

The impact of interoceptive sensibility on perception of pain



Mara Michels¹, Marian van der Meulen¹, Wolfgang Miltner², André Schulz¹, Claus Vögele¹, Angelika Dierolf¹

¹ Department of Behavioural and Cognitive Sciences, Institute for Health and Behaviour, University of Luxembourg, Esch-sur-Alzette, Luxembourg; ²Friedrich-Schiller-Universität Jena, Klinische Psychologie

Introduction



Background

Interoceptive processes are closely linked with the autonomic nervous system, which regulates physiological responses to pain, such as changes in heart rate. HRV is commonly used to estimate sympathovagal balance, which is the relation between the sympathetic and parasympathetic branches of the autonomic nervous system^{1,2}.

Previous studies examined the interaction of pain with interoceptive accuracy, revealing mixed results about the influence of enhanced interoceptive accuracy on acute pain tolerance and pain experience. Also, no changes in underlying physiological reactivities were found, meaning that changes in sympathovagal balance did not predict changes of pain tolerance or pain experience^{1,3,4}.

Present study

Therefore, the aim of this study is to investigate the influence of interoceptive sensibility⁵ on the perception of pain regarding the stability of subjective pain ratings comparing painful to nonpainful stimuli. To measure the interoceptive sensibility, the MAIA-2 was used, which is a more economical approach comparing the heartbeat detection task used to measure interoceptive accuracy. We hypothesize that enhanced interoceptive sensibility is associated with higher consistency in subjective pain ratings. This effect is also accompanied by underlying differences in physiological reactivity, measured by HRV to pain stimuli.

Methodology



Participants

33 young healthy adults (18 – 30 yrs), 16 female, 17 male, all students

Materials

- MAIA-2⁶
- transcutaneous electrical stimulation – WASP electrode + DS8, VAS rating
- HRV: 3-point measurement, during resting state (EO, EC counterbalanced) and pain distraction task, segments of 210 seconds

