Consortium on Individual Development

CID project updates 2018/2019

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Preface

This booklet contains an updated overview of all Consortium on Individual Development (CID) research projects as of 31 August 2019.

Of the 70 projects, 40 are ongoing and 30 are finished. We asked CID researchers on ongoing projects for their 2018/2019 highlight and 2019/2020 plans.

Taken together, this provides insight into our vibrant research community and a sense of what is coming up for CID in 2019/2020.

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WP1 The role of brain development

Work package 1, rooted in the Utrecht YOUth cohort, focuses on longitudinal changes in brain structure and the way these changes relate to genetic and environmental factors, and how this brain development in turn mediates behavioural development.

Overview ongoing WP1 projects

14 ongoing projects		
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Yentl de Kloe
PhD candidate, UU
WP1, Kemner

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Attention as a building block of social competence

1 October 2018 – 1 October 2022

Brief description

My first project was studying whether eye-tracking measures from YOUth relate to social competence and behavioural control as measured with questionnaires. I am writing my findings up now, so hopefully it will be published soon.

Highlight 2018/2019

In the past year I presented a poster (described above) on my first conference. I also started measuring toddlers (R3) within YOUth last month, which is challenging but very nice.

Plans 2019/2020

This year I'll be working on finding out whether it is possible to automatically code behaviours in the PCI R0 videos.

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Marissa Hofstee
PhD candidate, UU
WP1, Deković

Longitudinal effects of parenting and brain development on the early development of self-regulation:
A combined micro and macro approach
1 March 2019 – 1 March 2023

Brief description

The concept self-regulation and related constructs are widely studied, but many of the previous studies focus either on environment or brain development independently. However, brain development is also formed by environmental experiences. Therefore, in this project, we will examine a longitudinal mediation model of self-regulation with a multi-method approach including both behavioural and neuroimaging measures.

Highlight 2018/2019

The start of my PhD project in March at the department of Clinical Child and Family Studies and the start of a mediation article and a meta-analysis.

Plans 2019/2020

Continue my data collection within the YOUth cohort and writing the mediation article and the meta-analysis.

Ties Fakkel
PhD candidate, UU
WP1, Vollebergh

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Socioeconomic status and adolescent psychosocial development

1 October 2018 – 1 October 2022

Brief description

Within CID we have a treasure of information about psychosocial development from childhood to early adulthood. My aim is to better understand how socioeconomic status impacts this development, and how in turn psychosocial competencies impact the development of socioeconomic status.

Highlight 2018/2019

I have been exploring the available data within our CID-cohorts, and have renewed my appreciation for the extent with which adolescent data has been collected for decades – and still is being collected so meticulously. Similarly, in my first year I have had the pleasure of being introduced to many experts from different research areas within CID, which has greatly broadened my perspectives.

Plans 2019/2020

I plan to publish an article in our CID special issue, work with longitudinal RADAR-data for my next project, and hopefully find an opportunity to share my findings in an interesting setting.

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Heiko Schmengler
PhD candidate, UU
WP1, Vollebergh

Socio-Economic Health Disparities (SEHD) in adolescence: social causation and social selection

1 October 2018 – 1 October 2022

Brief description

This project investigates the complex processes that influence the development of socioeconomic health disparities during adolescence and young adulthood. Special attention will be paid to the role of both social causation and selection mechanisms in influencing young people's health (behaviours) and educational trajectories. It will mainly be based on the TRAILS dataset.

Highlight 2018/2019

Started PhD.

Plans 2019/2020

Working on a collaborative paper that is going to be part of the CID special issue.

Gijs Holleman
PhD candidate, UU
WP1, Kemner

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Gaze behaviour during parent-child interaction

May 2017– May 2021

Brief description

The goal of my project is to better understand how gaze behaviour supports social interaction between parents and children, and how gaze in interaction is related to social competence and behavioural control. I use a state-of-the-art dual eye-tracking setup and I am currently collecting data within the YOUth *Child & Adolescent* cohort.

Highlight 2018/2019

1: I started the data collection for my project at Youth Child & Adolescent.

2: I presented a poster of my work at two conferences last summer.

3: I co-authored an article which was published in the journal Cognition.

4: I learned new statistical and visualization techniques and developed my programming skills.

Plans 2019/2020

I plan to start the first analyses of the parent-child eye-tracking data. I'm also going to be collecting a lot more data the coming months. I'm looking forward to see how the project is going to develop.

