Action Prediction in Autism Spectrum Disorders

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Developmental disorders NEC
Study type	Observational non invasive

Summary

ID

NL-OMON40834

Source
ToetsingOnline

Brief title
Action Prediction Autism

Condition

- Developmental disorders NEC

Synonym
Autism, Autism Spectrum Disorder

Research involving
Human

Sponsors and support

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

Intervention

Keyword: Action Prediction, Autism Spectrum Disorder, Electroencephalography, Eye-tracking

Outcome measures

Primary outcome

Based on previous findings, we expect that healthy controls predict the different action steps of the presented action sequences and that their predictions become faster for the later action steps, reflecting the integration of the contextual information. For the ASD group on the other hand, we expect to see less predictions and no improvement for the last action steps, reflecting a prediction difficulty and a deficit in integration of information as suggested by previous literature. In addition, we expect to find group differences in neural connectivity, measured by means of EEG coherence analysis. In addition, we aim to explore changes in EEG coherence related to action prediction and finally assess group differences.

Secondary outcome

Behavioural task performance during the EEG-ET task will be used assess the compliance of the participants and ensure both groups were equally able to perform the task. Age, AQ, IQ, and gender will be taken into consideration as covariates in the statistical tests.

Study description

Background summary

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder associated with

a heterogeneous set of deficits. Although many researchers have investigated ASD over the past decades, the underlying mechanisms that cause autism are still unclear. Recently, it has been suggested that a deficit in forming and updating predictions about the surrounding world might be a potential mechanism that could explain multiple of the diverse deficits associated with the disorder. Our study focuses on investigating potential prediction deficits in ASD with respect to predicting observed actions performed by others. Although multiple previous studies do find prediction difficulties in individuals with autism, especially concerning multi-step actions, other studies find predictions of simple actions to be intact in ASD. Since the methods that have previously been applied are very diverse and findings are mixed, we aim to further explore this topic. To better understand potential deficits and associated neural processes, we aim to link behavioural and neurocognitive measures of action prediction in one experimental design, based on a previous eye-tracking study conducted with healthy adults.

Study objective

The main objective of this study is to investigate whether adolescents with ASD, compared to healthy controls, show difficulties in generating and updating predictions about an unfolding action sequence. Using Eye-tracking (ET) and electroencephalography (EEG), we want to investigate whether prediction deficits in ASD are apparent across multiple domains, and we will study the relationship between neurocognitive and behavioural measures of action prediction.

Study design

The proposed study is a non-invasive combined ET-EEG study in which participants are presented with visual and auditory (language) stimuli describing a multi-step action sequence. Participants eye movements are recorded to investigate whether anticipations of consecutive action steps, and EEG measurements are taken to assess connectivity patterns during this action prediction process. The computerized task is followed by a short EEG resting state measurement as well as the administration of a set of questionnaires and psychometric tests.

Study burden and risks

Our study requires one visit to the Donders Institute for Brain Cognition and Behavior with a time investment of about 3 hours. We apply non-invasive common techniques to record eye movements (using Eye-tracking) and brain activation (using EEG), as well as minimal standardized questionnaires and psychometric tests. The risks associated with these measurements are negligible, no adverse events are expected, and the burden for the participants is hence considered to be minimal.

We chose to include minors (12-18 years-old) because of several reasons. First of all, this age group is easily accessible for our research team which will allow us to collect a reasonable sample size. Furthermore, the developmental trajectory of deficits in action prediction in ASD, and it*s relation to brain connectivity, is incompletely understood and investigating adolescents within this age range might give us important insights in this trajectory.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adolescents (12-15 years)
Adolescents (16-17 years)

Inclusion criteria

- right-handed, between 12 and 18 years old, IQ higher than 80
- Autism group: clinical diagnosis of autism spectrum disorder

Exclusion criteria

- psychiatric (co-)morbidity, history of epilepsy, visual impairments

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:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	04-05-2017
Enrollment:	66
Type:	Actual

Ethics review

Approved WMO Date:	08-04-2015
Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	08-12-2016
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	03-01-2017

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	NL49584.091.14