The Role of the Parietal Cortex in Familiarity and Recollection: A Transcranial Magnetic Stimulation Study

Published: 17-06-2016
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To investigate contributions of the angular gyrus in recollection processes.

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

Summary

ID

NL-OMON43131

Source
ToetsingOnline

Brief title
Parietal Cortex: Familiarity and Recollection

Condition

- Other condition

Synonym
not applicable

Health condition

fundamenteel onderzoek bij gezonde vrijwilligers

Research involving
Human

Sponsors and support

Primary sponsor: Radboud Universiteit Nijmegen
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Memory, Parietal Cortex, Transcranial Magnetic Stimulation

Outcome measures

Primary outcome

The main objective of this study is to investigate whether activity in the

angular gyrus is necessary for recollection processes in recognition memory.

Secondary outcome

Not applicable

Study description

Background summary

It has been proposed by dual-process theories that recognition memory consists of familiarity and recollection processes (Jacoby & Dallas, 1981; Mandler, 1980). Familiarity memory processes are responsible for recognition without context, while recollection memory processes are responsible for recognition with context (Yonelinas, 2002).

A review focusing solely on the parietal cortex, indicated that recollection-related activation is localized in the angular gyrus (AG; BA 39; Vilberg & Rugg, 2008). However, disentangling the role of brain activation can be challenging in fMRI research. Brain activation in a brain region while performing a memory task, is indicative of that brain region playing a role in the execution of the task. However, it does not indicate that that brain region is necessary to perform the memory task. Only when disrupting or enhancing the function of a brain region influences the performance on the task, there is an indication for a critical role of that brain region.

Up until now, little research has been done looking at the involvement of the left angular gyrus in familiarity and recollection.

Study objective

To investigate contributions of the angular gyrus in recollection processes.

Study design

A randomized controlled within-subject design. The experiment consists of three sessions, one intake session and two test sessions on three separate days. In the test sessions, participants will perform a recognition memory task. In one of the two test sessions, participants will receive a 20 minutes 1 Hz train of inhibitory rTMS targeting the left angular gyrus. RTMS to the vertex will serve as the active control condition as this region is not directly implicated in memory processes. The location of stimulation will be determined by neuronavigation using predetermined coordinates from literature (Vilberg & Rugg, 2008). Test sessions will be randomized and counterbalanced across participants.

Intervention

1 Hz sub threshold repetitive transcranial magnetic stimulation (1200 pulses).

Study burden and risks

The currently proposed TMS paradigm does not carry any significant risks. Safety guidelines as acknowledged by the International Federation of Clinical Neurophysiology will be followed strictly. Potential side-effects are muscle tension and headache. These are generally mild discomforts that respond promptly to common analgesics. Volunteers can withdraw from the study at any given time and there are no direct benefits for the participants.

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

Between 18-35 years of age years, right-handed, non-smoking, normal or corrected-to-normal vision, Dutch as a native language

Exclusion criteria

Skin disease, 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, electronic hearing devices, pregnancy.

Study design

Design

Study type:	Interventional
Intervention model:	Parallel
Allocation:	Randomized controlled trial
Masking:	Single blinded (masking used)
Control:	Placebo
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	26-08-2016
Enrollment:	28
Type:	Actual

Ethics review

Approved WMO

Date:	17-06-2016
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	NL56819.091.16

Study results

Date completed:	03-04-2017
Actual enrolment:	20