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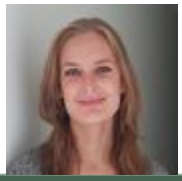
Elizabeth Buimer
PhD candidate, UMCU
WP1, Hulshoff Pol



Life events and MRI brain measures

June 2018 – May 2022

Brief description

The aim of my PhD project is to investigate the relation between (resilience to) negative life experiences and structural and functional brain development in children. I will use YOUth data of children around the age of 9 years old including questionnaires assessing life events and MRI scans.

Highlight 2018/2019

Started my PhD and contributed to data collection within YOUth.
Worked on a methodology paper on the test-retest reliability of the YOUth MRI protocol for CID's special issue in DCN.
Presented my face masking project at the Human Brain Mapping conference in Rome 2019. In this project I assessed the effect of masking privacy-sensitive facial features on structural MRI scans.

Plans 2019/2020

I will first submit the reliability paper for the special issue and submit the face masking paper. Next, I will start working on my first study with YOUth data on childhood life events and structural brain measures.

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Bram Gooskens
PhD candidate, UMCU
WP1, Durston

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How do environmental factors impact the development of cognitive control and its neural circuitry?

June 2018– June 2021

Brief description

Within the YOUth 'Kind & Tiener' cohort, my aim is to determine whether, and which, environmental factors affect cognitive control abilities. We will first perform an exploratory factor analysis, to find interpretable and informative factors underlying environmental influences on cognitive control. Secondly, we will investigate if different environmental factors will have distinct effects on brain activation underlying cognitive control.

Highlight 2018/2019

At YOUth, we are steadily including more and more children. To date we have data from approx. 1200 children (!), which will allow us to perform the most comprehensive factor analysis.

Plans 2019/2020

In the coming months I will analyse the questionnaire data. I will then continue with my second project, in which we will use the outcome of the behavioural study (the factor analysis) to study the interaction between environmental factors and the neural correlates of behavioural control as measured during fMRI. Finally, I will prepare my first CID manuscript, which will hopefully be submitted early spring 2020.

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Anika van der Klis
PhD candidate, UU
WP1, Kager

Emotion recognition and linguistic development

May 2019 – May 2023

Brief description

This project investigates the influence of different parental styles on infants' emotion recognition and linguistic development. Parental styles will be analysed regarding coordinated use of voice, face, gaze, and gestures – containing overlapping cues for emotion and referentiality. This project also examines how differential responses to facial and vocal affect predict language development.

Highlight 2018/2019

After completing my Master's degree in linguistics, I started my PhD project in the summer of 2019. I primarily worked on reading and synthesizing the literature. I have also received training in conducting Eye-Tracking and EEG tasks with infants and recently started testing 5- and 10-month-old infants in the YOUth Cohort Study.

Plans 2019/2020

I will start working on the first study to be included in my dissertation using data collected in the YOUth cohort. The first study aims to explore the effects of parents' differential use of multimodal cues on infants' emotion recognition development.

Stefanos Mastrotheodoros
PhD candidate, UU
WP1/3, Branje

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The development of parenting and parent-adolescent relationships during adolescence

December 2015 - December 2019

Brief description

How do parenting and parent-adolescent relationships develop during adolescence? In my PhD project I use longitudinal and multi-informant data to investigate the trajectories of parenting, and parent-adolescent relationships during adolescence.

Highlight 2018/2019

During the 2018-2019 year I published one paper in the Journal of Youth and Adolescence. Furthermore, I visited the University of Wisconsin-Madison, for 3 months, where I worked with Prof. Dr. Lauren Papp. Finally, along with CID researcher Susanne Schulz, I organised a 1-day symposium on "Family Dynamics and Psychopathology of Parents and Children: Implications for Prevention and Intervention", with a keynote by Prof. Dr. Zimmer-Gembeck, and invited researchers from the Netherlands.

Plans 2019/2020

I plan to finish my PhD in the next few months, and I am already applying for jobs in academia.

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Zsofia Belteki
PhD candidate, UU
WP1, Kemner

How language and social development interact and affect social interaction across development: Comparing typical and atypical trajectories

April 2019 – March 2023

Brief description

My research explores the relationship between attention to faces and early language development in infants by working with the Youth-Cohort and EU-AIMS datasets. The aim of the project is to extend our understanding of when and why typical and atypical developmental trajectories diverge in language and social abilities.

Highlight 2018/2019

Starting my PhD and moving to Utrecht. Currently I am working on a review linking the existing literature between early word learning and attention to faces.

