INVESTIGATING THE EFFECTS OF MULTISENSORY INTERACTION BETWEEN VISION AND NOCICEPTION ON THE MOTOR SYSTEM

L. Filbrich[1,2], J. Lambert[2], V. Legrain[2]

[1]Health Psychology, KU Leuven; [2]Institute of Neuroscience (IoNS), UCLouvain (Belgium)

INTRODUCTION

Mutual interactions between nociception and vision have recently been highlighted, showing that near visual stimuli can influence nociceptive perception and vice-versa. However, while the existence of such multisensory perceptual effects in pain seems now established, their functional role has rarely been considered yet. Although there is evidence for a close relationship between pain and the motor system, it is currently not known whether nociception-induced motor effects could be modulated by interactions with vision. Here, we investigated the influence of nociceptive-visual interaction on the motor system of healthy participants, by testing whether nociception-induced changes of cortico-spinal excitability (CSE) can be modulated by visual stimuli approaching the body part on which nociceptive stimuli are applied.

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)

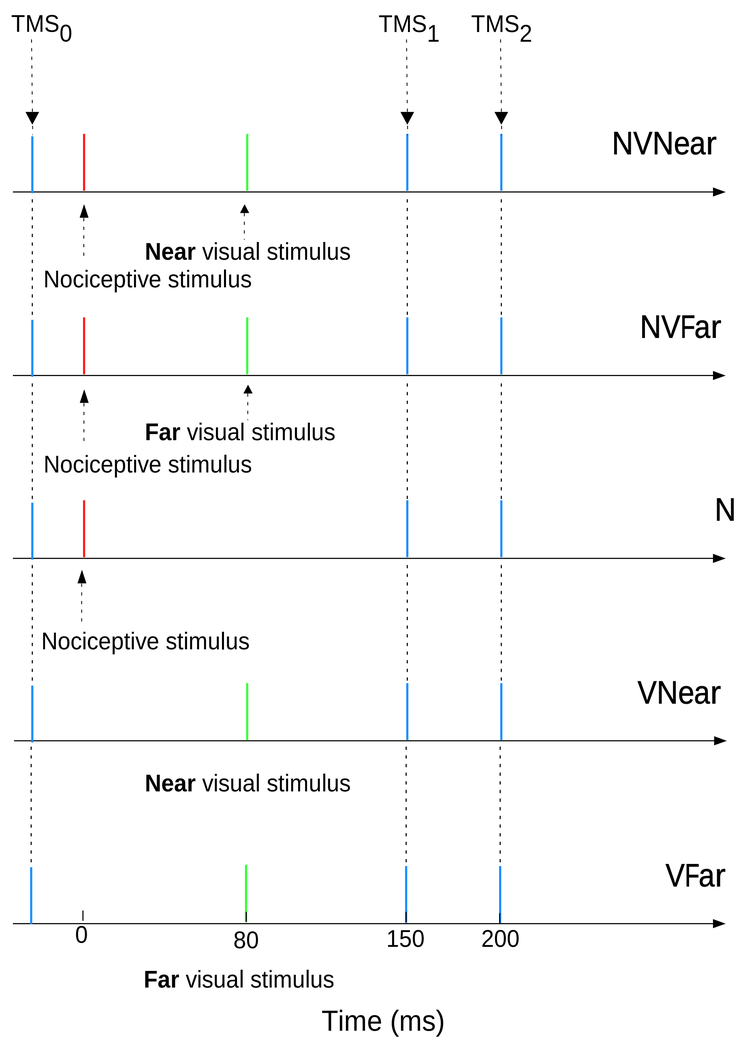
followed by a **visual stimulus** approaching (near) or receding (far) from the stimulated hand (150 ms duration from starting to end point).

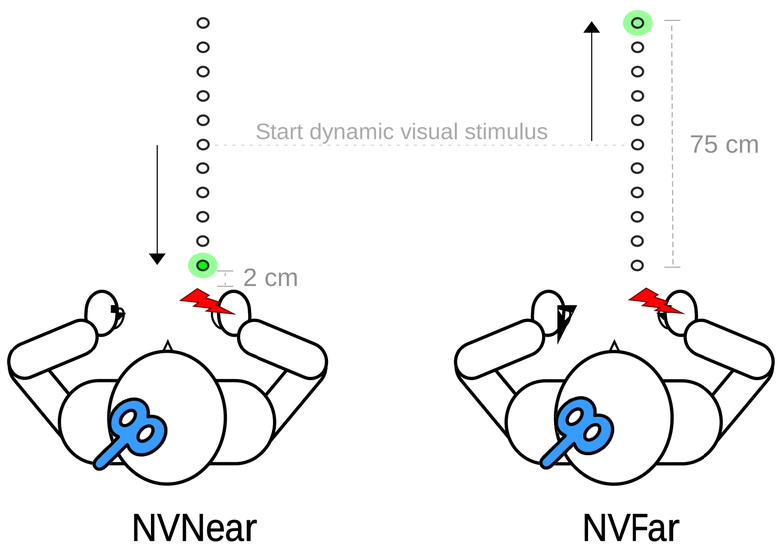
Single-pulse transcranial magnectic stimulation (TMS, 120% of resting motor threshold) at each trial over the left primary motor cortex (M1) at one out of 3 time points (baseline [TMS_0], 150 [TMS_1] or 200 ms [TMS_2] after the nociceptive stimulus).

