The sense of touch: embodied simulation processes and empathy in Autism Spectrum Disorders

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Ethical review	Approved WMO
Status	Pending
Health condition type	Mental impairment disorders
Study type	Observational non invasive

Summary

ID

NL-OMON30908

Source
ToetsingOnline

Brief title
Embodied simulation and autism

Condition

- Mental impairment disorders
- Psychiatric disorders NEC

Synonym
autism, autism spectrum disorders

Research involving
Human

Sponsors and support

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

Intervention

Keyword: Autism spectrum disorders, Embodied simulation, Functional Neuroimaging, Mirror neurons

Outcome measures

Primary outcome

1. Blood Oxigen Level Dependent response (signal change in brain activation as

measured by means of functional magnetic resonance imaging related to visual

stimuli presented to the participants during scanning)

2. Empathy quotient (obtained by a questionnaire measuring empathic abilities)

3. Symptom severity in the social domain (measured by the autism diagnostic

interview-revised)

Secondary outcome

n.v.t.

Study description

Background summary

Autistism Spectrum Disorders are chronic developmental neurobiologic disorders, which have onset in the first years of life. The most disabling and most defining symptoms for autism are the social deficits, leading to life-long handicaps in social functioning. There is no curative treatment for autism, and the neural and cognitive mechanisms underlying the social deficits are poorly understood.
A putative mechanism underlying social cognition is embodied simulation. Neuroscientific models of embodied simulation propose that the same neural structures involved in our own body-related experiences also contribute to the understanding of the experiences and intentions of others. This idea is supported by the discovery of the mirror neuron system (grounded in the sensory-motor system) that creates a link between others and ourselves, since it is involved in performing actions or experiencing emotions/sensations as well as in observing someone else performing an action or experiencing an emotion/sensation. Accordingly, the brain regions that have been implicated

most often in autism all have mirror/simulation capacities involved in social cognition, not coincidentally impaired in autism. Hence a mirror neuron-simulation theory for autism has been postulated, claiming that impaired simulation processes, especially in the mirror neuron system, are at the root of autism.
Recent studies also found support for the existence of a visuo-tactile mirroring mechanism in the somatosensory cortices. This activated when one experiences a touch as well as when one observes someone or something else being touched. Furthermore, it was found that visuo-tactile synaesthesia (a neurological condition in which the observation of another person being touched leads to tactile sensations on one's own body) is related to hyperactivation of this mechanism, and that this type of synaesthesia correlates with heightened empathic abilities. These findings suggest an essential role of this mechanism in social cognition (like empathic abilities), and in the social cognition deficits that are defining for autism. However, a visuo-tactile mirroring mechansism has not been investigated in autsim yet.

Study objective

The present study aims at exploring a visuo-tactile mirroring mechanism in patients with autism. Furthermore, the relationship between neural tactile simulation processes, empathic abilities, and symptom severity in the social domain will be investigated.
Based on the mirror neuron-simulation theory patients with autism are hypothesized to show less activation in the visuo-tactile mirroring mechanism during the observation of touch stimuli, compared with healthy control participants, which would indicate dysfunctional embodied simulation processes. An inverse correlation is predicted between activation in the visuo-tactile mirroring mechanism during the observation of touch stimuli, and symptom severity in the social domain. A correlation is predicted between activation in the visuo-tactile mirroring mechanism during the observation of touch stimuli, and empathic abilities.

Study design

Twenty high-functioning autistic patients (age 14-18 years) will undergo a functional magnetic resonance imaging (fMRI) session, while watching short video clips depicting a person being touched, or not. To compare the results of the patients, 20 healthy control participants will undergo the same procedure. An implicit attentional task requires the participants to watch specifically whether the person in the video clip is being touched. Afterwards the participants will be asked to answer some questions regarding the observed video clips, and to respond a questionnaire estimating empathic abilities.

Study burden and risks

The duration of the fMRI scan session is 50 minutes. Responding the questionnaire will take approximately 30 minutes. The study is not demanding or aggravating for the participants. The used research methods are applied to a very large scale in normal subjects and in subjects with various conditions (including autism) without side-effects or unwanted effects, and will not expose participants to any thinkable risk.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

Participants with autism spectrum disorders should meet DSM-IV criteria for autistic disorder or Asperger disorder.
General inclusion criteria: age 14-18 year, IQ > 85, right handedness (Edinburgh handedness Inventory > 80), normal visual capacities (correction < 0.75).

Exclusion criteria

Sensory impairments, organic brain disorders, metal objects in body, alcohol/drug abuse. Specific exclusion criterium for healthy control participants is the presence or a history of medical conditions with a detrimental impact on neurological functioning.

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:	Pending
Start date (anticipated):	01-10-2007
Enrollment:	40
Type:	Anticipated

Ethics review

Approved WMO

Application type:	First submission
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	NL19349.091.07