Assessing stability of cortico-cortical networks in healthy volunteers: A resting state EEG study

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The primary objective of this first study is to explore the short-range stability of cortico-cortical networks in healthy volunteers by measuring resting state EEG.

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

Summary

ID

NL-OMON35182

Source
ToetsingOnline

Brief title
Network stability in the brain

Condition

- Other condition

Synonym
n.v.t

Health condition

onderzoek bij gezonde vrijwilligers

Research involving
Human

Sponsors and support

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

Intervention

Keyword: Brain, Electroencephalogram, Networks, Stability

Outcome measures

Primary outcome

Cortico-cortical networks will be reconstructed by computing the level of statistical dependency between the electrode signals across different frequency bandwidths (1-30Hz), by means of computing the level of coherence between the time-series of the different electrodes. From the resulting individual cortico-cortical networks, graph metrics that describe the topology of the network will be computed, with the mean focus on the level of degree -number of connections in the network-, local efficiency -expressing the level of local clustering of nodes- and global efficiency -computed as the inverse of the minimal number of steps to travel between any two nodes, expressing how efficient information can be transported between different parts of the network. Next, network stability will be assessed by determining the test-retest reliability of these metrics across the different time-points for the different frequency bandwidths across the group of subjects.

Secondary outcome

not applicable

Study description

Background summary

The human brain consists of complex networks. Despite the fact that different brain regions have their on functional specialization, together they form networks that exhange information and in order for the brain to function properly stability within these networks is essential. However, this has never been studied in a systematic way. The aim of this study is to examine the stability of these networks.

Study objective

The primary objective of this first study is to explore the short-range stability of cortico-cortical networks in healthy volunteers by measuring resting state EEG.

Study design

Participants will be prepared for the EEG recording (20 minutes) and electric brain activity will be recorded from 64 positions for one hour (i.e., 6 blocks of 8 minutes). Participants will be seated in a comfortable reclining chair and instructed to relax. A short pause of a few minutes will be given after every 8 minutes of recording. During the recording eight minutes of 1 minute eyes-open and 1 minute eyes closed will be recorded. Prior to the EEG session participants will be asked to refrain from taking psychotropic substances, including coffee, tea and chocolate at least 2 hours prior to the EEG recording. Graph analyses will be applied to the EEG data to extract the networks and stability of these networks will be determined.

Study burden and risks

Burden: Time investment of 90 minutes (traveling time not included) and wearing an electrode cap.
Risks: There are no risks involved with EEG scalp recordings.

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

Males: Healthy, right-handed, non-smoking volunteers, aged between 18-35 years ;
Females: Healthy, right-handed, non-smoking, aged between 18-35 years, using contraceptives

Exclusion criteria

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 head surgery, history of neurological or psychiatric disorders, medication use (i.e., benzodiazepines, antidepressants and neuroleptica), brain infarction, pregnancy.

Study design

Design

Study type: Observational non invasive

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

Recruitment

NL

Recruitment status:	Will not start
Enrollment:	30
Type:	Anticipated

Ethics review

Approved WMO Date:	22-03-2012
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)
Approved WMO Date:	06-08-2013
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	NL38783.041.11