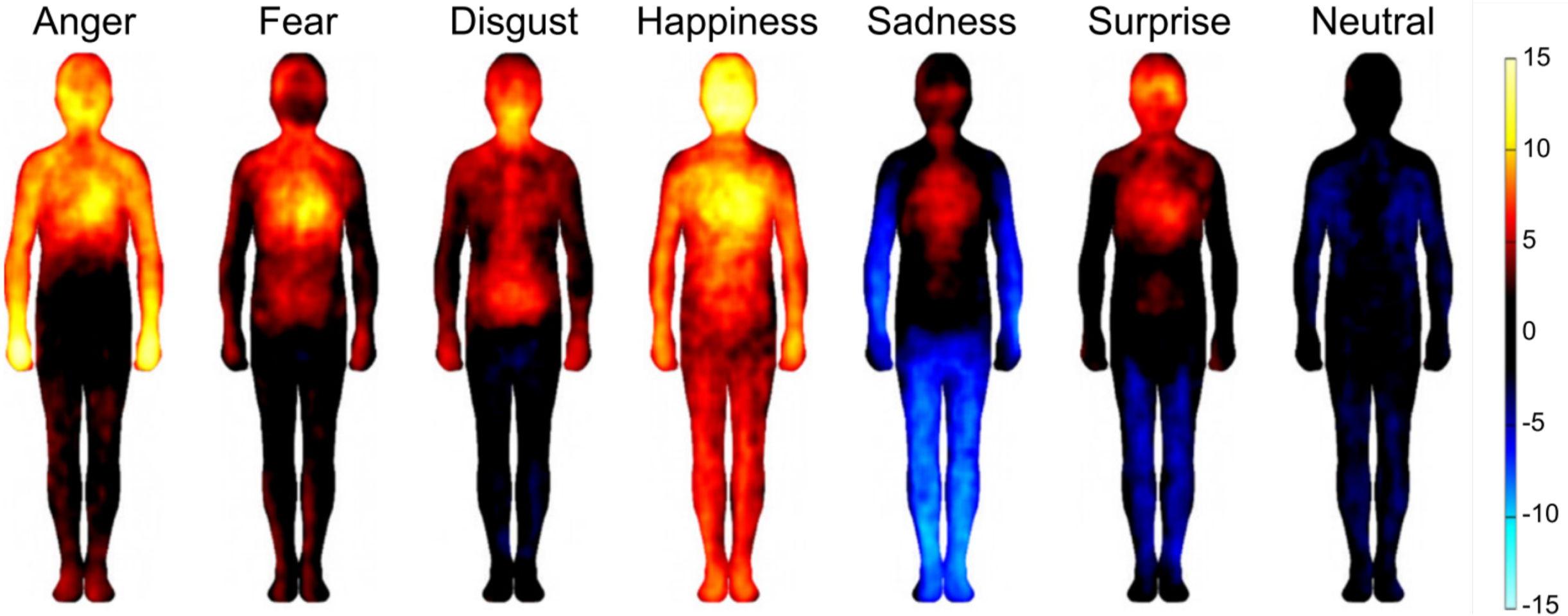
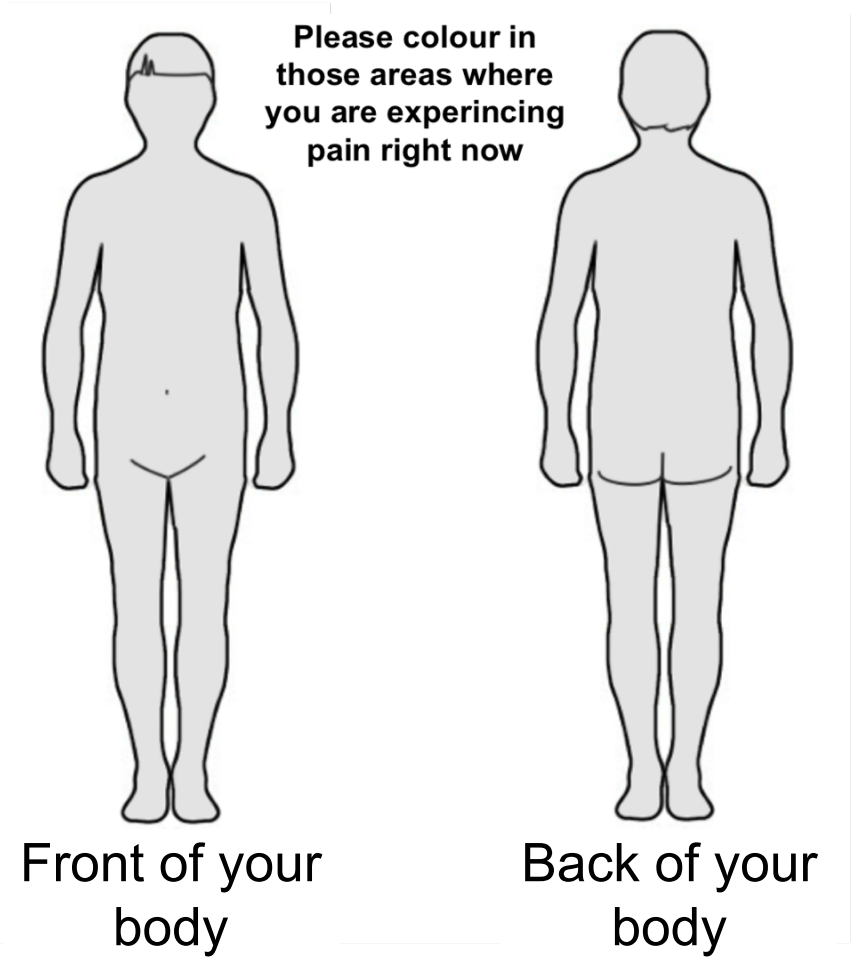