Plans 2019/2020

I am hoping to finalise my review and to start working with the EU-AIMS dataset. I will be comparing the CDI and MSEL language measures collected on typically developing infants and infants who have a higher chance of developing autism.

Niilo Valtakari
PhD candidate, UU
WP1, Kemner

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Fine-grained face-scanning patterns during parent-child interaction – a dual eye tracking approach

July 2019– July 2023

Brief description

I will be using dual eye-tracking to investigate the role of gaze behaviour to faces of infants interacting with their parent or a stranger. The focus of the project is to understand the idiosyncrasy of face-scanning patterns and how they are affected by factors such as individual traits and the familiarity of the interacting partner.

Highlight 2018/2019

My highlight of 2019 was starting as a PhD candidate and working on building the dual eye tracking setup that we are going to use for the project. The process involved learning a lot of coding and technical stuff, and I am now very much looking forward to designing and running experiments using the setup.

Plans 2019/2020

The current plan is to run some pilot experiments using the setup with both infants and adults. Meanwhile, I am also working on a review article to explore the different types of eye tracking interaction setups and what type of research can be done with them.

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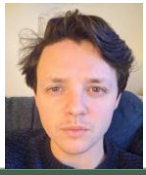
Bauke van der Velde
PhD candidate, UU
WP1, Kemner



The development of infant brain networks

1 December 2015 – 31 October 2020

Brief description

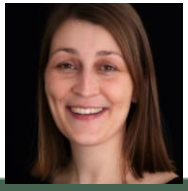
The aim of this project is to better understand how networks in the infant brain develop during the first year of life. We will focus on the optimization of brain network communication and whether individual differences in the development of communication optimization explain or will be explained by behavioural development.

Highlight 2018/2019

My personal highlight was the first time I started working with the large YOUth dataset (N=1900). Cleaning the data and understanding how well the data is gathered. The first paper using the large EEG-dataset, on the relationship between the optimization of brain networks and the development of complex behaviours, is almost finished.

Plans 2019/2020

1) Finishing the abovementioned paper
2) Writing a paper on the guidelines for large-scale EEG-research in infants
3) Writing a paper on the development of the social brain network



Ine Beyens
Postdoc, UvA
WP1, Valkenburg

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The relationship between media use and ADHD-symptoms: A differential susceptibility perspective

November 2015 – November 2019

Brief description

The aim of the project is to investigate (1) how and why certain types of screen media entertainment may influence children's ADHD-related behaviours (attention problems, hyperactivity, impulsivity) and (2) which children are particularly susceptible to the effects of media entertainment on ADHD-related behaviours.

Highlight 2018/2019

Our review of the association between screen media use and ADHD was published in *PNAS*. Our study of transactional relationships between children's violent media use and ADHD-related behaviours was published in *Communication Research*. Our recent work on parental media monitoring was published in *Human Communication Research* and *Journal of Broadcasting & Electronic Media*.

Plans 2019/2020

Together with Patti Valkenburg, Irene van Driel, and Ellen Hamaker, I will develop an Experience Sampling study to investigate the interplay between parental monitoring and self-monitoring of screen media use and its effects on behavioural control among adolescents.

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Dienke Bos
Assistant Professor, UMCU
WP1, Durston

Connected and in control II: Development of functional connectivity underlying behavioural control

October 2018 – March 2022

Brief description

Recent work has suggested that the ability to perform behavioural control relies on more than the maturation of frontostriatal and frontoparietal executive networks alone: dynamic cross-network interactions between the central executive network, and the salience- and Default Mode network, are thought to underlie individual differences in cognitive functioning. In this project, we investigate functional interactions during task and rest between these large-scale functional networks and how they relate to individual differences in the maturation of behavioural control.

Highlight 2018/2019

One of my main highlights was the opportunity to become Assistant Professor in CID. Furthermore, receiving the first data from the Rondom 9 cohort for the PhD-project was the highlight of the summer. We cannot wait to start analysing!

Plans 2019/2020

In the coming month I plan to submit a data request for my own project as described above. I plan to analyse the data and prepare a manuscript over the course of 2020. Further, I will finish analyses on resting-state and DTI data that were part of my CID post-doc project. And finally, I will continue to supervise Bram Gooskens, and supervise two new CID-interns starting in January, and I hope to free up some time for (CID-related) outreach activities!