Procedure

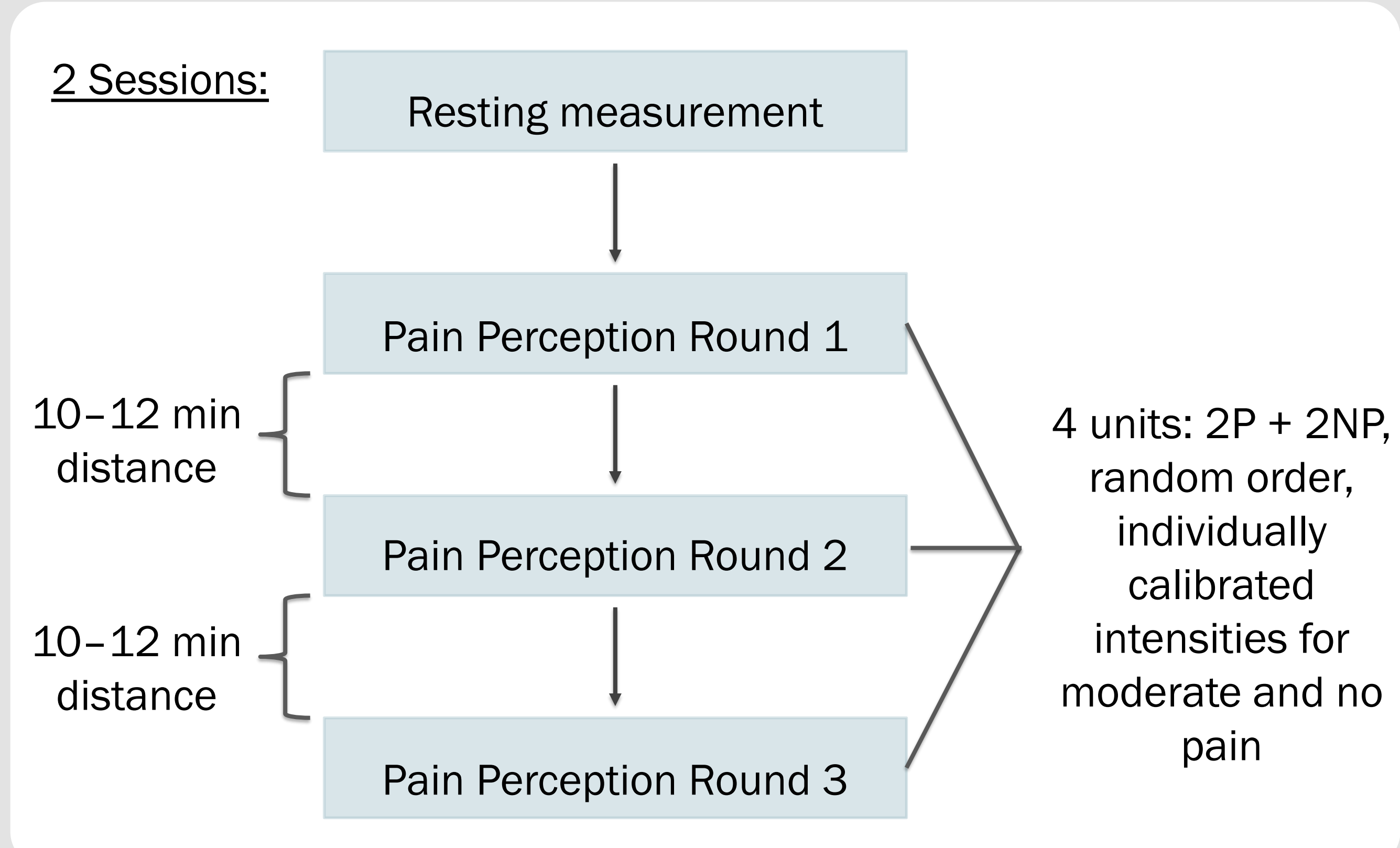
MAIA-2 filled out beforehand, two session design; short, individualized pain stimuli in the non-painful to moderate pain range, VAS-ratings regarding subjective intensity and unpleasantness

Data analysis

multiple regressions:

- criteria variance (PP ratings over 2 sessions and 3 rounds) and mean of pain ratings for both, intensity and unpleasantness of pain and non-pain ratings with factors subscales of MAIA-2 and mean of LF/HF (PP over 3 rounds over two session)
- criteria mean of LF/HF with subscales of MAIA-2