Figure adapted from Nummenmaa et al. 2014 PNAS

On-line tool to collect bodily topographies

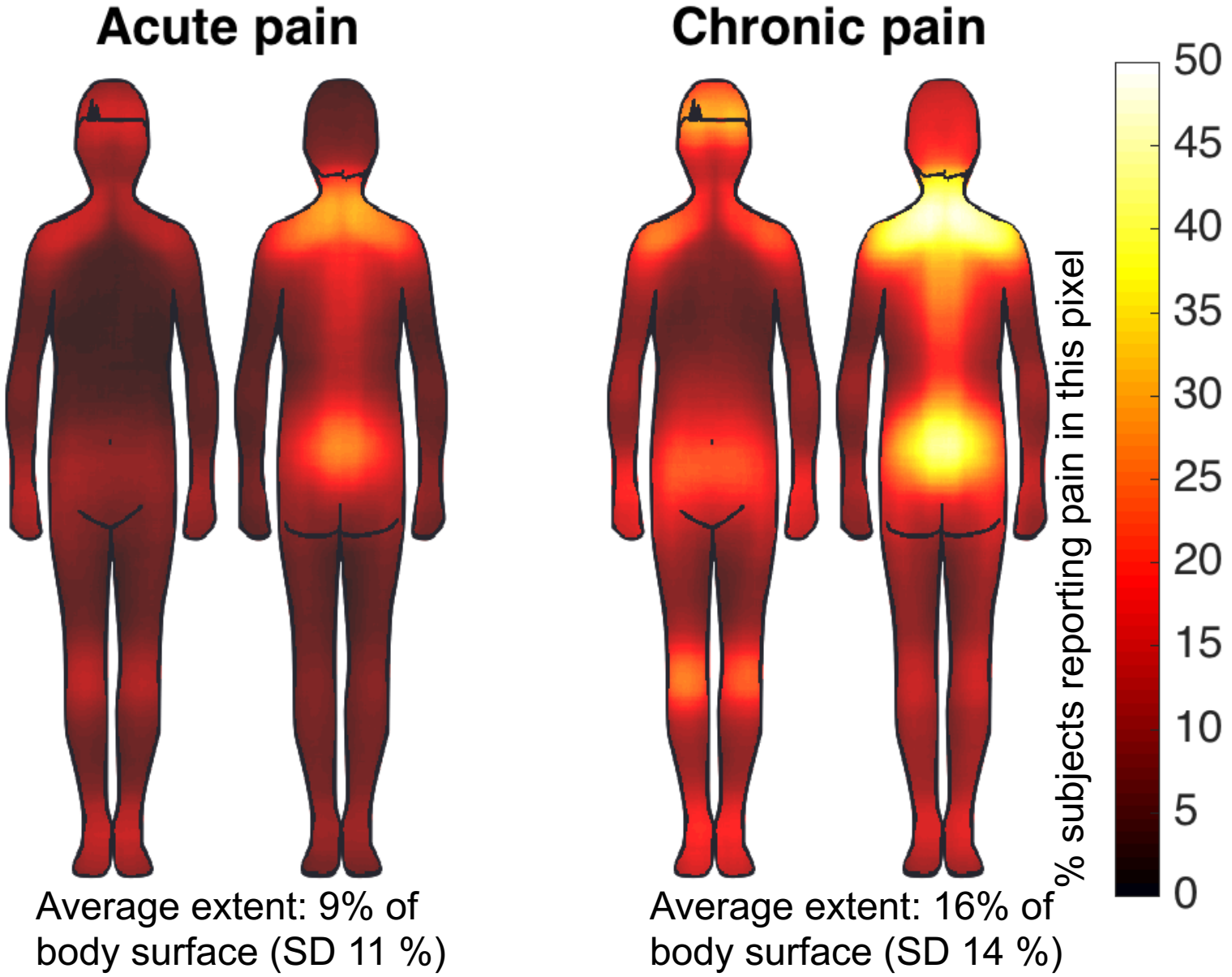
- **Self-reported topographies of**
  - Body maps (activations & de-activations) of anger, fear, disgust, happiness, sadness, surprise, neutral emotional states
  - Tactile, hedonic, and nociceptive sensitivity
  - Acute and recurrent/chronic pain
- **Intensity of current pain** (0 – 10)
- **Current emotional state** (0 – 10)



