

Social Learning in Adolescents

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Original study: The proposed project will examine the effect of social learning in typical developing adolescents, by including brain structure, function and behavioural modelling in a typical developing age group. The main goal of this study is to...

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

Summary

ID

NL-OMON47647

Source

ToetsingOnline

Brief title

Social-Learning

Condition

- Other condition
- Developmental disorders NEC

Synonym

Attention-Deficit/Hyperactivity Disorder (ADHD)

Health condition

Geen aandoening

Research involving

Human

Sponsors and support

Primary sponsor: Universiteit Leiden

Source(s) of monetary or material Support: NWO

Intervention

Keyword: ADHD, Adolescence, Neuroscience, Puberty, Social-Learning

Outcome measures

Primary outcome

Original study:

Age- and puberty related change in brain structure and function related to the construct of social-learning.

MRI scans:

Structural MRI will be used to gain information on gray and white matter properties (volume, density, and cortical thickness).

DTI will be used to gain specific information on white matter microstructure and fibertracking.

Functional MRI will be used to gain information on task-related brain activity during social learning, particularly during social observation (study 1) and during social interactions (study 2)

Pubertal assessment:

Participants will fill in a self-report form of pubertal maturation.

Participants will also provide saliva to test for testosterone, DHEA, and estradiol levels.

Current addendum:

Age- and puberty related change in brain structure and function related to the

construct of social-learning.

MRI scans:

Structural MRI will be used to gain information on gray and white matter properties (volume, density, and cortical thickness).

DTI will be used to gain specific information on white matter microstructure and fibertracking.

Functional MRI will be used to gain information on task-related brain activity during social learning during social observation (similar to study 1)

Pubertal assessment:

Participants will fill in a self-report form of pubertal maturation.

Participants will also provide saliva to test for testosterone, DHEA, and estradiol levels.

Secondary outcome

see above

Study description

Background summary

Original study:

Humans evolved in a highly social environment, in which social learning, defined as learning to predict actions of others and interacting successfully with them, was critical for survival. Given that our social world is highly complex (e.g. consisting of numerous complex agents) and dynamic (e.g. constantly changing relations), substantial neural resources have been evolved to deal with social interactions. Several developmental phases are characterized by different sets of social-cognitive skills and environmental

demands. Adolescence, which starts with the onset of puberty, is one particularly challenging period in which social behaviour transitions to full integration with larger groups of peers. A fundamental task in adolescence is to achieve adult levels of social competence. This requires a great deal of learning about complex social interactions. That is, adolescence is a period of encountering many novel social situations (e.g. school, sport-teams, home) in which adolescents aim to integrate social signals from peers and become a significant member in the peer group. However, we know yet little of the changes and underlying mechanisms of adolescent learning in social contexts.

A new neurodevelopmental model suggested that particularly puberty increases adolescents* flexible learning and quick adaptation to novel social contexts. Adolescence is a period of ongoing changes in function and structure of subcortical-limbic, and cortical-control brain regions that may give rise to changes in risk-taking, learning and social sensitivity. Puberty is the main biological basis of the transition from childhood to adolescence and is marked by a sharp rise in gonadal hormones, such as testosterone and estradiol, which are thought to influence the developing brain. Particularly puberty is thought to drive changes in social interactions, possibly by a moderating role on underlying brain development.

Here I propose to advance our understanding of the age-related changes in social learning in relation to brain development by studying: (1) learning by observation (2) learning by social interactions.

Current addendum:

Attention deficit hyperactivity disorder (ADHD) is one of the most common developmental disorders with a prevalence between 5-10% and is characterized by high levels of attention and / or hyperactivity and impulsivity, and impaired academic and social functioning. Learning, and social learning in particular, is essential to be able to function at an age-appropriate level in academic and social domains. However, research in ADHD has shown both problems in learning, especially in the stimulus-response link and the prediction of reward, and in the field of social cognition, for example in the field of mentalizing (putting yourself in someone else's shoes). To date, not much is known about social learning in adolescents with ADHD and its underlying mechanisms. Understanding the neural markers that underlie these deficits in ADHD can provide new information for parents, clinicians and policy makers. This makes it important to conduct research on social learning among young people with ADHD.

Puberty marks the transition from child to adolescent and is a period in which sex hormones such as testosterone and estradiol increase significantly and may influence brain development. This can ultimately lead to changes in social learning. Nothing is known yet about the levels of these sex hormones in youth with ADHD, and the role of these hormones in social learning.

The aim of this study is to test a neurocognitive model of social learning in

adolescents with ADHD, by investigating brain structure, brain function, modeling behavior and puberty. We focus on the questions of Study 1 from the original protocol and examine both social learning through observation as well as learning about outcomes for self and others.

