Growing Up Together in Society (GUTS) - Rotterdam Cohort

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The current study describes the Rotterdam Cohort (i.e., a sub-project) of the larger Growing Up Together in Society Project, which has the aim to examine combined social contextual, biological, and behavioral mechanisms that drive the transitions...

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

Summary

ID

NL-OMON56557

Source
ToetsingOnline

Brief title
GUTS Rotterdam

Condition

- Other condition

Synonym
general brain and behavioral development

Health condition

algemene hersenontwikkeling en gedragsontwikkeling

Research involving
Human

Sponsors and support

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

Intervention

Keyword: Adolescence, Development, Neuroscience, Self-regulation

Outcome measures

Primary outcome

In line with the primary objectives of the study, the primary study parameters include self-regulation (e.g., delay discounting, goal setting), reward processing, trust, inhibition, their neural correlates, and how they are related to age/development. Using ESM, we will also measure how self-regulation fluctuates over time.

• Self-regulation, reward processing, inhibition, and trust will be operationalized both on a behavioral level (i.e., responses on the fMRI tasks and EEG tasks described under 8.3) and on a neural level.
o For self-regulation, we will calculate the area under the curve (AUC) for the different task conditions using a 3 (target: self, friend, stranger) by 2 (choice: now vs. later) design. We will then use a repeated measures ANOVA to examine differences in the AUC depending on the task conditions. Regarding the brain, the whole brain contrast [self-regulation vs. control] will be assessed, and we will perform an ANOVA with a 3 (target: self, friend, stranger) by 2 (choice: now vs. later) design. This allows us to measure neural activity in brain regions related to self-regulation for self and others.

o Reward processing will be operationalized as neural activity during a vicarious reward task (i.e., whole brain contrast for win > lose to measure which brain regions are more active when you experience reward as in winning, indicating higher reward reactivity in those brain regions). In this task, we will examine the contrast win > lose for self and others, and we will also compare activity between targets (e.g., [win > lose for self] versus [win > lose for other] using an ANOVA.

o Trust will be operationalized as the percentage of trust choices in a dichotomous trust game (i.e., a trust game in which participants can either trust another person or not) towards different targets (e.g., friends and strangers). Regarding neural activity, we will examine contrasts in which we compare trust > no trust and the different targets (e.g., friend > stranger), as well as a repeated measures ANOVA using both the trust vs. no trust conditions and the target condition. This allows us to measure neural activation related to trusting different individuals.

o Inhibition will be measured using a Social Eriksen Flanker Task, and will be operationalized as the reaction time in milliseconds for correct trials. We will compare reaction times for the social and non-social condition of the task, and examine neural activity expressed in ERPs using EEG, for which we will also compare the social and non-social task conditions.

• Using Experience Sampling (ESM), we will examine fluctuations in daily self-regulation (i.e., the extent to which individuals indicate making self-regulated choices) via multiple short questions a day on their smartphones. Given that we will also assess how much time adolescents spend

with others (e.g., parents, friends), ESM will allow us to not only examine fluctuations in self-regulation over time, but also how this is influenced by time spent with specific others, such as parents).

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Secondary outcome

This study includes a wide range of secondary outcomes, which include structural MRI; self-regulation, goal motivation, reward sensitivity, background measures, parenting measures, social media measures, and outcome measures as assessed by questionnaires (see Table 2 in the protocol); hormone data collected with saliva and hair; genetic data collected via saliva (see below); ERPs measured by EEG related to non-social inhibition and reward processing; and a behavioral effort task. The background measures include questions asking for sensitive data, such as age, income, and ethnicity. We ask for this sensitive information because one of the goals of the current study is to obtain a sample that covers a broad range of different backgrounds, both in terms of for example income and ethnicity. The lack of information that scientists have on participants* background, and that certain marginalized groups are underrepresented in scientific studies is problematic for the

generalizability of findings about brain-behavior mechanisms, as well as for the validity, reliability, and reproducibility of results. By asking for sensitive data like income and ethnicity, we can aim to make the current study representative and we can transparently communicate about the generalizability of the findings in scientific publications.

Study description

Background summary

How do young people successfully grow up in an increasingly complex society, and what are the main causes for differences in contributing to society? Society becomes more resilient when its members contribute to common goals (Masten, 2018; Masten & Motti-Stefanidi, 2020). With the Growing Up Together in Society (GUTS) research program we study the vital question: How do neurobiological and social-cognitive development interact with social (relations with family and peers) and societal (families* social-economic status) opportunities? How can we understand and predict the extent to which young people develop into socially contributing citizens?

We hypothesize that successfully developing self-regulation will be a key factor that explains (i.e., mediates) or compensates and exaggerates (i.e., moderates) the relation between inequalities in social and societal opportunities, neurobiological development, and contributions to society (Hofmann et al., 2012). People with better self-regulation, defined as effective goal setting, goal motivation, and goal capacity, are better at balancing immediate and delayed gratification, and balancing their own and others* needs (Carver & Scheier, 2012; Hofmann et al., 2012). Understanding the role of self-regulation, its developmental trajectory, and individuals* adaptation to environmental challenges may therefore also provide solutions to decrease the effect of social inequalities on young individuals* potential.