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WP2 Effects of interventions

Work package 2 aims to dissect the reason why not all children are equally responsive to variations in the social environment. It is based on the Leiden – CID Intervention Cohort, where large-scale experimental-longitudinal interventions of parent and peer behaviour allow for testing of which child characteristics shape the effect of (manipulated) environmental factors.

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Overview ongoing WP2 projects

8 ongoing projects (see WP4 for 2 additional collaborative projects)		
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Neural mechanisms involved in the VIPP-SD	Laura Kolijn	22
Variations in the social environment and the neurocognitive development of social competence	Simone Dobbelaar	23
The relation between variations in social environment and structural brain development	Lina van Drunen	24
Long-term effects of a Video-feedback Intervention to Promote Positive Parenting on children's behavioural control and social competence	Jana Runze	25
Nature, nurture and neural mechanisms of social emotion regulation in childhood	Michelle Achterberg	26
Prosocial development in childhood and emerging adolescence	Mara van der Meulen	27
Multimodel brain imaging approach to test the relation between brain development, behavioural control and social competence	Lara Wierenga	28
Intervention effects of video feedback on social competence and behavioural control in early childhood and early adolescence: The role of children's daily experiences	Saskia Euser	29

Laura Kolijn
PhD candidate, VU
WP2, Bakermans-Kranenburg

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Neural mechanisms involved in the VIPP-SD

April 2016 – April 2020

Brief description

The Leiden Consortium on Individual Development (L-CID) aims to understand the influences of a parenting intervention on child development. I focus on maternal (neural) processes that may be involved in the effects of the Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline (VIPP-SD) on parenting behaviour.

Highlight 2018/2019

In 2018 and 2019 I gave a talk about my data on VIPP-SD effects on neural processes at the WAIMH in Rome and at SRCD in Baltimore. The paper on this topic was recently published in Social Neuroscience. In August I presented a poster on maternal emotion processing at Flux in New York and I visited Yale University in New Haven where I gave a talk on VIPP-SD effects on neural face processing.

Plans 2019/2020

Currently, I am finishing a paper to submit in the special issue of developmental cognitive neuroscience. In 2020, I hope to visit a lab abroad for which I am currently writing grand applications.

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Simone Dobbelaar
PhD candidate, LU
WP2, Crone

Variations in the social environment and the neurocognitive development of social competence

January 2019 – December 2022

Brief description

In my PhD project, I want to study the relationship between variations in the social environment (induced by a parenting intervention) and the neurocognitive development of social competence in middle childhood and early adolescence. To investigate this, I will use and help collecting the longitudinal data in the L-CID twin study.

Highlight 2018/2019

In January 2019, I started my PhD project in WP2 under supervision of prof. dr. Eveline Crone and dr. Anna van Duijvenvoorde. Besides finishing my PhD proposal, I helped in the (MRI) data collection of the 5th yearly visit of the L-CID twin study. Until the 31st of August, we tested 310 children of 7-9 years old, and we are currently in the finishing phase of this data collection.

Plans 2019/2020

In the upcoming months, I am going to finish the current ongoing data collection of the 7-9 years old cohort. After that, I will continue with the data collection of the 5th visit of the other cohort (11-13 years old, $N \approx 400$). Furthermore, I am going to work on my first paper.

Lina van Drunen
PhD candidate, LU
WP2, Crone

Consortium on Individual Development

The relation between variations in social environment and structural brain development

August 2019– May 2023

Brief description

This PhD project aims to unravel the relation between variations in social environment and structural brain development in children aged 7-13 years old and to what extent genetic and environmental interactions are involved. Furthermore, I will examine how the interaction between social environment and brain development predicts behavioural control and social competence.

Highlight 2018/2019

The final research master internship was a perfect preparation for my PhD project. I examined self-concept in relation to social competence in the fMRI scanner. Specifically, how genetic and environmental factors influence the behaviour and brain areas involved in self-concept. The combination of working with twins (N=360) and analyzing fMRI/MRI data was a perfect match with my research interests.

Plans 2019/2020

For the upcoming year, I will collect MRI data (N=400) of children aged between 11-13 years old for the final wave of this longitudinal L-CID study. I am looking forward to delve into the challenging analysis of structural brain development!

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Jana Runze
PhD candidate, VU
WP2, Bakermans-Kranenburg

Long-term effects of a video-feedback intervention to promote positive parenting on children's behavioural control and social competence
1 August 2019– 30 April 2023

Brief description

I work as a PhD candidate at the VU on the Samen Uniek Twin study. I investigate long-term effects of parenting support and the role of differential susceptibility. Within this context, I am especially interested in focusing on the combination of behavioural and biological aspects, above all the role of cortisol in children.