Study objective

Original study:

The proposed project will examine the effect of social learning in typical developing adolescents, by including brain structure, function and behavioural modelling in a typical developing age group.

The main goal of this study is to have a theoretically based understanding of how social learning develops from childhood to adulthood.

The first primary objective is to test a neuroscientific model across adolescence of social observational learning by distinguishing action-based imitation, and outcome-based learning when observing others.

The second primary objective is to test pubertal-related change a neuroscientific model of learning from social interactions by distinguishing social preferences and social norms in social learning.

Besides, we are also interested in:

-Social modelling: Testing how social observational learning is modulated by the observed agent.

-Learning from own (non-social) outcomes: This paradigm is focused on observational learning, but also allows to study the influence and developmental trajectory of experiential learning on the basis of positive and negative feedback.

-Individual differences: testing for background variables such as social preferences and social norms based on background environmental variables such as home environment and parenting relation in a typical developing sample.

Current addendum:

The aim of this study is to gain scientific knowledge about social learning in adolescents with ADHD. In addition, we relate these outcomes to individual differences in psychosocial outcomes (for example, risk behavior) and background variables, such as relationships with parents and peers. To be able to make a good comparison, we include adolescents with and without ADHD in the addendum study, who will be matched on demographic characteristics such as age and level of education.

Study design

Original study:

This study uses a longitudinal (Study 1) and cross-sectional (Study 2) design, combining neural activity responses with behavioural assessments. Participants

will perform a computerized task related to observational learning (Study 1), and learning about the level of cooperation when interacting with others (Study 2). We will measure brain activation using functional Magnetic Resonance Imaging (fMRI). We will use structural MRI and Diffusion Tensor Imaging (DTI) to measure underlying brain anatomical processes. In addition, we will measure cognitive functioning (e.g. learning, working memory) and individual differences (attachment, friendships) on a set of tasks and questionnaires outside of the scanner. We will collect hormone measures from saliva samples, because of our interest in the role of pubertal hormones in social interactions. All measurements are non-invasive.

To this end, we will acquire fMRI and sMRI data and behavioral responses of participants ages 8-20 years in three separate sessions, approximately 1 year apart in the time period 2016-2020 (n=160). Additionally, we will acquire fMRI and sMRI data and behavioral responses of participants aged 8-18 in a cross-sectional study in the same time period (n=160).

Current addendum:

The addendum study builds on the two studies in this protocol and will focus on the questions of Study 1, namely how do adolescents with ADHD learn from and about others, which we test with a cross-sectional design. Subjects in the addendum study play an observational-learning task (similar to study 1) and a task in which they learn about outcomes for the self and others. We measure brain activation with functional MRI. We also use structural MRI and Diffusion Tensor Imaging to investigate structural changes in the brain over age. Additionally, we measure cognitive functioning (learning, working memory) and individual differences (friendships, parent relationship) on a set of tasks and questionnaires outside the scanner. In addition, we also collect saliva samples for hormone determinations. It is expected that puberty plays an important role in the changes in social learning during adolescence. All measurements are non-invasive.

Participants in the addendum study are between the ages of 14 and 20 years. Data collection will be completed within the time allowed for the original protocol (2020).

Study burden and risks

There are no known risks associated with participating in the proposed measurements. MRI is a non-invasive technique

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)
Children (2-11 years)
Elderly (65 years and older)

Inclusion criteria

Original study:

- Dutch speaking
- Right-handed

-In the right age-range;Current addendum:

ADHD group:

- Left and right-handed
- Gender: male
- Fluent in Dutch
- Age 14-20
- ADHD diagnosis

- Normal intelligence;Matched typically developing group:

- Left and right handed
- Gender: male

- Fluent in Dutch
- Age 14-20
- No history of psychiatric disorders
- Normal intelligence

Exclusion criteria

Original study:

- Current use of neurotrophic medication
- Presence of chronic illness
- MRI contradictions (which include metal implants, heart arrhythmia, claustrophobia)
- Participants will additionally be prescreened for head trauma, learning disabilities, and history of neurological illness and/or use of psychotropic medications.;

Addendum:

- Gender: female

Study design

Design

Study type: Observational non invasive

Masking: Open (masking not used)

Control: Uncontrolled

Primary purpose: Other

Recruitment

NL

Recruitment status: Recruiting

Start date (anticipated): 14-04-2016

Enrollment: 420

Type: Actual

Ethics review

Approved WMO

Date: 01-04-2016

Application type: First submission

Review commission: METC Leiden-Den Haag-Delft (Leiden)
metc-ldd@lumc.nl

Approved WMO
Date: 31-05-2019
Application type: Amendment
Review commission: METC Leiden-Den Haag-Delft (Leiden)
metc-ldd@lumc.nl

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	NL56438.058.16