Communication in context in neurotypical and ASD populations

Published: 24-03-2020
Last updated: 30-11-2024

We aim to provide a neurocognitive account of communicative disabilities in patients with autism spectrum disorder (ASD), focussing on shared representations of a communicative context. We expect that ASD patients show impaired shared...

Ethical review	Approved WMO
Status	Completed
Health condition type	Communication disorders and disturbances
Study type	Observational non invasive

Summary

ID

NL-OMON52774

Source
ToetsingOnline

Brief title
Communication in context

Condition

- Communication disorders and disturbances

Synonym
Autism, autism spectrum disorder

Research involving
Human

Sponsors and support

Primary sponsor: Radboud Universiteit Nijmegen
Source(s) of monetary or material Support: NWO

Intervention

Keyword: autism spectrum disorder (ASD), human communication, social anxiety, social interaction

Outcome measures

Primary outcome

1. Differences in communicative success (percentage correct) and behavioral communicative alignment (correspondence in communicative signals between successive interactions) between ASD patients and NT and high-SA controls;

2. Differences in neural communicative alignment (cerebral coherence) between ASD patients and NT and high-SA controls;

3. Between-group differences in successful communicative meaning interpretation (percentage correct); different eye-gaze pattern trajectories and different patterns of brain activity associated communicative meaning interpretation;

4. Spatial overlap in neural communicative alignment in the nonverbal and verbal tasks, and potential between-group differences;

5. Differences in communicative adjustment between ASD patients and NT and high-SA controls as assessed with an online communication game, and whether communicative adjustment is associated with increased grey matter volume in the prefrontal cortex.

6. EEG will be used to provide a fine-grained temporal and spectral characterization of communicative alignment and context-dependent interpretation; and potential between-group differences.

Secondary outcome

1. Answers to various questionnaires (see section 8.3.3) will be used to examine potential associations between the main study outcomes and individual differences in autism and social anxiety symptom severity, (verbal) IQ, alexithymia, social reward sensitivity and demographics (also in the NT controls only).

2. Eye-tracking: we will investigate differences in eye gaze pattern and pupil dilation during task performance (TCG and neuro-CSI) between ASD patients and NT and high-SA controls, and whether this is associated with our main study outcomes.

3. MR-spectroscopy: we will investigate differences in the excitatory-inhibitory balance of the rSTG between ASD patients and NT and high-SA controls, and whether this is associated with our main study outcomes.

4. EEG-fMRI: Investigate whether potential differences in rSTG BOLD activity during communicative alignment are related to differences in electrophysiological activity of the rSTG, as measured with EEG.

5. EEG-study: Investigate how ASD patients process multimodal communicative

signs embedded in communicative settings, in particular whether they benefit

from the use of co-speech gestures used by the speaker in the same way as

high-SA and NT controls.

Study description

Background summary

Autism spectrum disorder (ASD) is a neurodevelopmental disorder, characterized by deficits in social interaction and communication. Deficits in communication are most evident in social situations where literal meaning and the speaker*s intention strongly diverge, such as in the case of irony and sarcasm (Tesink et al, 2009; Zalla et al, 2014). Understanding communication deficits in ASD may ultimately result in new targets for interventions aimed at improving social communication in ASD patients. Surprisingly, however, communication deficits in ASD have rarely been studied during live interactions. Furthermore, when investigating communication deficits in ASD, it is important to take social anxiety into account, which is prevalent in ASD, influences social abilities and could be a particularly strong confound when investigating live social interactions (as in this study).

Recent evidence suggest that humans understand each other because they continuously develop and coordinate a shared conceptual space that provides context to select and interpret their communicative behaviours. Here, we aim to investigate whether ASD patients have difficulties in using the conceptual space defined by an ongoing interaction to resolve the pervasive ambiguity of human communicative signals.