Adolescence is a vital period in the development of self-regulation and societal contributions, given that this is the transition phase from childhood - characterized by strong dependency on parents and caregivers - to adulthood, in which one is expected to function as a mature, independent individual (e.g., politically, financially, and socially), and commit to social norms of society (Crone & Dahl, 2012; Crone & Fuligni, 2020; Steinberg & Morris, 2000). Adolescence is defined as the period between ages 10-24 years, starting with the biological onset of puberty (Crone & Dahl, 2012). The end of adolescence is

often described as the time when individuals adopt mature social and societal norms (Crone & Dahl, 2012). Researchers have described a prolonged period of adolescent development, also referred to as emerging adulthood, during which individuals, when provided with opportunities, show further advancement in education and social development, with longer dependency on parents (Arnett, 2000; Willoughby et al., 2014). Despite important insights in the general developmental patterns in the last two decades, there is an urgent need to clarify the impact of diverse societal contexts on development. New insights from the field of social neuroscience hold the promise of providing fundamentally new insights in the role of diversity in societal contextual domains on adolescents* transition into adulthood, either in interaction with or through the effects of self-regulation.

Study objective

The current study describes the Rotterdam Cohort (i.e., a sub-project) of the larger Growing Up Together in Society Project, which has the aim to examine combined social contextual, biological, and behavioral mechanisms that drive the transitions across adolescence into emerging adulthood, and the impact of these transitions on how young people function in the societal contexts: educational settings, social relationships, and societal norms.

The primary objectives of the current Rotterdam cohort are to examine 1) delay discounting for self and others and the associated neural correlates (using fMRI) and possible effects of age and social economic status, 2) reward processing, and the associated neural correlates (using fMRI) and possible effects of age and social economic status, 3) trust towards others, and the associated neural correlates (using fMRI) and possible effects of age and social economic status, 4) how adolescents* self-regulation fluctuates over time (using experience sampling or ESM), and 5) the neural correlates (expressed in ERPs measured with EEG) of inhibition in social conditions.

Study design

This cohort-sequential longitudinal study aims to include 800 adolescents and young adults across ages 10-20 years, with a broad range of Socio-Economic Status. In addition, we include a pilot sample of 30 young adults. The pilot measurement will take place in 2023. The first measurement wave of the longitudinal project is scheduled to take place in 2024, after which participants will be followed up in 2027 (when they are 13 - 23 years old) and 2030 (when they are 16 - 26 years old). This GUTS-Rotterdam study will include neuroimaging, behavioral experiments, questionnaires, and hormone data to study developmental changes across adolescence and young adulthood. Neural activation will be measured using functional Magnetic Resonance Imaging (fMRI) and electroencephalograms (EEG) while participants are performing tasks. Resting-state fMRI will be used to assess functional connectivity. We will use

structural MRI to measure underlying brain anatomical processes. In addition, we will measure social and cognitive functioning on a battery of questionnaires and experimental tasks outside of the scanner. Hormone data are collected through hair and saliva. All measurements are non-invasive.

Study burden and risks

There are no known risks associated with participating in the proposed measurements, apart from fatigue or other feelings of burden related to the number of measurements in the current study. MRI and EEG are non-invasive techniques involving no catheterizations or introduction of exogenous tracers. Numerous children and adults have undergone magnetic resonance and EEG studies without apparent harmful consequences. Some people become claustrophobic while inside the MRI magnet and in these cases the study will be terminated immediately at the subject's request. The only absolute contraindications to MRI studies are the presence of intracranial or intraocular metal, or a pacemaker. Relative contraindications include pregnancy and claustrophobia. Subjects who may be pregnant, who may have metallic foreign bodies in the eyes or head, or who have cardiac pacemakers will be excluded because of potential contraindications of MRI in such subjects. Contraindications for EEG include seizure disorders, individuals with recent stroke, cerebrovascular or respiratory diseases, and sickle cell anaemia. Although there is no direct benefit to the participants from this proposed research, there are greater benefits to society from the potential knowledge gained from this study. This knowledge will aid in our understanding of how self-regulation interacts with environmental and individual differences in typical development and how this might contribute to beneficial or detrimental outcomes later in life.

Contacts

Public
Erasmus Universiteit Rotterdam

Burgemeester Oudlaan 50
Rotterdam 3062
NL
Scientific
Erasmus Universiteit Rotterdam

Burgemeester Oudlaan 50
Rotterdam 3062
NL

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)

Inclusion criteria

In order to be included in the study participants will need to have a good understanding of Dutch, have normal or-corrected to normal vision

Exclusion criteria

Participants should report no use of psychotropic medication during the first wave
Participants should not have contraindications for MRI or EEG (e.g., metal implants, heart arrhythmia, claustrophobia)
Participants should not be pregnant
Participants should be able and willing to provide informed consent (and for participants under age 16, their legel representatives should also be able and willing to do so)

Study design

Design

Study type: Observational invasive

Masking:	Open (masking not used)
Control:	Uncontrolled

Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruiting
Start date (anticipated):	22-04-2024
Enrollment:	830
Type:	Actual

Medical products/devices used

Generic name:	ActiveTwo
Registration:	No

Ethics review

Approved WMO Date:	12-02-2024
Application type:	First submission
Review commission:	METC Erasmus MC, Universitair Medisch Centrum Rotterdam (Rotterdam)
Approved WMO Date:	20-12-2024
Application type:	Amendment
Review commission:	METC Erasmus MC, Universitair Medisch Centrum Rotterdam (Rotterdam)

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	NL84269.078.24