Highlight 2018/2019

I started my PhD in August 2019, and was already able to dive into the current data collection wave as well as organizing the next wave. Further, I was able to start writing my first paper about sleep and cortisol.

Plans 2019/2020

In 2020, I will focus on coordinating the data collection and collecting data. Further, I aim to finish and publish my first paper about sleep and cortisol.

Michelle Achterberg
PhD candidate, LU
WP2, Crone

Consortium on Individual Development

Nature, nurture and neural mechanisms of social emotion regulation in childhood

September 2015 – December 2019

Brief description

My PhD project is part of the Leiden Consortium on Individual development and is focussed on the development of emotion and behaviour regulation in a social context. Specifically, I study aggression regulation following social feedback using a longitudinal twin fMRI design in children aged 7-13 years old.

Highlight 2018/2019

This summer I have finished my dissertation, which I hope to defend in the beginning of 2020. Moreover I published my first independent paper (together with Mara van der Meulen). I also became a member of the flux trainee committee and the CID young retreat committee.

Plans 2019/2020

In the upcoming months I will finish the final bits of my PhD project and will start my Postdoc project within the Leiden Consortium on Individual Development.

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Consortium on Individual Development

Mara van der Meulen
PhD candidate, LU
WP2, Crone

Prosocial development in childhood and emerging adolescence

January 2015 – December 2019

Brief description

The goal of this project is to study the neural correlates of prosocial behaviour from middle childhood into emerging adolescence. Using a combination of functional and structural neuroimaging, in addition to behavioural genetic analyses, I aim to investigate the interplay of personal and environmental factors that influence prosocial development.

Highlight 2018/2019

In 2018/2019 I have expanded my knowledge and experience on structural neuroimaging, which resulted in new collaborations and a set of methodological papers. In 2019 I also finished my PhD dissertation, which I will be defending on December 10th.

Plans 2019/2020

In 2019/2020 I will be coordinating a new wave of data collection in the L-CID middle childhood cohort. In addition, I hope to work on pre-registration of my (longitudinal) research plans, to increase my participation in open science practices.

Lara Wierenga
Postdoc, LU
W2P, Crone

Consortium on Individual Development

Multimodel brain imaging approach to test the relation between brain development, behavioural control and social competence
January 2019 – April 2023

Brief description

The Leiden – Consortium on individual development studies why not all children are equally responsive to variations in the environment. To do so we annually follow **990 twins** aged between 3 and 13 years for 6 years. As a post doc on this project I am involved in planning and supervising the data collection. Furthermore, I am developing an open science frame work. My research interests are to gain a better understanding of sensitive periods in brain development in relation to sex differences and male biased disorders.

Highlight 2018/2019

This year we have finished data collection of waves 4 and 5 (out of 6), and have managed to keep **90%** of our participants on board! We are now starting up the last few waves of data collection. We have also implemented scrum meetings, which turns out to be very effective and a fun way of working together.

Plans 2019/2020

I am proud to let you know that Mara van der Meulen has planned her thesis defence on Dec 10th. Furthermore, Lina van Drunen started her PhD, we developed a novel task **BaM²** (Brain and Music in twins) that measures musical ability in order to map sensitive periods in brain development. I am beyond excited to supervise them!

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Saskia Euser
Postdoc, LU
WP2, Crone

Intervention effects of video feedback on social competence and behavioural control in early childhood and early adolescence: The role of children's daily experiences

November 2013 – January 2023

Brief description

The Leiden Consortium on Individual Development (L-CID) is an intervention study in which we aim investigate the underlying mechanisms of differential susceptibility within and between families. In this project, I will focus on the role of children's daily life experiences in the intervention effects on children's behavioural outcomes.

Highlight 2018/2019

Setting up and coordinating the last wave of data collection of the early childhood cohort of WP 2.

In addition, I have worked on several papers about intervention effects and about genetic and environmental influences on parenting and children's sleep quality.

Plans 2019/2020

I will coordinate and finalize the data collection of the early childhood cohort in August 2020 and I will code parent child interaction video's with two groups of students. In addition, I plan to work with our e-diary, sleep and intervention data, using longitudinal analyses.

