

INTRODUCTION

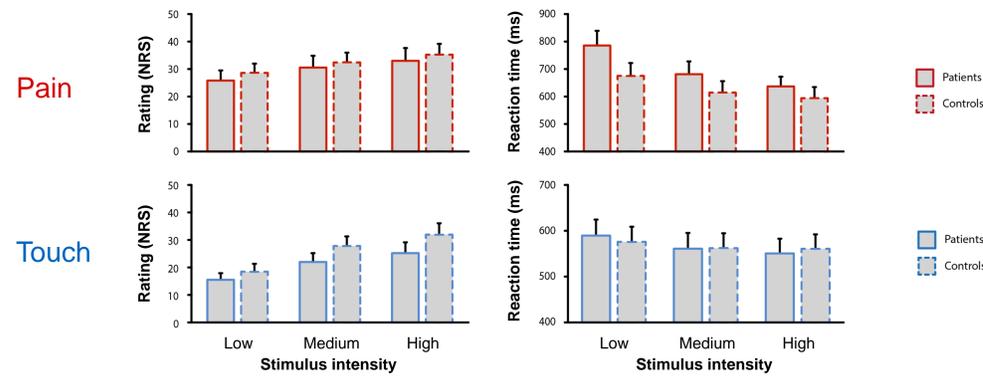
- Pain serves vital protective functions, which crucially depend on appropriate behavioral responses to noxious stimuli.
- Traditionally, pain has mostly been conceptualized as a perceptual phenomenon (*perception-behavior-model*). However, there is mounting evidence for more action-oriented concepts of pain^{a,b,c,d} and emotion^e. Correspondingly, recent experimental evidence indicates that behavioral responses to noxious stimuli significantly shape the perception of pain^f (*behavior-perception-model*).
- In chronic pain, perception is often decoupled from noxious input and behavioral responses are no longer protective, suggesting fundamental changes of stimulus-perception-behavior relationships. We therefore performed a simple experiment to compare stimulus- perception-behavior relationships between chronic pain patients and healthy control subjects.

METHODS

- Design**
- 22 chronic pain patients (10 CBP, 10 FMS, 2 PHN) and 22 healthy control subjects (mean age 60 yrs)
 - Randomized application of pain and touch stimuli of varying intensity (*low, medium, high*) to the right hand
- Stimuli**
- Tm:YAG laser (*pain*) and von Frey filaments (*touch*)
- Dependent variables**
- Reaction times (*ms, behavior*)
 - Intensity ratings (*NRS, perception*)
- Paradigm**
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- Data analysis:**
- ANOVA (SPSS)
 - Multi-level moderated mediation analysis (R)

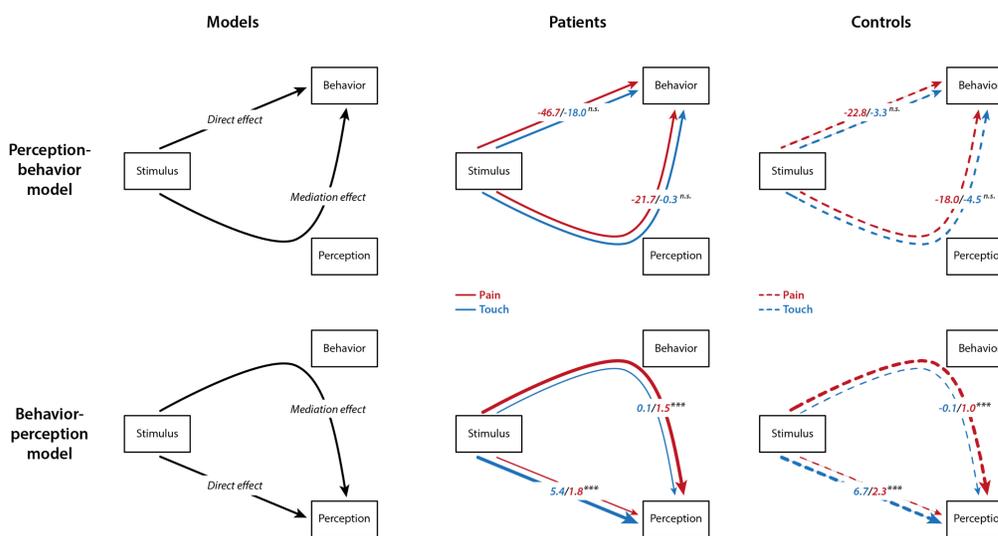
RESULTS

Reaction times and ratings



- Stronger stimuli evoked higher perceptual ratings and shorter reaction times for pain and touch stimuli in patients and controls ($p < 0.001$).
- Reaction times and ratings did not differ between patients and controls (n.s.).

Moderated mediation analysis



- In the perception-behavior model, mediation and direct effects did not differ between pain and touch stimuli in both groups (n.s.).
- In the behavior-perception model, the mediation effect was stronger for pain and the direct effect stronger for touch in both groups ($p < 0.001$).

CONCLUSIONS

- **The findings indicate that behavioral responses to noxious stimuli also shape the perception of pain in chronic pain patients.**
 → The results provide further evidence for an action-oriented concept of pain in healthy humans and chronic pain patients.
- **The results do not provide evidence for an altered behavior- perception-relationship in chronic pain patients.**
 → These findings point towards preserved behavior-perception-relationships for noxious stimuli in chronic pain patients.
 → These findings are in line with observations of a preserved processing of acute pain in chronic pain patients.

LITERATURE

- ^a Bolles & Fanselow 1980. A perceptual-defensive-recuperative model of fear and pain. *Behav. Brain Sci.*
- ^b Fields 2006. A motivation-decision model of pain: the role of opioids. *Proceedings of the 11th World Congress on Pain.*
- ^c Sullivan 2008. Toward a biopsychomotor conceptualization of pain: implications for research and intervention. *Clin. J. Pain.*
- ^d Tabor et al 2017. Embodied pain-negotiating the boundaries of possible action. *Pain.*
- ^e LeDoux 2012. Rethinking the emotional brain. *Neuron*
- ^f May et al. 2017 Behavioral responses to noxious stimuli shape the perception of pain. *Sci. Rep.*