

Role of primary somatosensory cortex in tactile detection and discrimination: fMRI-guided TMS investigations

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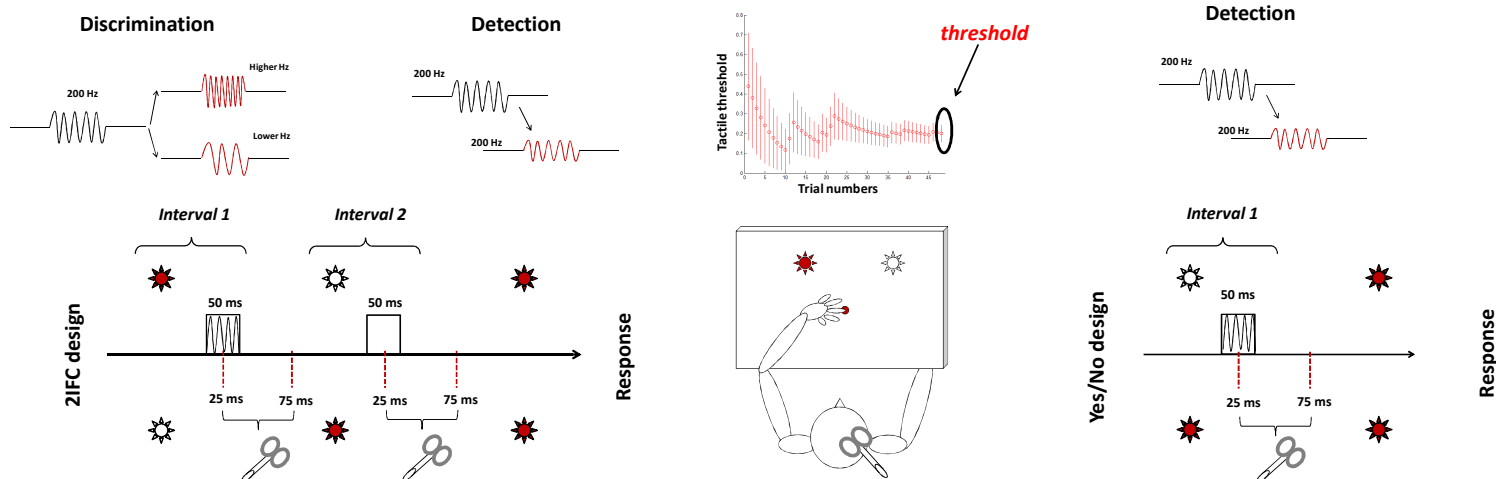
Introduction

In the present study in **seven experiments** we investigated the contribution of the **primary somatosensory cortex (SI)** to the perception of tactile stimuli at the fingers in **discrimination** and **detection** task. We combined the **QUEST** threshold estimation method with **MRI-guided** single and double pulse **TMS** (sp/dpTMS).

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Design

yes-no

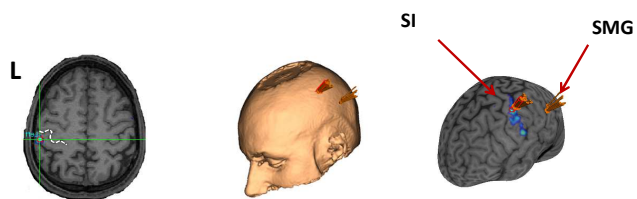


fMRI-guided TMS

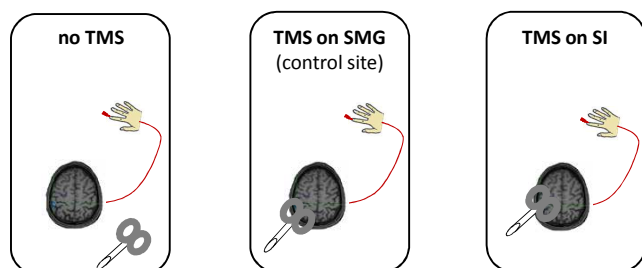
TMS Stimulation conditions

Participants (N=20) underwent a series of fMRI scans (localisers) to produce somatotopic maps of SI and SII cortices.