WP3 The role of generational transmission in families

Work package 3 focuses on the continuity of thriving (or failure to thrive) across three generations, and uses information available in large existing Dutch cohorts. The aim is to determine which factors are involved in transmission of behaviour between grandparents, parents, and children.

Overview ongoing WP3 projects

10 ongoing projects		
Title	Project of	Page
Social withdrawal and social relationships in adolescence and early adulthood	Stefania Barzeva	32
The impact of the home environment on academic skills and educational achievement	Sofieke Kevenaar	33
The genetic and environmental influences on academic skills and behavioural control	Zenab Tamimy	34
Intergenerational transmission of psychopathology and relationships	Susanne Schulz	35
On the development and intergenerational transmission of social competence across adolescence and young adulthood	Andrik Becht	36
Postdoc on the ERC funded Consequences of Adolescent Peer Experiences (CAPE) project of Tina Kretschmer	Charlotte Vrijen	37
Social influences on mental health, control, and social competence from adolescence to young adulthood and parenthood	Jennifer Klop - Richards	38
Developmental models of psychopathology and turning points in mental health trajectories	Anoek Sluiter-Oerlemans	39
Parental characteristics and its effect on behavioural control in childhood	Eveline de Zeeuw	40
Intergenerational transmission of parenting processes	Sanne Geeraerts	41

Stefania Barzeva
PhD candidate, UMCG
WP3, Oldehinkel

Consortium on Individual Development

Social withdrawal and social relationships in adolescence and early adulthood

September 2017 – September 2021

Brief description

My PhD research focuses on social withdrawal and social relationships in adolescence and early adulthood. I'm particularly interested in investigating this topic longitudinally, bi-directionally, and at the within-person level.

Highlight 2018/2019

A summer of research activities in Greece!

I attended the EADP-EARA-SRA Summer School in Kalamata, where I learned so much from talented early and senior researchers from around the world. Then to Athens for the 19th European Conference on Developmental Psychology, where I received the EADP/ERU Best Poster Award with an alternative, minimalistic poster design!

Plans 2019/2020

Currently, I am working on a study that investigates adolescents' friendship network characteristics as longitudinal, parallel processes, and if/how these characteristics influence social withdrawal during the transition to life after secondary school.

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Sofieke Kevenaar
PhD candidate, VU (NTR)
WP3, Boomsma

The impact of the home environment on academic skills and educational achievement

September 2018 – September 2022

Brief description

In my PhD project, the aim is to study the intergenerational transmission of academic skills, educational achievement and factors that play a role in school success, like self-control and grit. I aim to disentangle the contribution of genetic and cultural transmission to study individual differences in children regarding the skills above.

Highlight 2018/2019

I started my PhD at the Netherlands Twin Register (NTR) at the VU in September 2018. Since then, I am working on a project about individual differences in self-control and grit across socioeconomic backgrounds, which I presented at the Behavioural Genetics Association conference, and on a project with several CID cohorts about differences in self-control rated by different informants.

Plans 2019/2020

In the upcoming academic year, I plan to finish the two projects I'm currently working on and to start a new, more methodological, project. Furthermore, I will continue data collection for the NTR.

Zenab Tamimy
PhD candidate, VU
WP3, Boomsma

Consortium on Individual Development

The genetic and environmental influences on academic skills and behavioural control

May 2019 – April 2023

Brief description

My PhD project focusses on the genetic and environmental influences on educational achievement and behavioural control. I plan to investigate the intergenerational transmission of educational achievement and behavioural control from parent to offspring (project 1 and 2) and to unravel the direction of causation between behavioural control and educational achievement using cross-sectional and longitudinal designs (project 3 and 4).

Highlight 2018/2019

In May 2019 I started my CID PhD-project at the Vrije Universiteit. Within my first project I will use two research designs to triangulate evidence about intergenerational transmission of education. I will use 1) the Children of Twins model, and 2) a molecular-genetics method using transmitted and untransmitted alleles, to disentangle the genetic and environmental transmission of educational achievement from parents to offspring.

Plans 2019/2020

In the upcoming academic year I aim to finish my first project and follow courses on genetics. In addition I will be involved in the continuing data collection within the NTR.

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Consortium on Individual Development

Susanne Schulz
PhD candidate, UU
WP3, Meeus/Branje

Intergenerational transmission of psychopathology and relationships

November 2017 – November 2021

Brief description

Using a longitudinal approach, this project (1) investigates the reciprocal associations between parental and adolescent psychopathology and relationships across adolescence, and (2) examines the mechanisms underlying these associations, such as the mediating role of emotional states or parenting and the moderating role of polygenic risk scores.