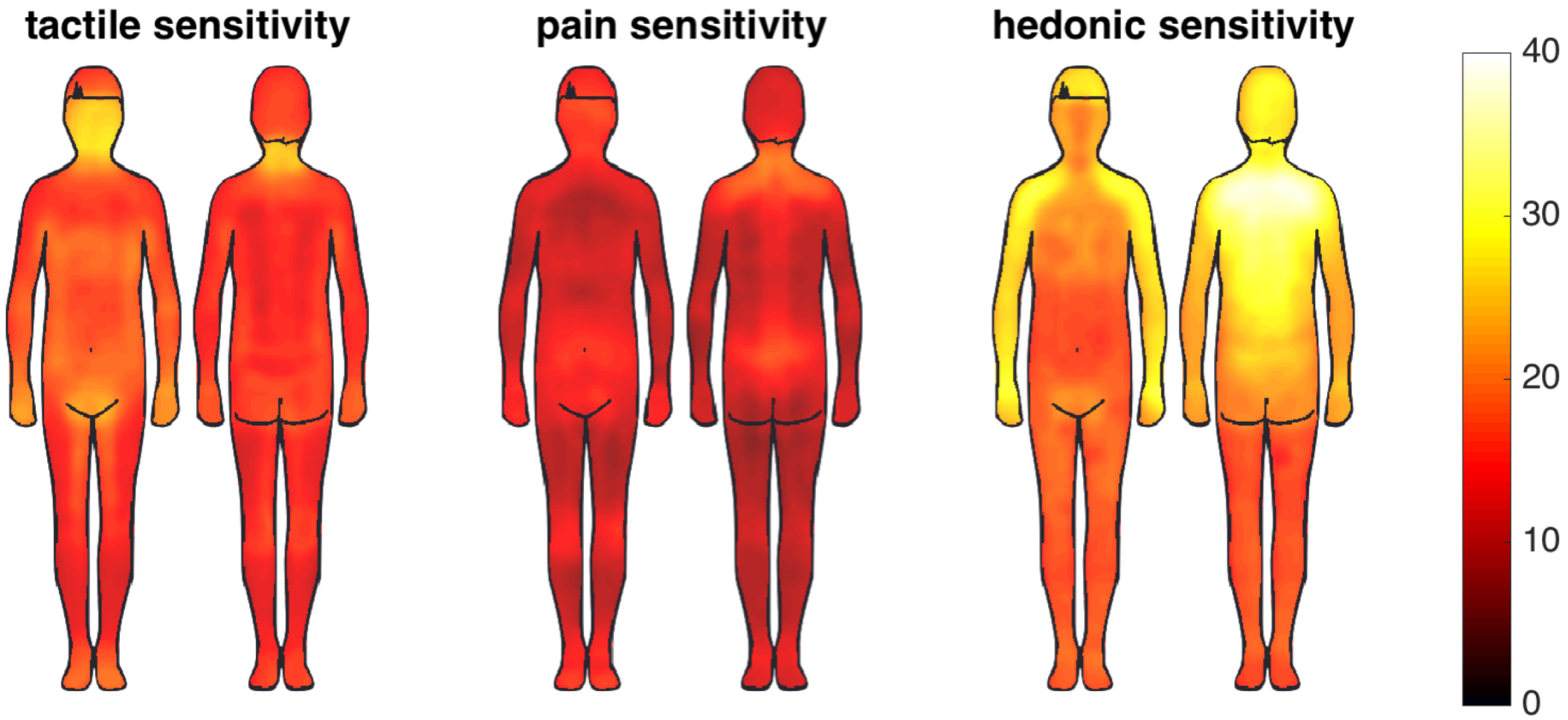
Sample: n = 2056 (1841 female)
age M = 35.94 years (SD 14.66)

