INVESTIGATING THE CROSSMODAL INFLUENCE OF VISION ON NOCICEPTION-INDUCED CORTICO-SPINAL EXCITABILITY

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INTRODUCTION

Efficiently reacting to painful events requires an optimally integrated multisensory representation of the body and its surrounding space, a representation that relies on interactions between somatic and extra-somatic stimuli occurring near the body. While the existence of such interactions between nociceptive and visual stimuli has recently been demonstrated, showing that nociceptive stimuli can impact the perception of visual stimuli outside the body and vice versa, their role in motor processing is not clear yet. Here, we tested whether nociception-induced changes of the cortico-spinal excitability (CSE) of the motor system can be modulated by visual stimuli approaching the body part on which nociceptive stimuli are applied, by using transcranial magnetic stimulation (TMS).

METHODS

25 right-handed **healthy volunteers** (mean age 24.4 years, SD=4.2, 19 women).

CO_2-laser **nociceptive stimuli** on right hand (100 ms duration, Aδ threshold+5°C)

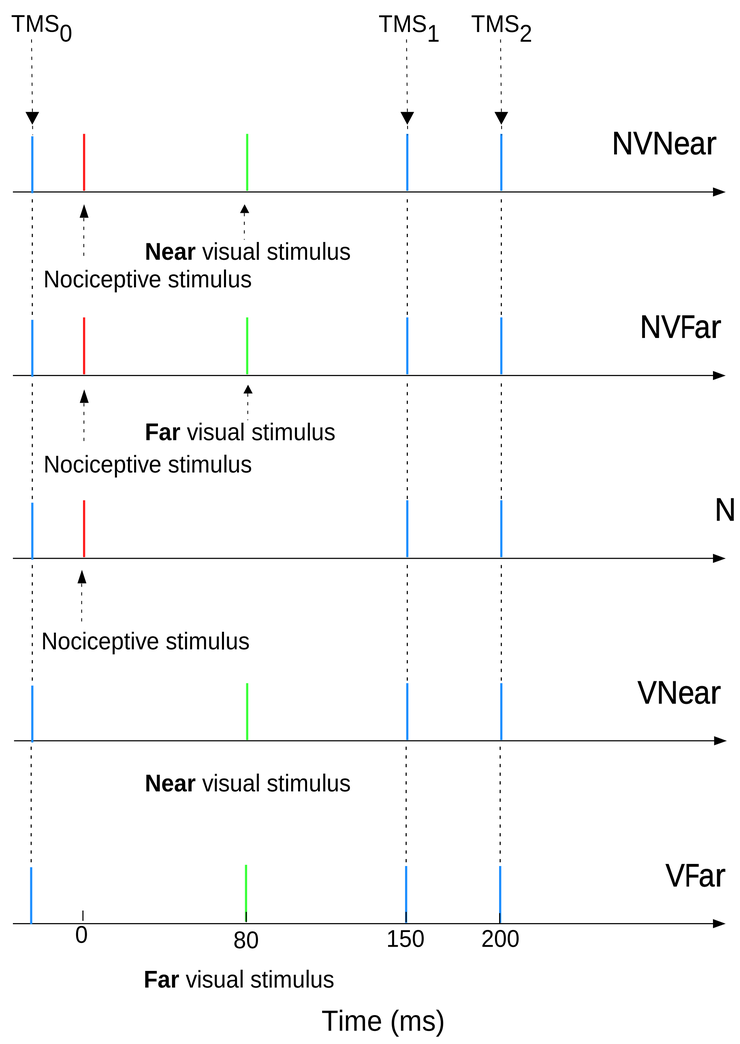
followed by a **visual stimulus** approaching (near) or receding (far) from the stimulated hand (150 ms duration from starting to end point).

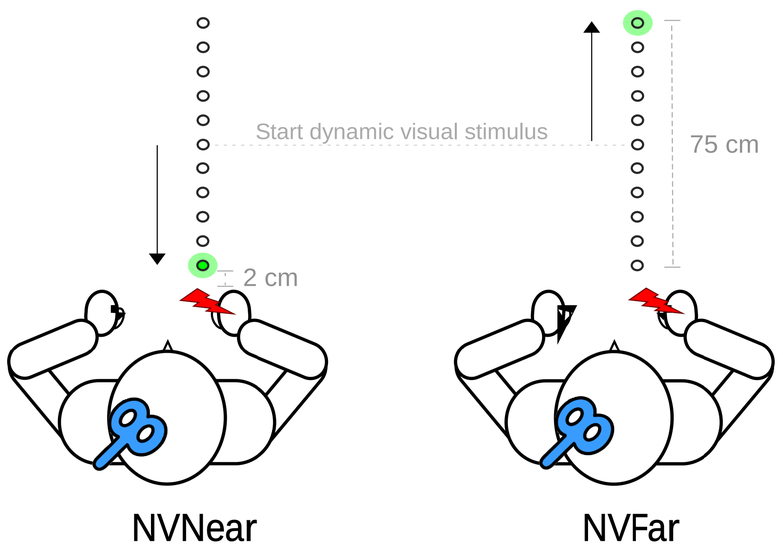
Single-pulse TMS (120% of resting motor threshold) at each trial over the left primary motor cortex (M1) at one out of 3 time points (baseline [TMS_0], 150 [TMS_1] or 200 ms [TMS_2] after the nociceptive stimulus).