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**).

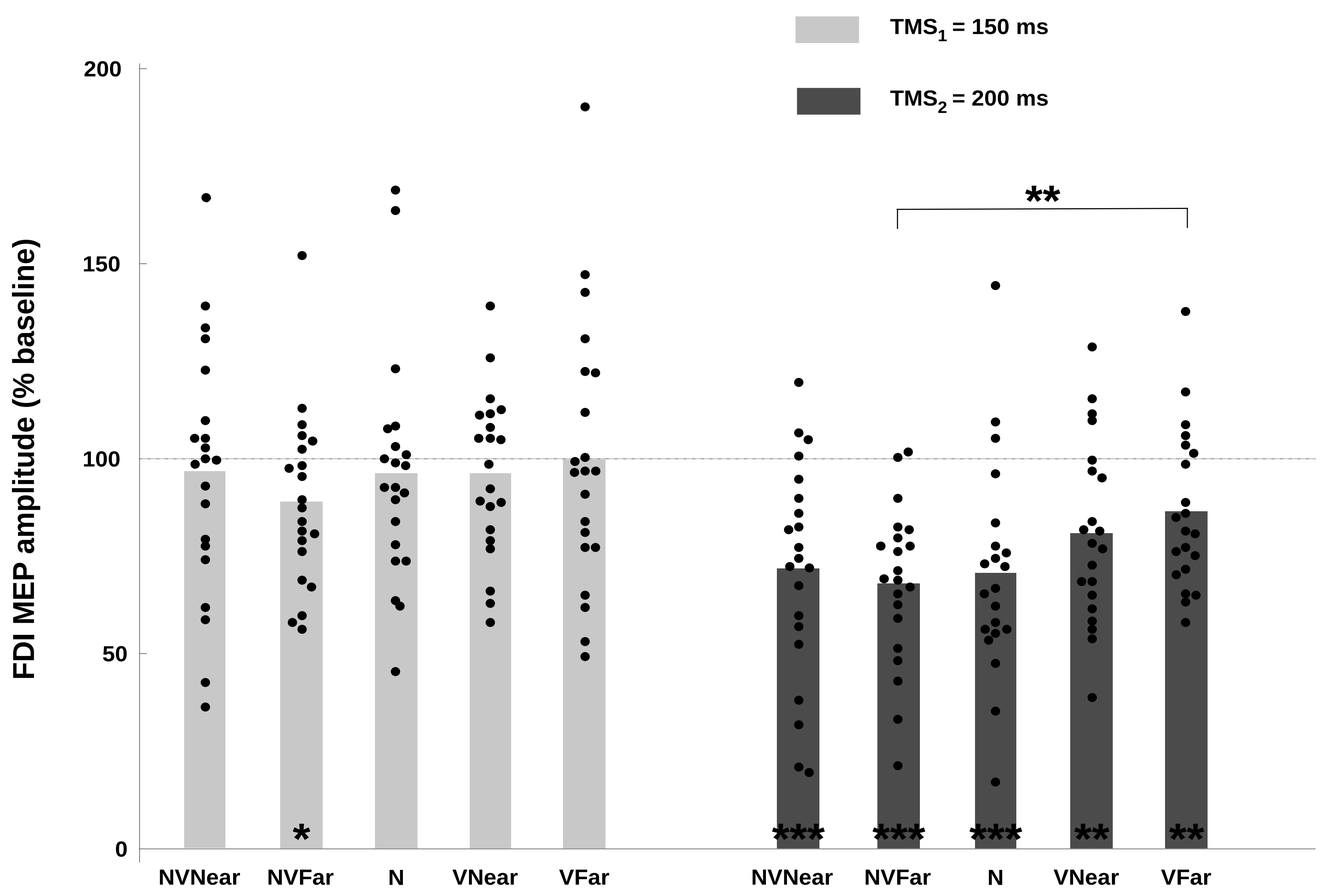




4 blocks of 50 trials, 1 block= 2 trials of each of the 5 stimulus conditions with TMS_0, 4 trials of the 5 stimulus conditions with TMS_1, 4 trials of the 5 stimulus conditions with TMS_2.

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

RESULTS & CONCLUSION



** p < 0.05, ** p < 0.01, *** p < 0.001, ● individual data*

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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