Pain in the sample

- **65% (1333 subjects) experienced pain while filling in the questionnaire**
  - 85% had experienced pain in the previous 24 hours
  - Average intensity of acute pain was 2.4 (SD 2.55, scale from 0 (no pain) to 10 (worst pain imaginable)
- **56% (1151 subjects) had had experience with recurring/chronic pain**

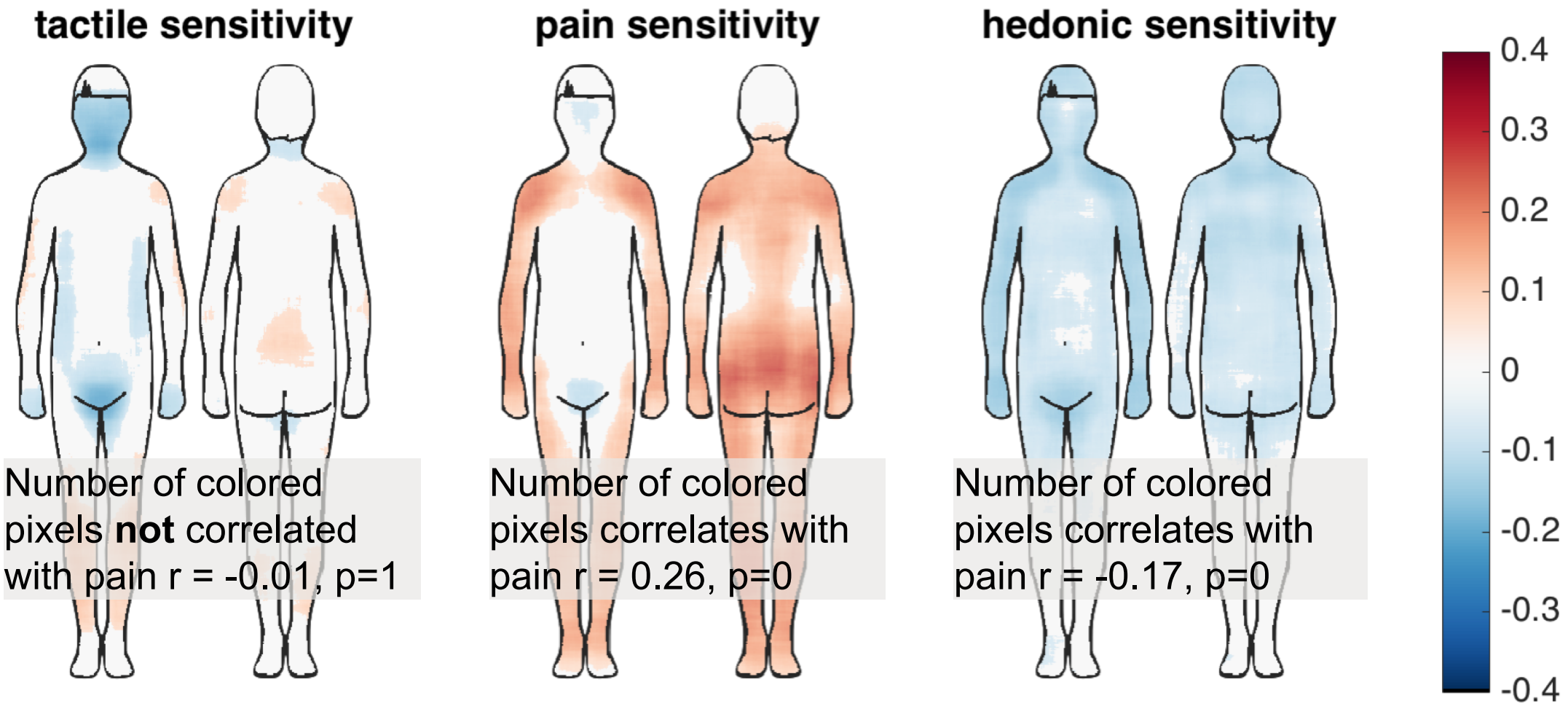


Bodily topographies of sensitivity



Colorbar indicates T score, thresholded at $p < 0.05$, FDR corrected

Pain intensity correlates with self-reported sensitivity



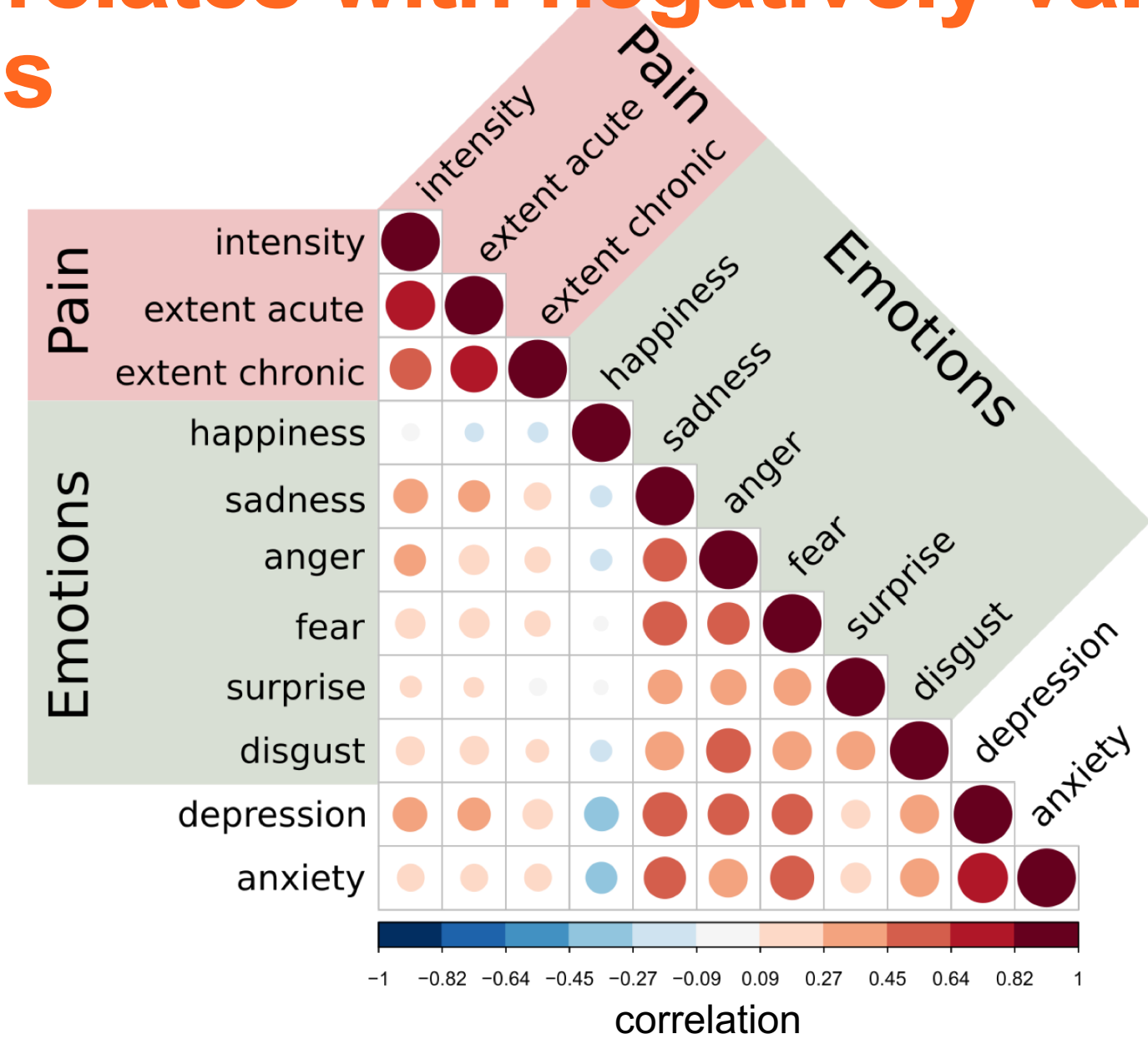
Number of colored pixels **not** correlated with pain r = -0.01, p=1