ANOVA: development LF/HF from baseline to PP over 2 Sessions



Results



Influence of interoceptive sensibility and sympathovagal balance on pain ratings

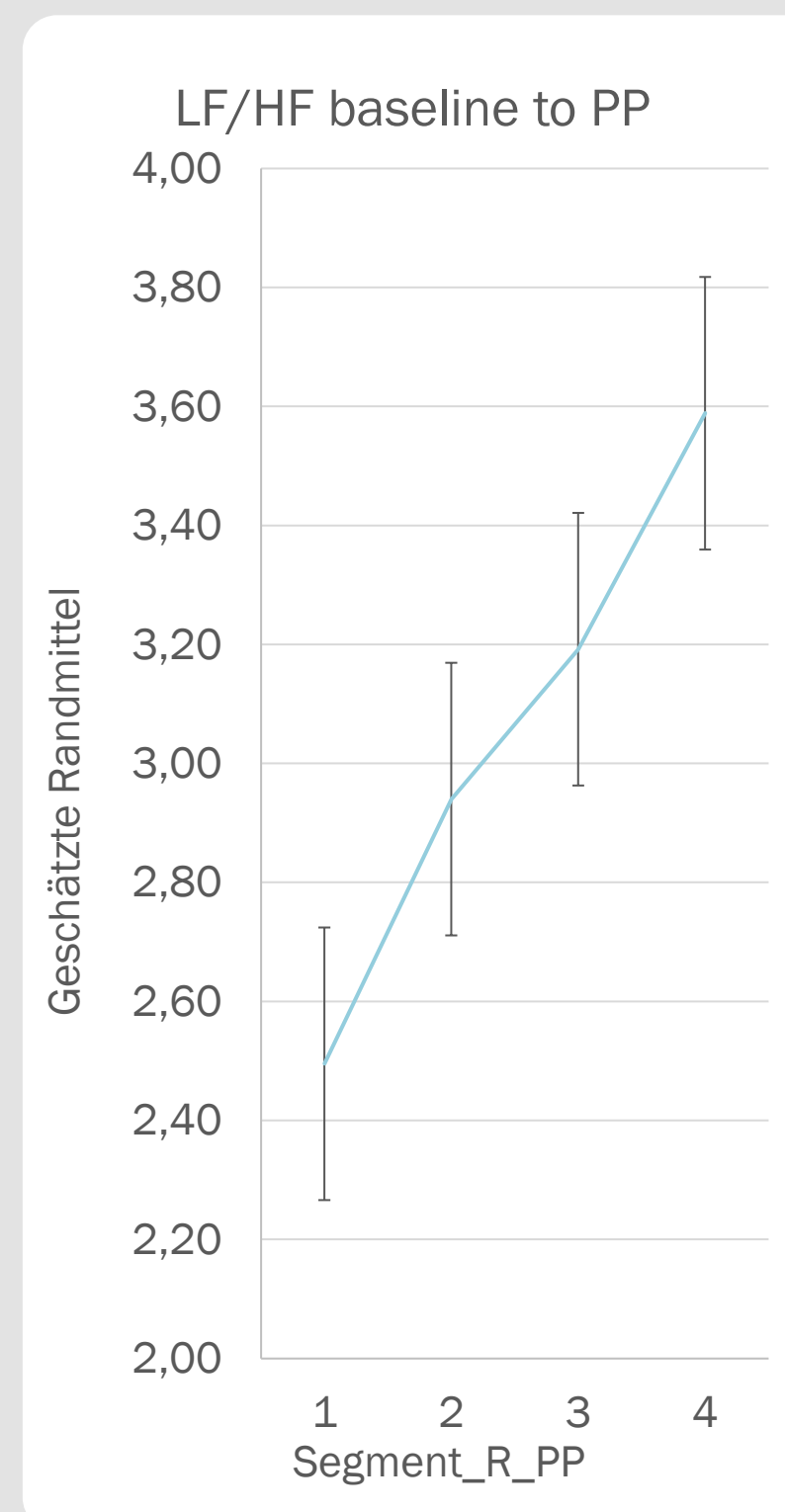
Variance of pain intensity	R ² = .24 (adjusted R ² = .1) F(5,27) = 1.73, p = .161
Variance of no pain intensity	R ² = .2 (adjusted R ² = -.04) F(5,27) = .73, p = .606

→ similar results for mean pain and no pain scores, also in unpleasantness
→ model-fit was not significant for all analysis, therefore results could not be interpreted further

Influence of interoceptive sensibility on sympathovagal balance

Sympathovagal balance	R ² = .15 (adjusted R ² = .02) F(4,28) = 1.19, p = .337
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→ model-fit was not significant, therefore results could not be interpreted further

