The impact of reward on learning processes and the underlying brain activity in children with ADHD

Published: 30-10-2008 Last updated: 05-05-2024

Study the role of reward on learningprocesses and the underlying brainactivity in children with ADHD (attention deficit hyperactivity disorder).

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

Summary

ID

NL-OMON32822

Source ToetsingOnline

Brief title Impact of reward on brain mechanisms in ADHD

Condition

Other condition

Synonym Attention deficit hyperactivity disorder (ADHD)

Health condition

cognitieve- en aandachtsstoornissen en - afwijkingen

Research involving

Human

Sponsors and support

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

Intervention

Keyword: ADHD, Functional MRI, Learning, Reward

Outcome measures

Primary outcome

Mapping the role of reward on learning processes and the underlying

brainactivity in children with ADHD.

- Brainactivity during a reward-related task and a learning task in children

with ADHD and healthy controls.

Secundary study parameters/outcome of the study (if applicable):

Secondary outcome

Study description

Background summary

The department of Clinical Neuropsychology of the VU University in Amsterdam holds an international research program into disruptive problem behaviour, with the main focus on ADHD (prof. dr. Oosterlaan, prof. dr. Sergeant, dr. M. Luman). The research group studies neurocognitive dysfunctions by the use of highly sensitive computer tasks and brain imaging techniques. One of the recent findings is that children with ADHD are more dependent on rewards to perform optimally. An underlying shortage of dopamine (DA) in the fronto-striatal system has been offered as a potential explanation.

Activity in the striatum is highly important for learning processes in the presence of reward cues. Receiving a reward results in an increase in DA in the

fronto-striatal system, which enhances stimulus-response (S-R) learning in the face of reward cues?

Findings in recent studies by dr. Luman are in line with fronto-striatal abnormalities in ADHD: (1) children with ADHD need more reward and penalties than controls in order to perform optimally, and (2) children with ADHD show impaired S-R learning.

With fMRI, activity of the fronto-striatal system in response to reward and during S-R learning will be captured. fMRI is a valid instrument to study fronto-striatal functioning, which has been confirmed by recent studies in adults and adolescents with ADHD. Both studies demonstrate decreased activity in the fronto-striatal regions in anticipation to rewards in ADHD compared to controls .

Hypothesis

1. Is impaired S-R learning in children with ADHD related to (a) a diminished sensitivity to reinforcement such as reward (b) diminished reactivity of the fronto-striatal system

Study objective

Study the role of reward on learningprocesses and the underlying brainactivity in children with ADHD (attention deficit hyperactivity disorder).

Study design

In this study, brain activity of 30 children with a DSM-IV diagnosis of ADHD en 30 healthy children (age 8 to 12) is measured using fMRI during two computerized cognitive tasks that measure the sensitivity to reward contingencies and learning processes.

Study burden and risks

There are no risks associated with this study.

Parent(s)/ caregivers need to agree with the notion that they will be informed about possible unforseen findings (such as a brain tumor) during the fMRI. In that case, Prof. dr. F. Barkhof (radiologist) will contact the parent(s)/ caregivers.

Contacts

Public

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Vrije Universiteit

V. der Boechorststraat 1 1081 BT Nederland **Scientific** Vrije Universiteit

V. der Boechorststraat 1 1081 BT Nederland

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age Children (2-11 years)

Inclusion criteria

Children between 8 and 12 years old Diagnosis of ADHD

Exclusion criteria

Any psychiatric disorders other than ADHD Learning disorders such as dyslexia Brain damage or neurological disorder (such as epilepsia)

Study design

Design

Study type:

Observational non invasive

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Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Other

Recruitment

NL	
Recruitment status:	Recruiting
Start date (anticipated):	01-01-2009
Enrollment:	60
Туре:	Actual

Ethics review

Approved WMO	
Date:	30-10-2008
Application type:	First submission
Review commission:	METC Amsterdam UMC

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 CCMO **ID** NL25374.029.08

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