The tactile stimuli were **200Hz sinusoidal vibrations** applied to the **index or middle fingers** for **50 ms**.

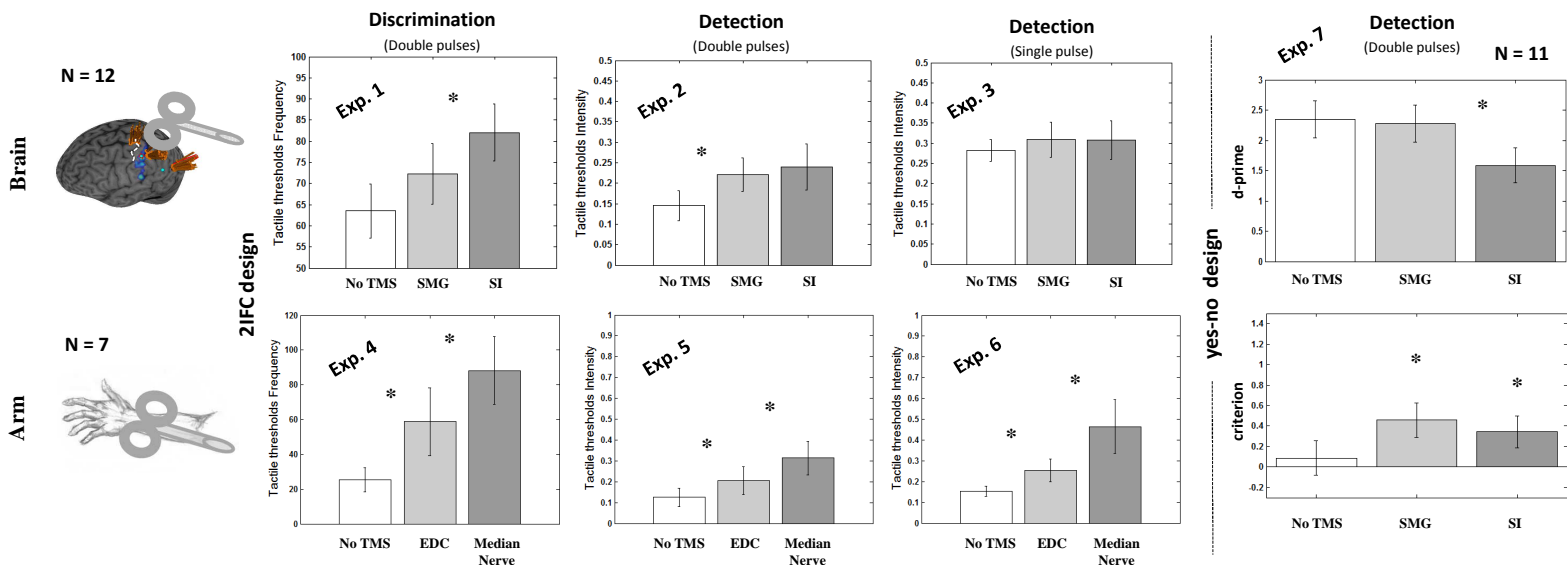


The peak activation focus in SI was lateral to the hand motor area, and on the posterior bank of the post-central gyrus was used to position the TMS (~2.5 cm from the target area) during a modified version of the behavioural task.



Results

Data values represent the mean (+/- SE) of the last point of the series of 48 trials used to determine the threshold (82 % correct).



Conclusions

Frequency discrimination thresholds at the fingers are increased by double-pulse TMS over SI in comparison to SMG. By contrast, **detection thresholds** at the fingers are not increased by either single or double pulse TMS over SI. This suggests that **SI is required for discrimination**, but **may not be for detection**, of tactile stimuli at the fingers.