Measure of CSE: motor-evoked potentials (**MEPs**) in the **right FDI** muscle.

Conditions: nociceptive followed by near visual stimulus (**NVNear**); nociceptive followed by far visual stimulus (**NVFar**).

+ 3 **control** stimulus conditions: nociceptive stimulus only (**N**), near visual stimulus only (**VNear**), far visual stimulus only (**VFar**).

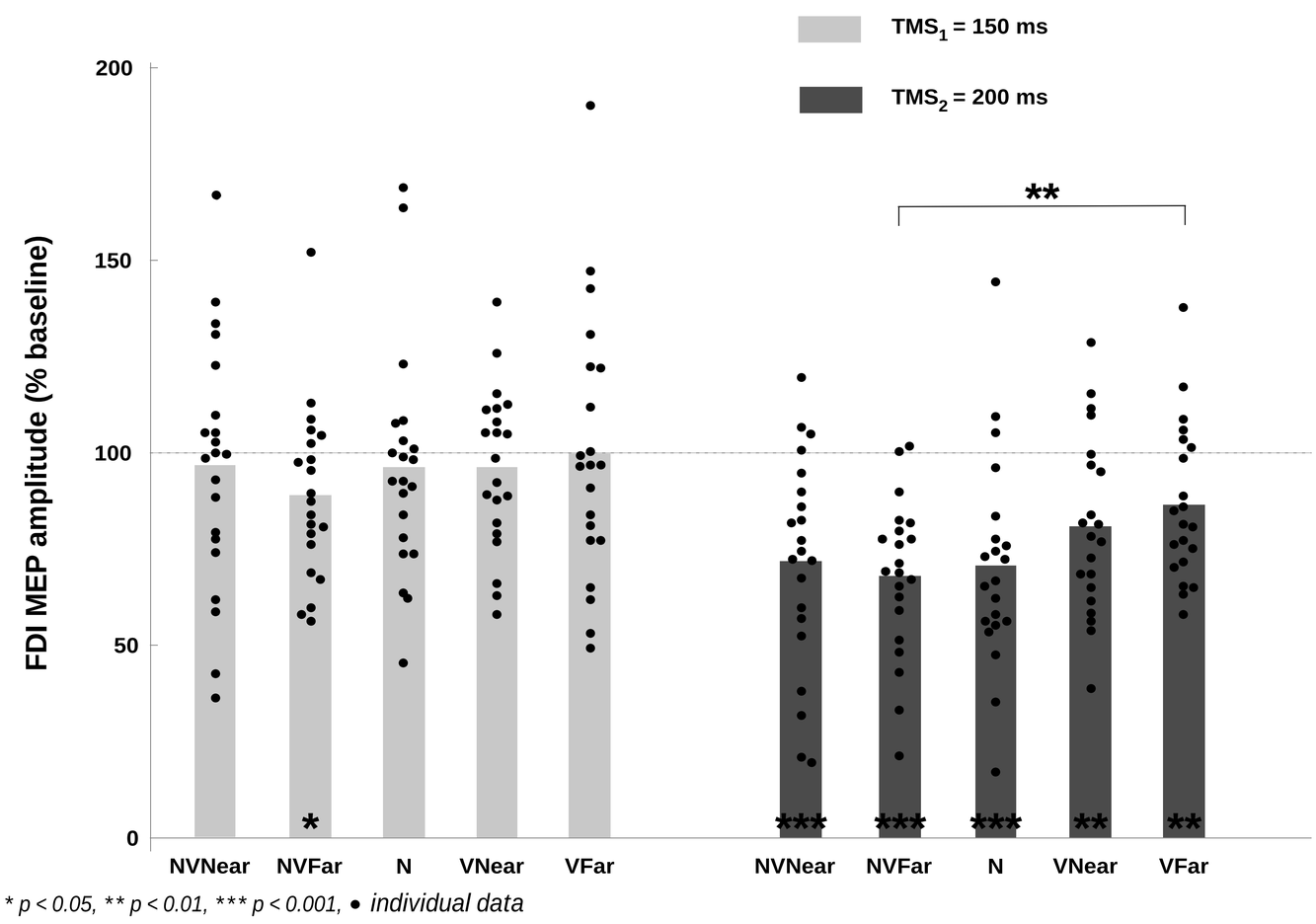




4 blocks of 50 trials, 1 block= 2 trials of each of the 5 stimulus conditions with TMS_0, 4 trials of the 5 stimulus conditions with TMS_1, 4 trials of the 5 stimulus conditions with TMS_2.

Measure: peak to peak MEP amplitude change in FDI expressed relative to TMS_0 baseline (100%).

RESULTS & CONCLUSION



Significant reduction of MEPs in all 5 stimulus conditions for TMS_2 but not TMS_1, i.e. 200 ms after the potential occurrence of the nociceptive stimulus.

Inter-condition comparisons at TMS_2: no significant differences between the conditions, with the exception of a significant difference between the NVFar and the VFar condition.

Conclusion: Nociception-induced changes of CSE seem not differently modulated by near vs. far visual stimuli, suggesting that our experimental setting did not allow to highlight specific visual-nociceptive interaction effects on motor processing. Future research could potentially concentrate on the dynamic and potentially threatening character of the visual stimuli.

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