Study objective

We aim to provide a neurocognitive account of communicative disabilities in patients with autism spectrum disorder (ASD), focussing on shared representations of a communicative context. We expect that ASD patients show impaired shared representations of a communicative context compared to NT and high socially anxious (SA) controls.

Study design

In this crossesctional study, 52 patients with autism spectrum disorder (ASD), 52 high-SA controls and 52 healthy participants will participate in two fMRI sessions. As we are interested in social interactions, we will invite 2 participants to simulataneously participate in the study and play a

communication game during fMRI scanning (dual-fMRI). Differences in communicative succes and alignment between pairs of ASD patients, pairs of SAD patients and pairs of healthy participants will be investigated.

It has been shown that social experience shapes people*s social abilities (Stolk, Hunnius, Bekkering, & Toni, 2013). The high-SA group will provide a control for potentially reduced social experience in autism as a consequence of avoiding social interactions throughout life.

After completion of the cross-sectional fMRI study, participants will be reinvited at the DCCN to participate in thea follow-up EEG-study at the DCCN (optional). EEG measures the brain potentials generated by the brain and is not harmful for the participants. The EEG study will also consist of two sessions, each taking one hour, in which participants perform similar communicative tasks as in the fMRI study. We will again offer the possibility to our participants to schedule the second EEG-session on a separate day.

Study burden and risks

All participants will be invited to the lab for two fMRI scanning sessions, during which they will perform two well-established communication tasks. fMRI scanning is not harmful for the participants. All procedures described in this protocol are well established, carry negligible risk, and constitute a minimal burden for the participants. Additionally, we offer the possibility to our participants to schedule the second fMRI scanning session on a different day. To further minimize participants* burden, we will administer a battery of questionnaires online, allowing participants to fill out these questionnaire at home at a convenient time. No pharmacological or otherwise invasive interventions are applied. The EEG-procedures are also safe, well establised, carry negligible risk and consistute minimal burden for the participants.

Contacts

Public
Radboud Universiteit Nijmegen

Kapittelweg 29
Nijmegen 5625 EN
NL
Scientific
Radboud Universiteit Nijmegen

Kapittelweg 29
Nijmegen 5625 EN

NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)

Inclusion criteria

- Between 18 and 40 years of age
- Normal or corrected-to-normal vision
- Normal uncorrected hearing
- Eligibility for MRI (i.e. no metals in or around the body, metal fragments, pacemakers, claustrophobia)
- Body mass index between 18.5 and 30
- Willingness and ability to give written informed consent and willingness and ability to understand the nature and content, to participate and to comply with the study requirements.
- Education level MBO-4 or higher
- Capable to read and comprehend the Dutch language

ASD patients:
- Current ASD diagnosis

Exclusion criteria

- Current alcohol or drug abuse
- Use of psychotropic medication or systemic glucocorticoids
- History of neurological disorders (e.g., traumatic brain injury, seizure history)
- Any severe or chronic systemic disease
- Severe cognitive impairment or a history of organic mental disorder
- Use of recreational drugs over a period of 72 hours prior to MRI scanning, and use of alcohol within the last 24 hours before MRI scanning
- History of neurological treatment or current neurological treatment

- History of head surgery
- Claustrophobia
- Epilepsy
- Pregnancy
- Dyslexia

All patients:
- Current psychotic, bipolar, substance-related, severe personality disorder, or mental retardation
- Current severe depressive disorder
- Prominent current suicidal risk or homicidal ideation

ASD patients:
- Current SAD diagnosis

High-socially anxious (SA) individuals:
- Current ASD diagnosis

Neurotypical participants:
- (lifetime history of) ASD or SAD diagnosis
- Current DSM-5 axis 1 disorder

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:	Completed
Start date (anticipated):	02-10-2020
Enrollment:	156
Type:	Actual

Ethics review

Approved WMO Date:	24-03-2020
Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	03-02-2021
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	24-08-2021
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	04-01-2023
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	NL72420.091.19