Number of colored pixels correlates with pain r = 0.26, p=0

Number of colored pixels correlates with pain r = -0.17, p=0

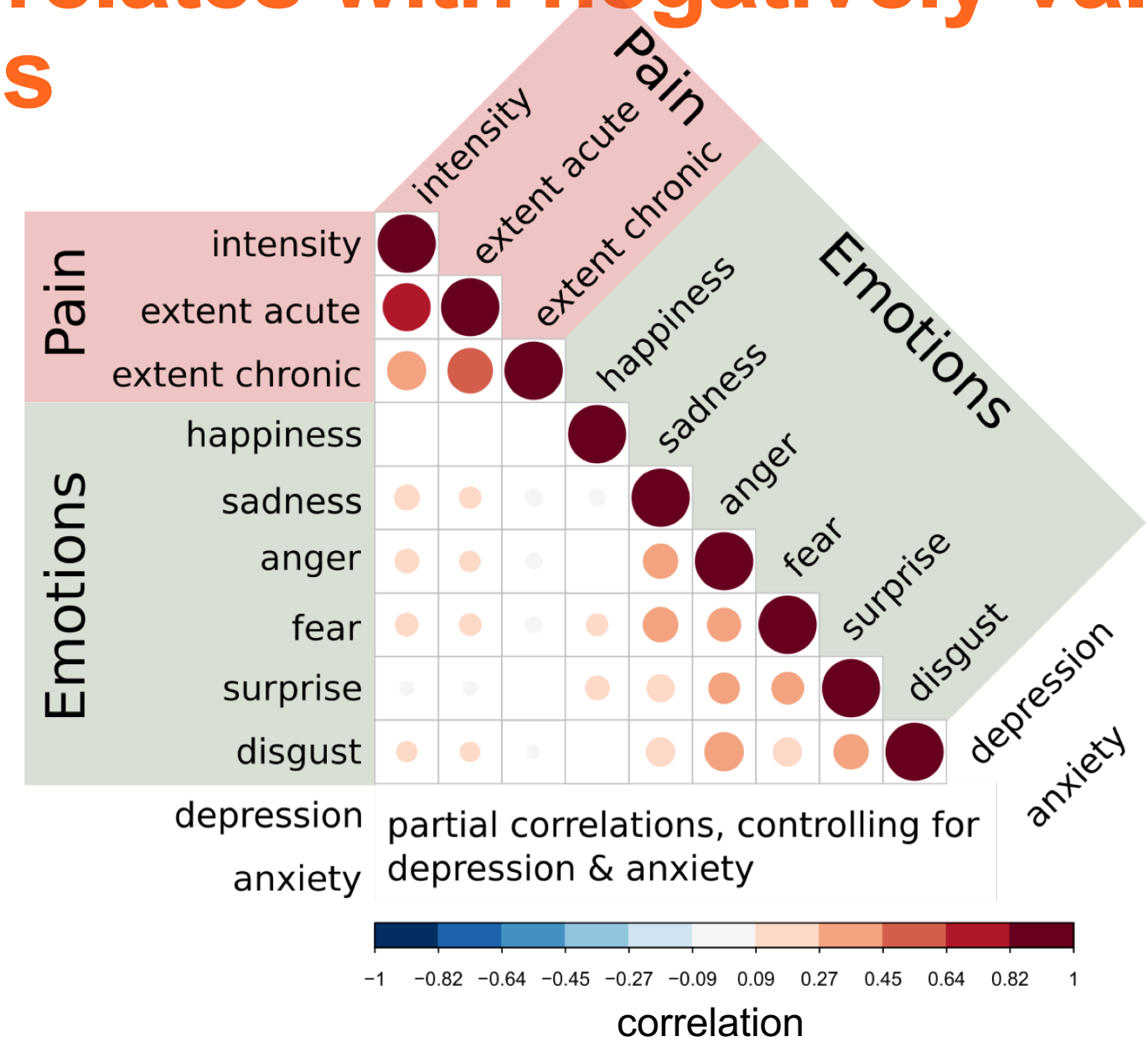
Correlations between each pixel in the body maps of sensitivity and reported intensity of current pain. Pain decreases hedonic sensitivity and tactile sensitivity in areas that are reported as most sensitive in the whole sample. Pain increases pain sensitivity, particularly in the extremities. Colourbar shows correlation coefficient (thresholded at $p < 0.05$, FDR corrected)