Highlight 2018/2019

I finished and submitted the first two studies of my PhD project, which I both presented at international conferences. Furthermore, I organized a symposium on family dynamics and psychopathology and gave a lecture on coping strategies for children and their families as part of the Universiteitsmuseum Utrecht's initiative *Smart Movies*.

Plans 2019/2020

Currently, I am investigating whether interaction quality might explain the associations between parental and adolescent psychopathology. Besides attending international conferences, I will also present my research at Dutch secondary schools as part of the Rector's League.

Andrik Becht
Postdoc, UU/LU
WP3, Branje

Consortium on Individual Development

On the development and intergenerational transmission of social competence across adolescence and young adulthood
October 2018 – September 2021

Brief description

This project focuses on the quality of and commitment to relationships across various contexts (i.e., family, peers, intimate partners) to capture a multi-informant perspective on the development of social competence.

Highlight 2018/2019

- On April 12, I've successfully defended my PhD thesis entitled: Becoming Certain of the Self: Longitudinal Studies Into the Dynamics of (Daily) Identity Development
- Fortunately, I was able to continue as a postdoc that is partially financed by CID (PI Susan Branje) and a VICI grant from Eveline Crone, Leiden University

Plans 2019/2020

- Finishing a review paper on understanding heterogeneous longitudinal patterns of brain development
- Finishing an empirical paper on longitudinal social brain development and peer relationships
- Learning preprocessing and longitudinal modelling of fMRI data. This will result in a paper aimed at understanding the neural correlates of self-concept development

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Consortium on Individual Development

Charlotte Vrijen
Postdoc, RUG
WP3, PI: Kretschmer

Postdoc on the CAPE project
1 August 2018 – 1 February 2023

Brief description

In the ERC-CAPE project (PI: Tina Kretschmer) we investigate the **C**onsequences of **A**dolescent **P**eer **E**xperiences across social contexts and generations. This project is closely affiliated with TRAILS NEXT (PI: Catharina Hartman). My main focus within the project is on genetic mechanisms in the intergenerational transmission of social development.

Highlight 2018/2019

(1) I successfully defended my dissertation entitled **'Happy Bias and Other Rewards**: Different perspectives on a bias away from positive and toward negative information as an underlying mechanism of depression'. (2) I co-organized the Noorderlichten activity 'Like parent, like child?', during which children and their parents had the opportunity to investigate how similar they were in looks, character and emotions (https://osf.io/6f59z/).

Plans 2019/2020

In the coming year I will work with genetic data from multiple generations and submit a systematic review and meta-analysis on the outcomes of bullying perpetration.

Jennifer Klop - Richards
Postdoc, UMCG
WP3, Oldehinkel

Consortium on Individual Development

Social influences on mental health, control, and social competence from adolescence to young adulthood and parenthood
October 2018 – May 2021

Brief description

This project is a continuation of the tranch-1 project "Examining the complex interplay between relationship experiences and individual factors to understand adolescent development". The focus lies on elucidating how social experiences shape development, and, in particular, how influences of such experiences reach into the next generation.

Highlight 2018/2019

My highlights include starting the micro-coding of the parent-child interactions in TRAILS Next, finalizing a very interesting piece of work on the social withdrawal - social anxiety feedback loop together with Stefania Barzeva (accepted in Development and Psychopathology), and organizing a successful public outreach event about intergenerational transmission at the Groningen Noorderzon festival.

Plans 2019/2020

Besides studying the effects of social experiences from a resilience perspective, I will start supervising PhD student Yugyun Kim on her project of self-regulation development. I also look forward to setting up new collaborations with other CID researchers.

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Consortium on Individual Development

Anoek Sluiter-Oerlemans
Postdoc, UMCG
WP3, Omel

Developmental models of psychopathology and life outcomes

November 2018 – February 2021

Brief description

In addition to work related to the enrichment of TRAILS study with measurements of a third generation (TRAILS Next), I have worked on research concerning: (1) the negative impact of adolescent psychopathology on young adult functioning, and (2) the identification of turning point experiences that demarcate persistent changes in mental health in adolescence.

Highlight 2018/2019

I have published a study examining the dynamical effects between prosocial skills and autism symptoms on a within-person level in European Child & Adolescent Psychiatry. I have also set up a new line of research focussing on how new parents experience the transition to parenthood and how their personal characteristics influence their parenting (specifically mind-mindedness) and subsequently their child's (social) development.