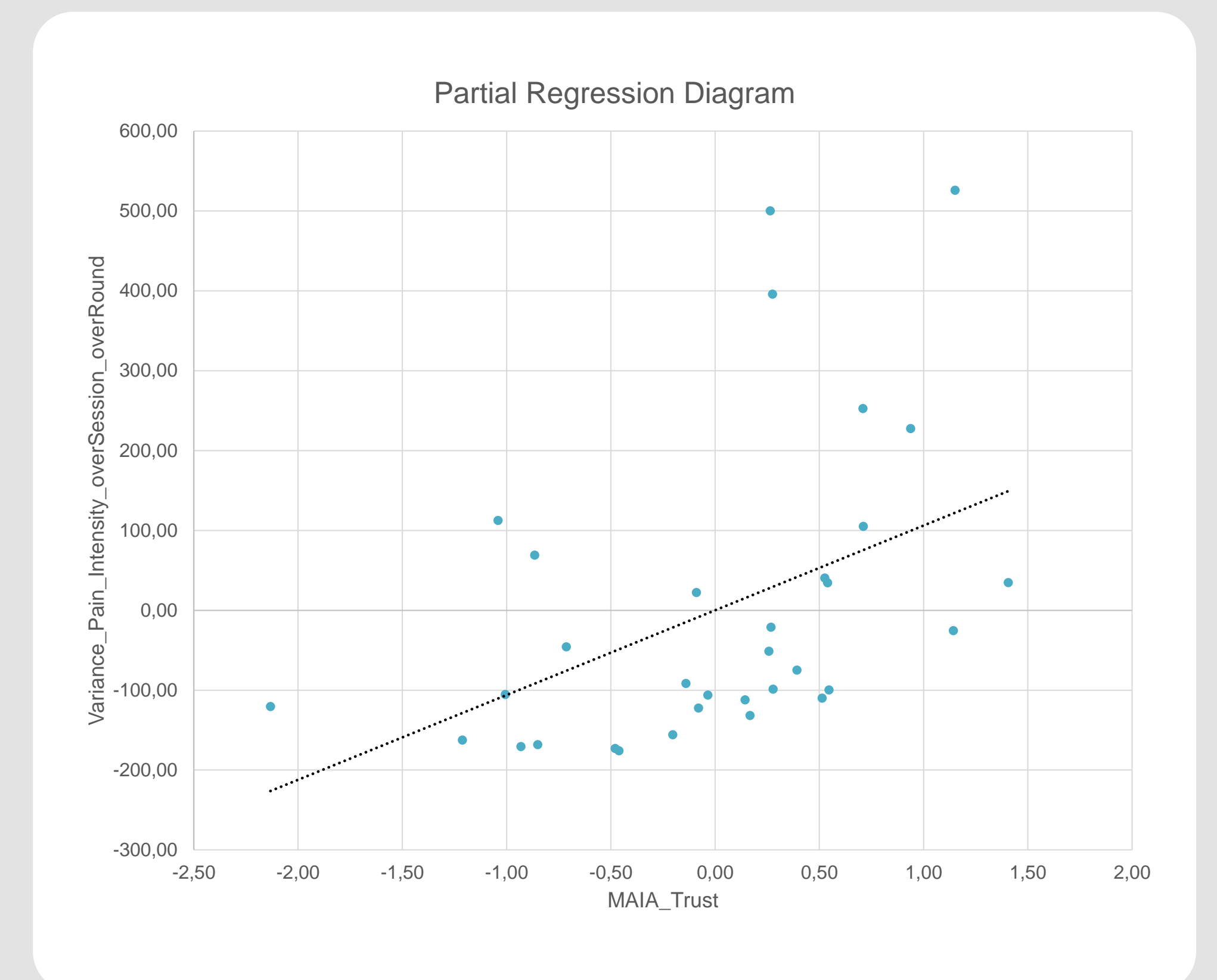


LF/HF from baseline to PP

- significant linear increase between resting state and PP3 (F = 4.93, p < .05)

Variance of pain intensity with MAIA trust

- significant correlation between MAIA-2 subscale trust and variance of pain intensity over the rounds of the session (r = 106.061, p 0 .016)



Discussion



- No effect of interoceptive sensibility or sympathovagal balance on consistency of pain ratings, no impact of interoceptive sensibility on sympathovagal balance
→ effect found by Pollatos et al. (2012) not replicated for interoceptive sensibility (previous literature: few indications about connection interoceptive sensibility and interoceptive accuracy)
- sample size as limitation: too small for number of factors of regressions
→ repeating study larger sample/using alternative analysis procedures: significant correlations between individual factors of interoceptive sensibility and pain perception (e.g.: trust subscale of MAIA-2)
- Incorporating interoceptive sensibility helpful for future interventions and possible treatments in pain patients (e.g.: trainings of interoception)

References

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