Simultaneous EEG and fMRI in a visual selective attention task

Published: 25-09-2007
Last updated: 10-08-2024

In this project, we will examine whether the simultaneous recording of ERPs and fMRI during the adapted grating task results in data of sufficient quality. More specifically, we would like to know 1) whether the components normally observed in the...

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

Summary

ID

NL-OMON31018

Source
ToetsingOnline

Brief title
EEG-fMRI in an attention task

Condition

- Other condition
- Cognitive and attention disorders and disturbances

Synonym
n.a.

Health condition

Het onderzoek is basaal en er werken alleen gezonde vrijwilligers mee

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Utrecht
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: attention, brain, EEG, fMRI

Outcome measures

Primary outcome

The research variables are: 1) brain activity maps obtained with 64-channel EEG, 2) brain activity maps obtained with 31-channel EEG (from the reference recording as well as the recording obtained in the scanner), 3) brain activity maps obtained with functional MRI, and 4) performance measures with respect to the adapted grating task (reaction times, percentages false alarms and misses).

Secondary outcome

none

Study description

Background summary

EEG (ERP) and fMRI are two brain imaging modalities with partially complementary benefits, i.e. high temporal resolution for EEG and high spatial resolution for fMRI. Simultaneous recording of EEG and fMRI has several interests, among others the possibility to obtain ERP data and functional images in the exact same conditions and environment. Recently, several groups have shown that it is possible to obtain ERPs in the MRI scanner, similar to the ERPs obtained outside of the scanner. In our lab, a specific experimental paradigm, the grating task, has been used for several years to assess visual selective attention from EEG recordings. The analysis of the EEG data results in a series of components, varying in amplitude, polarity, latency and scalp position. We have adapted the grating task to be suitable for simultaneous EEG-fMRI. In the EEG data obtained during this adapted task, some of the components associated with visual selective attention are observed. So far, no

simultaneous EEG-fMRI recordings have been performed during this task.

Study objective

In this project, we will examine whether the simultaneous recording of ERPs and fMRI during the adapted grating task results in data of sufficient quality. More specifically, we would like to know 1) whether the components normally observed in the EEG data can also be retrieved from EEG recordings in the MRI scanner. Furthermore, we would like to know 2) whether the fMRI data are of sufficient quality to find the generators of the components associated with visual selective attention.

Study design

Maximal twenty-five healthy volunteers will be recruited. Participants will undergo a maximum of 2 sessions on two different testing days. In the first session, 64-channel EEG data are recorded while the subject performs the adapted grating task. These data will be analyzed on the occurance of the expected components. Subjects with components of the expected polarity are selected for the second session; twelve subjects will be included in total. EEG data will also be analyzed with source localisation programs, which will serve as a reference for later fMRI source localisations. In the second session, a 31-channel reference EEG will be recorded using a MRI-compatible EEG cap. Subsequently, combined EEG-fMRI will be performed during the adapted grating task.

Study burden and risks

The burden for participants is low: the two methods used (EEG and fMRI) are generally experienced as a light burden. Invasive techniques will not be used. The total duration of participation is maximal 4,5 hours, during two sessions spread over maximal 8 weeks. A MRI-compatible EEG system will be used, which has been approved by the METC UMC Utrecht (protocol number 04/276). In previous experiments, no adverse effects have been encountered with this system. Therefore, the risks for subjects are expected to be very low.

Contacts

Public
Universitair Medisch Centrum Utrecht

Heidelberglaan 100
3584 CX Utrecht
Nederland

Scientific
Universitair Medisch Centrum Utrecht

Heidelberglaan 100
3584 CX Utrecht
Nederland

Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

physically healthy

Exclusion criteria

existence of a physical or mental illness

Study design

Design

Study type: Observational non invasive

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

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	09-11-2007
Enrollment:	25
Type:	Actual

Ethics review

Approved WMO Date:	25-09-2007
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)
Approved WMO Date:	18-11-2008
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	NL18863.041.07