Predictive attenuation of touch and tactile gating are distinct perceptual phenomena

Konstantina Kilteni and H. Henrik Ehrsson
Department of Neuroscience, Karolinska Institutet

Conclusions

- ►Somatosensory reafference feels weaker than somatosensory exafference.
- ►Voluntary movement per se leads to a decrease in somatosensory precision.
- ►Predictive attenuation of touch and tactile gating are two distinct perceptual phenomena.
- ►Distinct computational accounts and neural correlates.

References

1. Blakemore, S. J., Frith, C. D. & Wolpert, D. M. Spatio-temporal prediction modulates the perception of self-produced stimuli. J. Cogn. Neurosci. (1999)
2. Bays, P. M., Wolpert, D. M. & Flanagan, J. R. Perception of the consequences of self-action is temporally tuned and event driven. Curr. Biol. (2005)
3. Kilteni, K., Engeler, P. & Ehrsson, H. H. Efference Copy Is Necessary for the Attenuation of Self-Generated Touch. iScience (2020)
4. Chapman, C. E., Bushnell, M. C., Miron, D., Duncan, G. H. & Lund, J. P. Sensory perception during movement in man. Exp. Brain Res. (1987).
5. Williams, S. R., Shenasa, J. & Chapman, C. E. Time course and magnitude of movement-related gating of tactile detection in humans. J. Neurophysiol. (1998)
6. Gertz, H., Voudouris, D. & Fiehler, K. Reach-relevant somatosensory signals modulate tactile suppression. J. Neurophysiol. (2017).

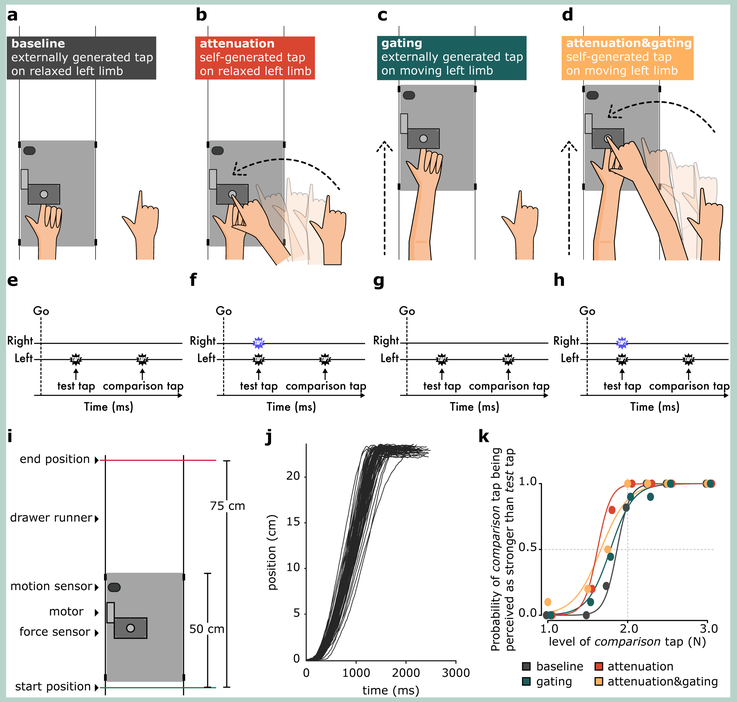
Introduction

The brain *attenuates* somatosensory reafference compared to exafference: self-generated strokes, forces, or taps feel weaker than external equivalents (1-3).

The brain *gates* externally generated stimuli during and before a voluntary movement: external touches are more difficult to detect and discriminate during movement than at rest (4-6).

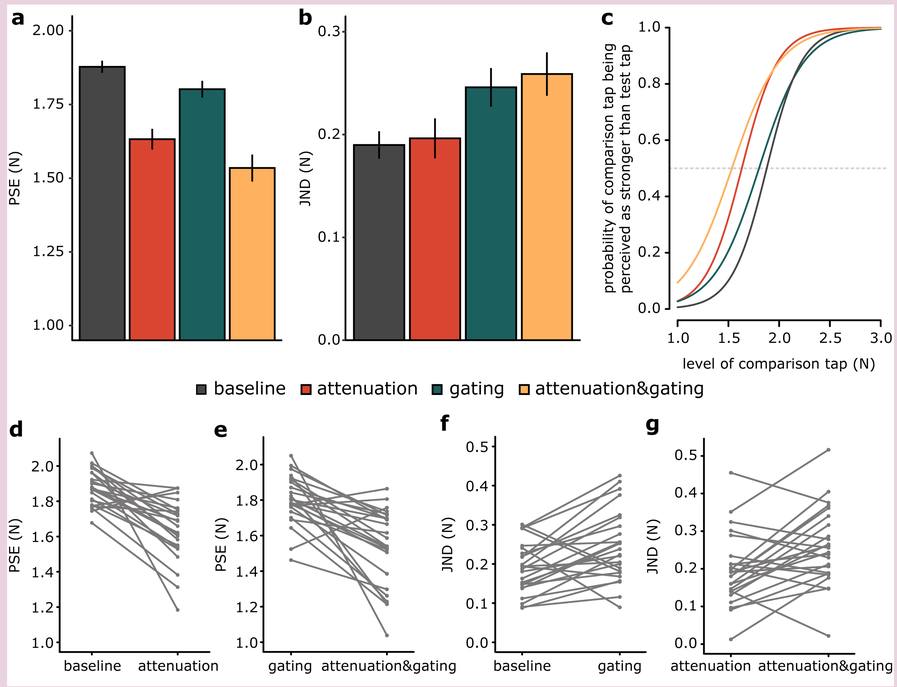
Q: Is attenuation and gating the same supression process?

Methods

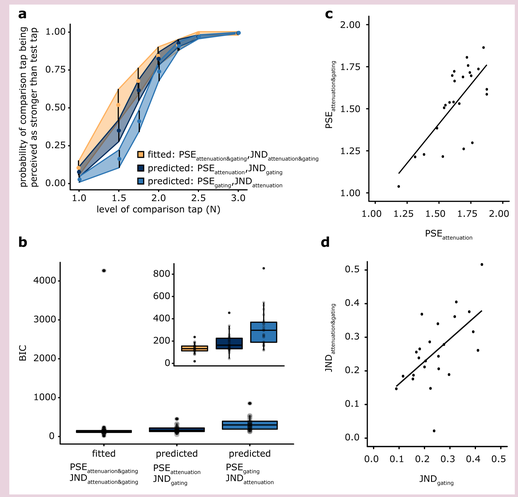


Results

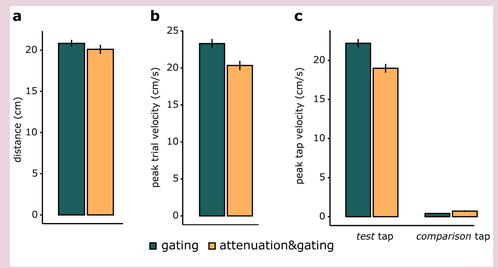
①



②



③



④

BioRxiv pre-print: https://doi.org/10.1101/2020.11.13.381202

Karolinska Institutet
Konstantina Kilteni PhD.
Department of Neuroscience

Email: konstantina.kilteni@ki.se
Telephone: +46 8 524 87066

Vetenskapsrådet
TORSTEN SÖDERBERGS STIFTELSE