Neural representations of mental imagery and the effect of neurofeedback training: A 7T fMRI study

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Ethical review	Approved WMO
Status	Will not start
Health condition type	Other condition
Study type	Observational invasive

Summary

ID

NL-OMON47869

Source
ToetsingOnline

Brief title
Neural representations of mental imagery

Condition

- Other condition

Synonym
Not applicable

Health condition

Het onderzoek richt zich op het decoderen van hersenfuncties en zijn van belang voor de ontwikkeling van breincomputer interfaces.

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Utrecht
Source(s) of monetary or material Support: European Research Council (ERC)

Intervention

Keyword: decode, functional MRI, imagery, neurofeedback

Outcome measures

Primary outcome

The primary study parameter is the fMRI decodability (classification accuracy)

of visually imagined symbols or imagined hand gestures.

Secondary outcome

Not applicable.

Study description

Background summary

People with the *locked-in* syndrome (LIS) lose nearly all of their motor control while their cognition remains intact, effectively locking them into their own body with limited or no means of communication. Brain-Computer Interfaces (BCIs) are able to restore communication in LIS patients by recording brain activity. One implementation of a BCI is by decoding brain activity patterns which are generated by brain functions like visually imaging symbols or imagining making hand gestures in order to facilitate communication. The classification accuracy of decoding (and therefore the accuracy of control over the BCI appliance) will benefit from more consistent brain activity patterns. By training people with feedback on the brain activity generated by visual or hand imagery (i.e. neurofeedback), we think brain activity patterns will become more consistent thus provide a more stable input for a communication BCI.

Study objective

In this study we want to investigate whether it is possible to fortify the spatial activity pattern generated by hand gesture imagery and visual mental imagery by means of neurofeedback. In addition, we examine which neurofeedback

parameters have a significant influence on the spatial activity pattern.

Study design

This study is an observational study with invasive techniques (functional MRI) where each experiment has multiple experimental groups and a control group. The study uses a pretest-training-posttest design where subjects receive neurofeedback as training.

Study burden and risks

There are no known risks associated with fMRI acquisition. The technique does not require administration of any contrast agent or ionizing radiation. The Utrecht group has ample experience with fMRI scanning (300 sessions per year on the 7 tesla MRI scanner). The fMRI procedure is painless. Slight discomfort may occur due to peripheral nerve stimulation during scanning, or due to lying still with the head and part of the body confined in a tunnel-like device.

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

Age 18-45

Exclusion criteria

Damage to the brain
Noncompliance with MRI safety check list (claustrophobia, metal in the body, etc.)
Pregnancy
Claustrophobia

Study design

Design

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

Recruitment

NL

Recruitment status:	Will not start
Enrollment:	105
Type:	Anticipated

Ethics review

Approved WMO Date:	24-05-2017
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)
Approved WMO Date:	21-06-2018
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	NL60278.041.17