The role of the parietal cortex in re-orienting to emotional stimuli: a single-pulse TMS study

Published: 16-06-2015
Last updated: 16-04-2024

Primary objective: The most important question this study wants to answer is when the right posterior parietal cortex (PPC) , which is known to be involved in re- orienting to task-relevant stimuli , is involved in re - orienting to threatening...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Observational invasive

Summary

ID

NL-OMON42175

Source
ToetsingOnline

Brief title
The role of the parietal cortex in re-orienting to emotional stimul

Condition

- Other condition

Synonym
NA

Health condition

fundamenteel onderzoek bij gezonde proefpersonen

Research involving
Human

Sponsors and support

Primary sponsor: Radboud Universiteit Nijmegen
Source(s) of monetary or material Support: VENI toegekend aan hoofdonderzoeker dr. M. Mulckhuyse

Intervention

Keyword: Emotional attention, Posterior parietal cortex, re-orienting, time-course

Outcome measures

Primary outcome

Primary study parameters/outcome: A repeated measures ANOVA with Target TMS SOA

(30ms , 60ms , 90ms , 120ms , 150ms , 180ms , 210ms , 240ms , 270ms , 300ms)

and Target Type (threatening (CS +) , non -threatening (CS) and

Cuevalidity (valid, invalid) as factors will be performed on percentage

correct and reaction times. If appropriate, planned comparisons between the

conditions will be carried out.

Secondary outcome

Secondary study parameters/outcome: In addition to our primary objective , we

will investigate a possible correlation between the degree of

anxiety as measured by the VAS and the STAI -T with re - orienting, as indexed

by the difference in performance on the CS + target and CS- target.

Study description

Background summary

Emotional stimuli, such as threatening stimuli affect attention selection. It is still not clear what the underlying neural mechanisms are of this attentional modulation. In the present study we will investigate the role of the right posterior parietal cortex (PPC), an area important in shifting

attention to task-relevant stimuli (reorienting). In the current study , participants perform a spatial cueing task while the right PPC is stimulated by single pulse transcranial magnetic stimulation (TMS). In the cueing task attention is first captured by a neutral peripheral sudden onset cue presented to the left or right of the fixation point .Subsequently, participants must respond to a threatening or non-threatening target presented at the same location (valid) or at the opposite location (invalid) of the cue. If the target appears on the opposite location, attention should be re-oriented to this location. After the onset of the target , we will administer a single pulse TMS to intefere with the re-orienting proces. A previous study (Chambers et al ., 2004) has shown that PPC is crucial in reorienting to task relevant (emotionally neutral) stimuli. Chamber et al. found that single pulse TMS interfered with reorienting to the target at two different points in time (two time- windows); a time- window corresponding to rapid subcortical processing and a time- window corresponding to slower cortical processing. To investigate whether reorienting to threatening stimuli is processed more quickly than non-threatening stimuli, we will use the set-up of Chamber et al , (2004) with the addition of a threatening (CS +) or non-threatening target (CS-). In order to investigate the temporal characteristics of re-orienting, the timing of the pulse will be systematically varied between trials. We measure the manual responses (percentage of correct and reaction time) to the target stimulus in order to determine when the right- PPC is involved in the re - orienting to threatening stimuli. The results will improve our knowledge and understanding of the underlying mechanisms of emotional modulation of attention. In addition, the results will also contribute to methods that can be developed for the prevention and treatment of anxiety disorders , for instance by means of attentional bias modification .

Study objective

Primary objective: The most important question this study wants to answer is when the right posterior parietal cortex (PPC) , which is known to be involved in re- orienting to task-relevant stimuli , is involved in re - orienting to threatening stimuli. Results from the study provide insight into the underlying neural processes of emotional modulation of attention, more specifically the timing of the process . By measuring manual responses to invalid targets in a spatial cueing task with threatening and non -threatening targets, we can investigate when re-orienting occurs and what the possible underlying neural correlates of the process might be. We anticipate that single pulse TMS inteferes with reorienting to threatening stimuli only in the first time window and not in the second time- window .
Secondary objective (s) : In addition to our primary objective, we will investigate a possible correlation between the degree of anxiety as measured by the VAS and the STAI-T with re - orienting, as indexed by the difference in performance on the invalid CS+ target and CS- target.

Study design

The study takes place in the Donders Centre for Cognitive Neuroimaging (DCCN) as a within-subject experiment with healthy, adult volunteers. The study consists of two experimental sessions. In the experimental sessions, the participants will first practice the task. Subsequently, by means of a work-up procedure the participant determines the intensity of the electrodermal stimulation after which the fear-conditioning procedure is peerformed. Immediately thereafter the experiment begins. During the experiment, a tsingle -pulse is administered to the right PPC on each trial. The timing of this pulse, with respect to the target onset (Target - TMS SOA), is systematically varied. A session consists of 10 blocks of each fifty trials, between the blocks participants can take a pause. In total, the experiment takes no longer than half an hour (including breaks). In the second session, participants are asked to complete the questionnaire (STAI- T). In total, a session lasts no longer than 60 minutes.

Study burden and risks

TMS can cause a mild headache during stimulation. For the assessment of risks and charges related to transcranial magnetic stimulation in this study we refer to section 5.2 of the approved Standard Use Procedure for Non-invasive stimulation of Brains (v. 2.1., CMO Nr. 2013/245) at the Donders Institute for Brains , Knowledge and Behaviour.
The electrodermal stimulus is unpleasant but not painful. For the assessment of risks and charges related to electrodermal stimulation in this study we refer to section 8.3.1 of the approved Research Protocol Imaging Human Cognition (v 1.0., CMO 2014/288) .

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

Healthy, right-handed participants, between 18*35 years old, with normal or corrected-to-normal vision, normal hearing.

Exclusion criteria

Exclusion criteria for participation include metal in cranium, epilepsy or family history of epilepsy, history of neurological or psychiatric disorders, medication use (i.e., benzodiazepines, antidepressants andneuroleptica), cardiac pacemaker, pregnancy and electronic hearing devices.

Study design

Design

Study type: Observational invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped

Start date (anticipated):	01-03-2016
Enrollment:	18
Type:	Actual

Ethics review

Approved WMO Date:	16-06-2015
Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL52504.091.15