Pain correlates with negatively valenced emotions



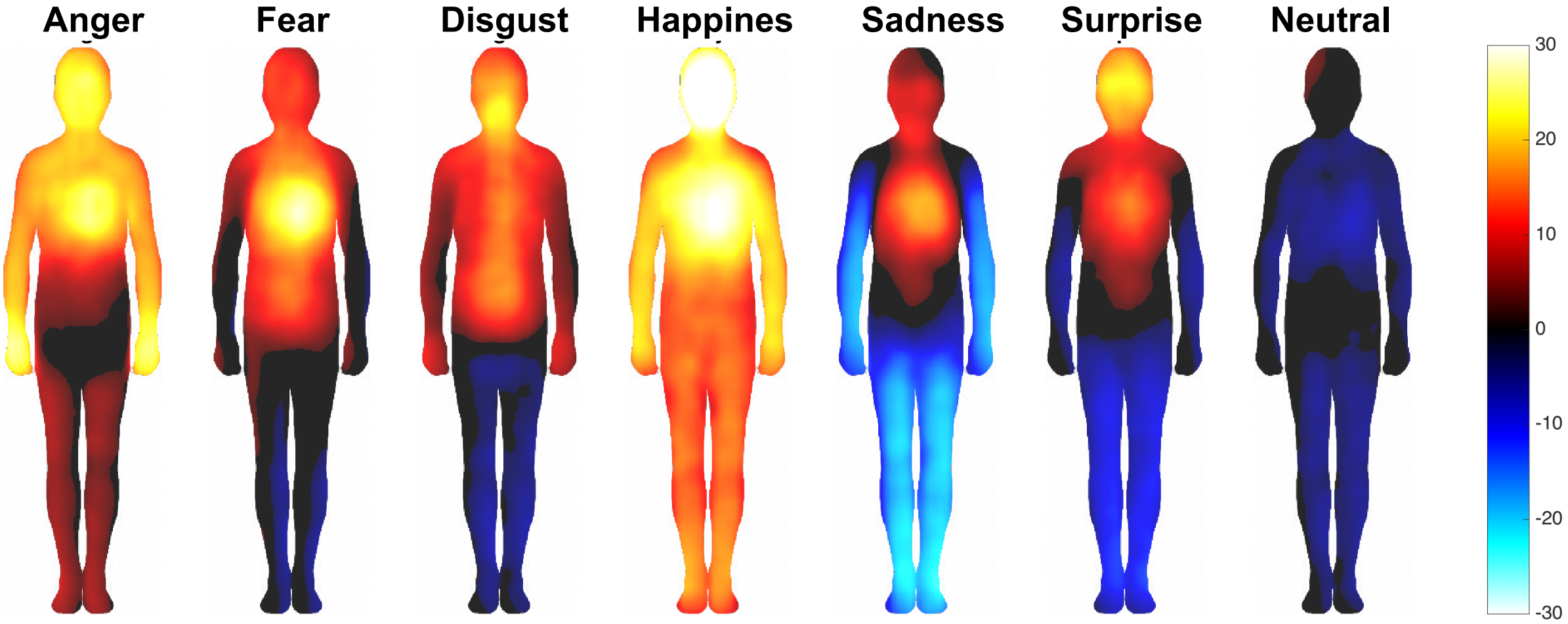
Only significant (α=0.05, Holm corrected) correlations shown

