# Hypo-priors in autistic visual perception

Published: 11-02-2015 Last updated: 24-04-2024

The purpose of this study is to test whether perceptual expectations modulate V1 activity consistent with \*hypo-priors\* in autistic individuals.

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

# **Summary**

### ID

NL-OMON40448

**Source** ToetsingOnline

**Brief title** Hypo-priors and visual perception

# Condition

• Developmental disorders NEC

**Synonym** autism, Autism spectrum disorder (ASD)

**Research involving** Human

# **Sponsors and support**

**Primary sponsor:** Donders Institute for Brain, Cognition and Behaviour **Source(s) of monetary or material Support:** Ministerie van OC&W

### Intervention

Keyword: autism, hypo-priors, neuroimaging, perception

#### **Outcome measures**

#### **Primary outcome**

The most important parameters are the fMRI and MEG data obtained while

participants perform the visual task. Here, it can be assessed how perceptual

expectations modulate V1 activity in both groups.

#### Secondary outcome

n.a.

# **Study description**

#### **Background summary**

A recent account of autism proposes that autistic perception is characterized by a reduced integration of sensory processing with prior world knowledge: so-called \*hypo-priors\*. In the context of visual processing, for example, this means that input to the sensory cortices of autistic individuals is less influenced by prior knowledge and experience than it is within healthy individuals. Previous research has shown that perceptual expectations strongly modulate activity in the early sensory cortices of healthy individuals. In visual perception, these modulations reduce overall V1 activity and yet 'sharpen' the representation of expected stimuli, leading to a more efficient representation of expected stimuli compared to unexpected stimuli. However, in the case of hypo-priors, the modulation of sensory input by expectation should not occur.

We will evoke perceptual expectations in and record brain activity using functional magnetic resonance imaging (fMRI) and magnetoencephalography (MEG). Using pattern analysis techniques on the fMRI, we can investigate the representational content of brain activity and thus estimate what content visual cortex is representing during the task. Then, by investigating the neural osciallations collected by MEG, we can analyze how these representations and the effect of expectations on them are implemented by the brain's physiology.

The knowledge obtained here will be informative about brain functioning in autism spectrum disorder. Moreover, it could be used to develop and inform new treatment approaches in the future.

#### **Study objective**

The purpose of this study is to test whether perceptual expectations modulate V1 activity consistent with \*hypo-priors\* in autistic individuals.

#### Study design

Cross-sectional, observational study with two to three sessions. Participants first complete questionnaires to assess their IQ and autistic traits and are familiarized with the MRI-scanner. During the second session, participants complete a visual task in the MRI-scanner. During a third session on a second day, the visual tasks are repeated in the MEG scanner.

#### Study burden and risks

This study is entirely safe. The first session involves completing standardized behavioural questionnaires. The second session involves performing a visual task in the MRI-scanner for approximately one hour. Using standard safety procedures, the risk posed by MRI to the participant can be considered negligible. MEG, which is used in the third session, does not pose any risk to subjects. Moreover, the Donders Institute has vast experience with neuroimaging studies within patient groups.

Although there is no immediate therapeutic or clinical benefit of this study, it will result in a more detailed understanding of autistic brain functioning and the knowledge obtained can be used in future research on diagnostic markers and treatment approachesfor ASD.

This study is group related and can therefore not be done in an adult population. Although ASD can be reliably diagnosed in adulthood, it is foremost a developmental disorder that is characterized by an onset early in life. Sensory abnormalities are most striking in childhood and adolescence and less pronounced in adulthood. This research is group-related to children and adolescents in so far that we aim to obtain knowledge that is relevant for the development of new treatment approaches for young patients, in whom possible treatment would be most effective. Results from studies involving adult participants would not generalize well to the population we target. It is therefore crucial to study abnormal sensory behaviors and their neural substrates at the stage where these are most typical.

# Contacts

#### Public

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# **Trial sites**

# **Listed location countries**

Netherlands

# **Eligibility criteria**

#### Age

Adolescents (12-15 years) Adolescents (16-17 years) Adults (18-64 years) Elderly (65 years and older)

### **Inclusion criteria**

Age: 12-18 years Native Dutch speakers Normal or corrected to normal vision IQ above 85 (within one standard deviation of the mean)

# **Exclusion criteria**

Comorbid psychiatric or neurological disorders History of brain surgery or brain trauma Current or recent alcohol or drug addiction Use of antipsychotic medication Metal objects in the body that cannot be removed (such as pacemakers, metal prostheses, piercings etc.)

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# Study design

# Design

Study type: Observational invasive		
Masking:	Open (masking not used)	
Control:	Uncontrolled	
Primary purpose:	Basic science	

### Recruitment

NL	
Recruitment status:	Recruitment stopped
Start date (anticipated):	12-02-2016
Enrollment:	102
Туре:	Actual

# **Ethics review**

Approved WMO Date:	11-02-2015
Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	08-10-2015
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	13-04-2016
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	08-06-2016
Application type:	Amendment

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Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	17-08-2016
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	22-11-2017
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 CCMO **ID** NL45835.091.13