Posterior Alpha Oscillations as an Index for the Attentional Bias in Children with Attentional Deficit Hyperactivity Disorder

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Investigate the hypothesis that children with ADHD have difficulty with the allocation of visio-spatial attention related to an inability to control posterior alpha. A paradigm will be used in which the aim is to address covert attention as similar...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Cognitive and attention disorders and disturbances
Study type	Observational non invasive

Summary

ID

NL-OMON35163

Source
ToetsingOnline

Brief title
A Study on the inter-Hemispheric Alpha Ratio in Kids with ADHD (SHARK)

Condition

- Cognitive and attention disorders and disturbances

Synonym
attentiondeficit/hyperactivity disorder; ADHD

Research involving
Human

Sponsors and support

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

Intervention

Keyword: ADHD, Alpha, Attention, Children

Outcome measures

Primary outcome

The difference in ALI between children with ADHD and without ADHD.

Secondary outcome

not applicable

Study description

Background summary

Until recently, the nature of EEG abnormalities in children with Attention Deficit Hyperactivity Disorder (ADHD) has not been decisive yet. The alpha activity (8-14 Hz) is regarded the most fundamental and invariant component of brain responses. According to the *inhibition timing hypothesis*, alpha activity is thought to be involved in the suppression of irrelevant information. In line with this hypothesis, attentional tasks in healthy subjects have been related to higher occipital alpha power contralateral to the unattended side than ipsilateral to the unattended side, defined by the alpha lateralization index (ALI). ADHD might therefore be explained by an inability to control posterior alpha and thus a deficit in the allocation of visio-spatial attention. A recent study in adults with ADHD showed that subject with ADHD have an attentional response bias to the right visual field compared to the left visual field. Subjects without ADHD did not show a similar bias. In the ALI, contrasting the difference found in healthy controls, no difference was found between the cue and no cue condition in participants with ADHD. Since both cognitive capacity and alpha-activity change as children get older, the attentional bias found in adults with ADHD cannot be generalized towards children with ADHD. Although resting state measurements in children with ADHD have shown excess right hemisphere power to be 8 times as likely to occur as excess left hemisphere power a direct link to cognitive performance needs to be tested in children with ADHD.

Study objective

Investigate the hypothesis that children with ADHD have difficulty with the allocation of visio-spatial attention related to an inability to control

posterior alpha. A paradigm will be used in which the aim is to address covert attention as similar recent studies did in adults with ADHD.

Study design

Alpha activity will be measured using EEG while performing a covert attention task. Next, the alpha lateralization index will be calculated and correlated to behavioural responses and severity of ADHD.

Study burden and risks

Children and their parents will have to visit the lab twice. The duration of the first visit will depend on the necessity of doing an IQ measurement. As a rule, only children in the ADHD-group will have had such a recent measurement. If no recent measurement has been performed, a shortened IQ measurement will be done in 45 minutes. During the first visit, the task that will be performed during the second visit will be practiced for 8 minutes. In addition, the child will be asked to do a paper and pencil task taking a couple of minutes while the parent/representative fills out a questionnaire. Finally, the procedure of the next visit will be explained. Following, the second visit will consist of an EEG-measurement of approximately 90 minutes, including preparation, a short practice session, and the actual task. Participation is not associated with any indications of risks.

Benefit and group relatedness: Participation is of great importance since generalization of recently obtained new insights on the nature of abnormalities related to ADHD, will not be possible without measurement in this specific target group. The brain develops during childhood and it is not clear yet what ALI looks like in typically developing children, therefore it is important to compare children with ADHD with typically developing children.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Children (2-11 years)

Inclusion criteria

For both groups inclusion criteria will be: (1) Age between 6 and 10 years. (2) Estimated IQ above 80. (3) Psychopharmaca- naïve or -free.
For the ADHD-group an inclusion criterion will be: (1) a diagnosis of ADHD, classified by the DSM-IV.

Exclusion criteria

For both groups exclusion criteria will be: (1) Regular use of medication. (2) (Co-morbid) psychiatric disorder (major depression, bipolar disorder, psychotic disorder, chronically motor tic disorder or Gilles de la Tourette, Conduct disorder, autism spectrum disorder, eating disorder, anxiety disorder). (3) Neurological disorders (e.g. epilepsy) currently or in the past. (4) Cardiovascular disease currently or in the past. (5) Serious motor or perceptual handicap.

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)

Control:	Active
Primary purpose:	Basic science

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	22-03-2012
Enrollment:	60
Type:	Actual

Ethics review

Approved WMO Date:	17-11-2011
Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	08-05-2012
Application type:	Amendment
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	NL38352.091.11