Pain correlates with negatively valenced emotions



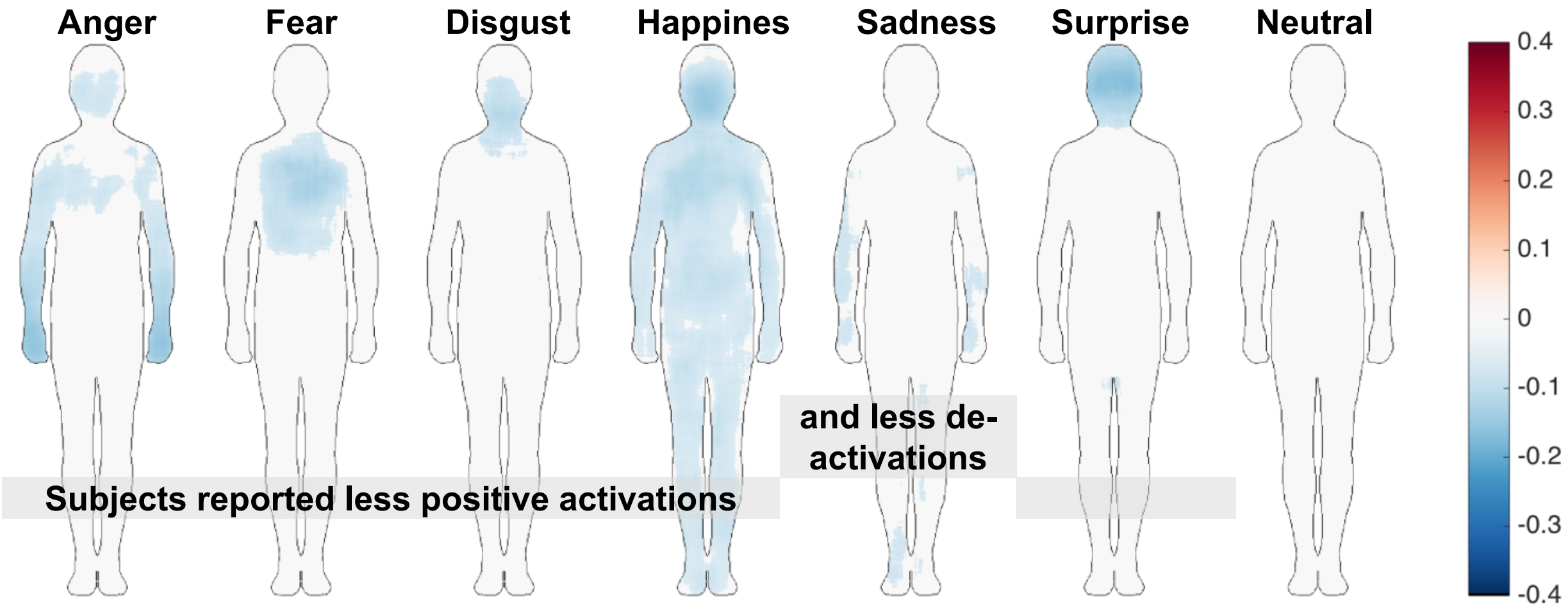
Only significant (α=0.05, Holm corrected) correlations shown

Bodily topographies of basic emotions



Body maps show regions whose activation increased (warm colours) or decreased (cool colours) when experiencing these emotions. Colourbar indicates t-statistic range (thresholded at $p < 0.05$, FDR corrected)

Pain is negatively correlated with reported changes



Spearman correlations between each pixel in the body maps of emotions and reported intensity of pain (at the moment of filling in the survey). Colourbar shows correlation coefficient (thresholded at $p < 0.05$, FDR corrected)

Conclusions

- Pain impacts (self-assessed) sensitivity to pleasure and pain
- More pain → more negatively valenced emotions
- More pain → emotions in the body less specific

- These results suggest a tight link between pain, emotion, and somatosensation

Questions? Comments?

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Slides are available at users.aalto.fi/~jtsuvile/

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