Advance preparation component in a cognitive switch paradigm

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Pimary objective: visualization of a cognitive switch on a single trials basis using electroencephalographySecondary Objective(s): investigation of the CSP technique and its relation with the cognitive tasks. Two main questions will be addressed:1)...

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

Summary

ID

NL-OMON31807

Source
ToetsingOnline

Brief title
Advance preparation component in a cognitive switch paradigm

Condition

- Other condition

Synonym
n.a.

Health condition

Healthy males and females

Research involving
Human

Sponsors and support

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

Intervention

Keyword: Burst, cognitive, paradigm, switch

Outcome measures

Primary outcome

Main study parameter is the differentiation between the two cognitive task

which is operated from the classification with CSP.

Secondary outcome

Secondary parameters are the neurocorrelate of the switch in the beta range

rhythm and the similaraty of the dynamics of the cognitive and motor switch

Study description

Background summary

We aim to develop a technique which permit the visualization of cognitive switches in a single trial basis. de Jong (in preparation) used Common Spatial Patterns analysis (CSP; Koles, 1991) to successfully (95% accuracy) visualize the neural correlates of task switching (a burst in the beta rhythm of the EEG) using a motor task. In this experiment we are trying to replicate de Jong findings using a cognitive task-switching paradigm. Given that CSP is more sensitive for tasks with different topographies we are going to use a task with a mathematical component, which has a stronger left hemispheric component; and a color matching task, which is know to have a stronger right hemispheric component.
Recently Brown and Williams (2005) state a relationship between basal ganglia and beta rhyhtm (8-30 Hz), for which the beta rhythm would be the frequency between which the basal ganglia communicate the *go* signal to the motor areas the instant before a voluntary movement. The beta burst reported from de Jong (in preparation) seems to reflect the neural correlate of this kind of interaction.

Study objective

Pimary objective: visualization of a cognitive switch on a single trials basis using electroencephalography
Secondary Objective(s): investigation of the CSP technique and its relation with the cognitive tasks. Two main questions will be addressed:
1) Is the neurocorrelate of the swicth still in the beta range rhythm (i.e. 20 hz)?
2) Are the dynamics of the cognitive and motor switch similar (i.e. burst activity)?

Study design

Individuals will participate to one experiment where EEG will be measured while performing a task switching task. Task switching implies that participants respond to the same stimulation depending on what task they have to perform. Usually the task series is represented in the form A, A, B, B, A, A, B, B, A, *, where A is the first task and B the second. Swithching cost will be observerd in the change from task A to B and from task B to A. An equation similar to 3 + 4 = 9 will be displayed and participants will have, in the math-match task, to judge if the equation is true or false; whereas in the color-match task participants will have to judge if the color of the font of the first and last item match. 50 % of the trials will be correct matches. Participants will know which task will follow to the one that they are currently performing and they are instructed to prepare to the following task each as soon as they are ready with the task at hand. CSP will analyse the EEG measured during this preparation period and it will used them for the classification and differentiation between the *switch* and the *non-switch* trials

Study burden and risks

EEG experiments are not invasive. The nature of stimulation is smilar to that used regulary in body image research and result in a temporary mild discomfort in healthy humans. All participants will be debriefed about the experiment.

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

Healthy individuals, who did not suffer from serious head trauma
Between 18 and 40 years
Healthy right-handed males and females
Native Dutch speaker

Exclusion criteria

Males and females younger than 18 and older than 40 years.
Males and females who are left-hand dominant.
Males and females with reading disabilities
Males and females that use drugs or medicines that could impair cognitive abilities

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):	22-02-2008
Enrollment:	16
Type:	Actual

Ethics review

Approved WMO

Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

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	NL21266.042.07