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

Published: 20-06-2017
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To investigate contributions of parietal theta oscillations in recollection processes.

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

Summary

ID

NL-OMON45300

Source
ToetsingOnline

Brief title
Parietal Cortex & Memory: tACS

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 Alternating Current Stimulation

Outcome measures

Primary outcome

Investigating whether activity in the theta-band frequency is necessary for

recollection-related processes in memory.

Secondary outcome

Not applicable

Study description

Background summary

Neural oscillations in the theta-band frequency range have been associated with memory processes, specifically recollection related processes. However, most studies were correlational in nature, so to what extend theta oscillations are necessary for recollection-related processes remains unknown. The aim of this study is to shed more light on this issue. We will apply online 3.5 Hz transcranial alternating current stimulation (tACS) over parietal cortices to alter recollection processes. Before stimulation participants will encode words, which will be retrieved in a recognition test while receiving tACS stimulation. It is hypothesized that theta tACS stimulation will facilitate recollection processes. The study will enhance our understanding of the role of the theta oscillations in memory processes.

Study objective

To investigate contributions of parietal theta oscillations in recollection processes.

Study design

A randomized double-blind controlled within-subject design. The experiment consists of three test sessions on three separate days. In the test sessions, participants will perform a recognition memory task. In one of the three test sessions, participants will receive bilateral 3.5 Hz tACS, and in one of three test sessions, participants will receive bilateral 8 Hz tACS. Sham tACS will serve as the active control condition, and will be administered during the remaining session. Test sessions will be randomized and counterbalanced across participants.

Intervention

Transcranial alternating current stimulation (tACS) will be by a battery-driven constant DC current stimulator (Eldith DC Stimulator (CE 0118), Ilmenau) using a pair of electrodes (25 cm^2) over the left and right parietal hemisphere and a reference electrode (100 cm^2) over the vertex, on three separate occasions. Participants will receive bilateral 3.5 Hz tACS (1 mA/25 cm^2, 30 min) during one session, bilateral 8 Hz tACS (1 mA/25 cm2, 30 min) during one session, and bilateral sham tACS (0 mA/25 cm^2, 30 min) during one session.

Study burden and risks

The currently proposed tACS procedure does not carry any significant risks. Safety guidelines as acknowledged by the International Federation of Clinical Neurophysiology will be followed strictly. Potential side-effects of tACS 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 ofepilepsy, 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:	Double blinded (masking used)
Control:	Placebo
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	08-09-2017
Enrollment:	54
Type:	Actual

Ethics review

Approved WMO

Date:	20-06-2017
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	NL61216.091.17