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Single pulse TMS over the primary somatosensory cortex and its effect on vibrotactile detection thresholds at the fingers

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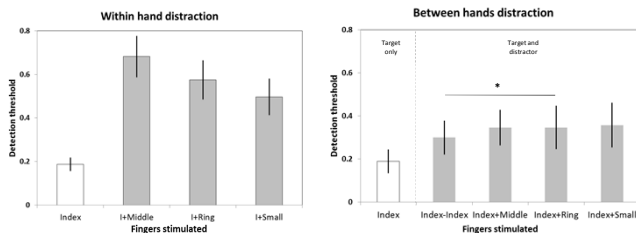
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Introduction

The aim of the present study is to test if it is possible to modulate vibrotactile target detection thresholds at the fingers at an early level of somatosensory processing by combining the **QUEST threshold estimation** method with **MRI-guided single pulse TMS (spTMS)**.

In a previous study (N=38) we used a Bayesian adaptive staircase procedure (QUEST) and a two-interval forced-choice design in order to establish threshold for detecting a sinusoidal vibration applied to the left or right index fingertip (target).

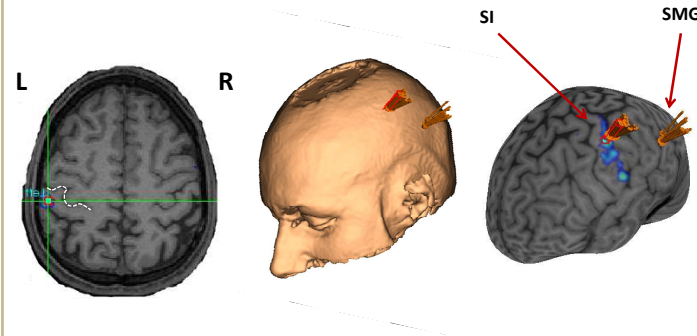
This was done either when the target was presented in isolation or concurrently with a distractor stimulus on another finger of the same or a different hand. Detection **thresholds varied as a function of the distractor finger** stimulated both within and between the hands (Figures below).



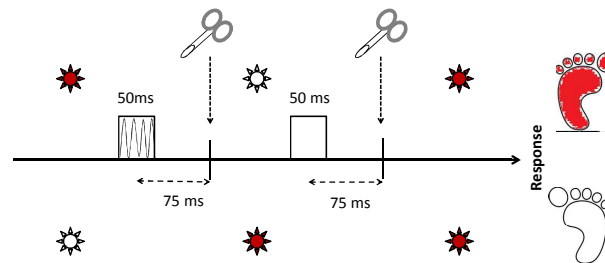
However, the precise time-course of these interactions when stimuli arrive on opposite sides of the body remains uncertain. Specifically, it is not clear how, when, or by which anatomical pathway tactile stimulation of different fingers of the same and different hands interact.

Design

Participants (N=8) underwent a series of MRI scans (localisers) to produce somatotopic maps of SI and SII cortices.



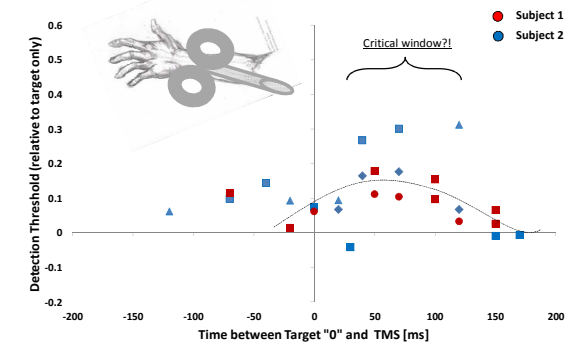
The peak activation focus in SI lateral to the hand motor area, and on the posterior bank of the post-central gyrus was used to position the spTMS (~2.5 cm from the target area) during a modified version of the behavioural task.



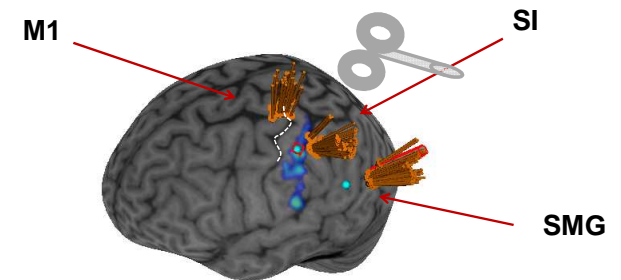
The tactile stimuli were **100Hz sinusoidal vibrations** applied to the **index finger** for **50 ms**.

Results

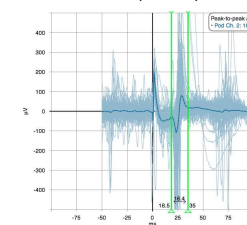
RADIAL NERVE TMS



BRAIN TMS (75 ms after target)



FDI (MEPs)



Index finger Detection

