Emotional modulation of attentional selection: A transcranial magnetic stimulation study

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Primary Objective: The main question this study wants to address is whether the right posterior parietal cortex, known to be involved in saliency detection and stimulus driven orienting, is also involved in orienting to emotional stimuli, such as...

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

Summary

ID

NL-OMON40338

Source
ToetsingOnline

Brief title
emotional attention

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

Intervention

Keyword: emotion, fear conditioning, right parietal cortex, rTMS, spatial attention

Outcome measures

Primary outcome

A repeated measures ANOVA with TMS (sham TMS, left rTMS, right rTMS) and distractor (CS+, CS-) as factors will be carried out on difference RT score and error rates. If appropriate, planned comparisons between the conditions will be performed. The alpha level of significance will be set at 0.05 (two-tailed) throughout.

Secondary outcome

Pearson*s correlation coefficient will determine the correlation between the level of state anxiety as measured by the VAS and attentional capture by threatening distractors as indexed by the difference RT score.

Study description

Background summary

Emotional stimuli, such as threatening stimuli, are known to influence attentional selection. However, how and when these stimuli modulate attentional selection is not yet clear. In the current study, we will investigate the influence of the right parietal cortex, involved in stimulus driven spatial attention on attentional orienting to threatening stimuli. We will use offline 1-Hz repetitive transcranial magnetic stimulation (rTMS) to the parietal cortex, which results in a transient disruption of cortical activity at the stimulation site. Subsequently, participants will perform a visual search task with irrelevant distractors that can either be threatening or non-threatening.

We will measure manual responses to the target stimulus in the presence and absence of distractor to index attentional capture. The results will increase our knowledge and insights in the mechanisms underlying emotional modulation of attention. Moreover, the study will contribute to methods involved in the prevention and treatment of anxiety disorders.

Study objective

Primary Objective: The main question this study wants to address is whether the right posterior parietal cortex, known to be involved in saliency detection and stimulus driven orienting, is also involved in orienting to emotional stimuli, such as threatening stimuli. We will index attentional capture by the difference RT for distractor present minus absence trials. We expect to find and interaction between TMS (sham rTMS, left rTMS and right rTMS) and distractor type (threatening, non-threatening). For non-threatening distractors we expect to find a difference between distractor present and absent trials that persists with sham TMS and left rTMS and is reduced with right rTMS. For threatening distractors, we expect that the difference RT persists across the TMS conditions.
Secondary Objective(s): In addition to our primary objective, we expect to find a correlation between the level of state anxiety as measured by ratings on the VAS and attentional capture by threatening distractors as indexed by the difference RT score between distractor present minus distractor absent.

Study design

The study is a sham controlled randomized cross-over design. Each participant will complete an intake session of maximum 30 minutes on one day, followed by three experimental sessions on three separate days of approximately 60 minutes.

During the intake session, explanation of experimental procedures, written informed consent, standard health and safety-screening list is administered. In addition, individual motor threshold (MT) from the left primary motor cortex using the thumb movement visualization method will be measured to determine stimulation intensity (Schutter & Van Honk, 2006).

In each experimental session, participants will first practice the task and perform the fear-conditioning procedure as described in section 8.3 study procedure. Subsequently, the will receive a 20-min 1-Hz train of pulses of either sham rTMS (left or right sham TMS will be counterbalanced between subjects), or rTMS to the left or to the right parietal cortex. Previous studies have shown that these parameters transiently disrupt cortical activity at the site of stimulation (e.g., see Hilgetag, Theoret & Pascual-Leone, 2001; Mevorach, Humphreys, Shalev, 2005; Schutter et al., 2001; Van Honk et al., 2002). The site of stimulation will be the same as that of Hodsoll et al., 2009 corresponding to points P3 (left parietal) and P4 (right parietal) on the 10-20

electroencephalography coordinate system. Stimulation intensity will be set at 10% below the resting motor threshold of each participant. Following the rTMS stimulation, the participants will perform the task as described in study procedure (section 8.3).

The research will take place at the Brain Stimulation Laboratory of the Department of Experimental Psychology, Utrecht University.

Study burden and risks

There are no immediate benefits associated with the study. TMS might be somewhat uncomfortable and may cause a mild headache during stimulation. When TMS is applied at fast frequencies (>= 25 Hz) the risk for an insult increases. However, given the currently proposed TMS parameters the likelihood of adverse events, like nausea, dizziness or an insult is negligible (Please see also 7.2 Adverse and serious adverse events). Total duration of the study per participants is no more than 1 hour. The loud sound is uncomfortable but given the current parameters the likelihood of adverse events is negligible. The volunteers will be paid for participation. They can withdraw from the study at any given time. Given the very low risks of this study comparing to the potentially large benefits, we regard this study legitimate and eligible.

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

- aged between 18 and 35
- normal or corrected to normal vision
- not color blind
- normal hearing
- right- handedness
- non-smoking
- females taking contraceptives

Exclusion criteria

Exclusion criteria for participation include metal in cranium, use of psychotropic drugs, including cannabis, XTC,amphetamines and cocaine, epilepsy or family history of epilepsy, history of closed-head injury, history of neurological or psychiatric disorders, medication use (i.e., benzodiazepines, antidepressants and neuroleptica), 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):	09-05-2014

Enrollment:	24
Type:	Actual

Ethics review

Approved WMO Date:	03-09-2013
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)
Approved WMO Date:	14-02-2014
Application type:	Amendment
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)
Approved WMO Date:	24-04-2014
Application type:	Amendment
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)

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	NL45081.041.13