Plans 2019/2020

I will visit Prof. Meins (expert on mind-mindedness) in October and two researchers in Brazil next Spring to set up new studies on parental mind-mindedness and its impact on child social development.

Eveline de Zeeuw
UD, VU
WP3, Boomsma

Consortium on Individual Development

Parental characteristics and its effect on behavioural control in childhood

May 2018 – 2021

Brief description

The project will focus on the association between parental characteristics, more specifically psychopathology and educational attainment, and behavioural control in their offspring during childhood using genetically sensitive designs, i.e. children-of-twin, Mendelian randomization and (non-)transmitted polygenic scores.

Highlight 2018/2019

We uploaded to bioRxiv and submitted to Behaviour Genetics a study in which we show that there was 'genetic nurturing' of parental educational level on adult educational attainment, but not on educational achievement and ADHD symptoms in childhood.

I became part of the editorial board for the special issue in developmental cognitive neuroscience.

Plans 2019/2020

The next step is to predict in the NTR and TRAILS cohorts, between and within families, individual differences in behavioural control from children's genetic predisposition for educational attainment and psychopathology.

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Consortium on Individual Development

Sanne Geeraerts
Postdoc, UU
WP3, Branje

Intergenerational transmission of parenting processes

September 2019– February 2022

Brief description

For my postdoc project, I examine intergenerational transmission of parenting practices using the RADAR study. RADAR is a longitudinal multimethod multi-informant study that includes three generations.

Highlight 2018/2019

Finished my WP1 PhD project '*Development of infant self-regulation within the early caregiver relationship: A cascade model*' (October 2014- September 2019).

Published an article about visual attention and self-regulation (first author), and about the structure of psychopathology (second author).

Gave a family lecture about coping strategies.

Plans 2019/2020

In the next year, I will focus on how and when parenting practices are transmitted from one generation to another.

I will also defend my dissertation on 13 March 2020. I am looking forward to publishing the other articles in my dissertation, of which two are currently in revision.

WP4 Animal and mathematical models of development

Work package 4 complements the studies in work packages 1-3 with advanced mathematical modelling and animal research. Both behavioural rodent and avian models of social and adaptive behaviour are used, with the additional possibility of detailed analyses focusing on development of involved brain structures. Mathematical models allow better description of longitudinal effects and ensure better data quality.

Consortium on Individual Development

Overview ongoing WP4 projects
(including 2 WP2 collaborations)

8 ongoing projects (including 2 WP2 collaborations)		
Title	Project of	Page
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Concerning Causes: Evaluation of methods to study causes and their effects in developmental processes	Jeroen Mulder	45
Twitter evolution: Comparative linguistics of birdsong and child language acquisition	Carien Mol	46
Critical factors of early life influences on impulsivity and social competence	Katerina Kalamari	47
WP2 collaboration: Testing the differential susceptibility theory in mice	Jelle Knop	48
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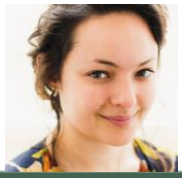
A neurogenetic analysis of birdsong learning as a model for infant development	Gabriël Beckers	50
WP2 collaboration: Influence of early life environment on later life social behaviour in animal models	Rixt van der Veen	51



Valeria Bonapersona
PhD candidate, UMCU
WP4, Joëls & Hoijtink

Consortium on Individual Development

Impact of early-life adversity in rodents on networks: pathways, neurotransmitters, cognitive domains

September 2017 – August 2021

Brief description

The aim of my PhD is to provide a global overview on the effects that early life adversity has on the brain. After >40 years of research in animals from molecules to behaviour, which findings are consistent and which aren't? I thrive to provide a new life to old animals' data, to better inform our "human" knowledge.

Highlight 2018/2019

- For the first time, I developed and investigated an idea that was truly "mine" and I had a fantastic team to support me in this adventure.
- We funded *RELACS,* a consortium of 9 rodent laboratories, who donated their old "drawer" data for it to be re-analysed.
- I supervised a truly incredible student – it has been such a honour to be involved of her education
- I published 2 papers, presented my work at 3 conferences, and won 3 prizes (travel grant, best oral presentation, competition for drug innovation). I am thankful for the possibility to share my work so frequently

Plans 2019/2020

Reading >1000 papers for a big meta-analyses we are conducting; learning more about network analysis; developing new creative ideas to compare variance in animals and humans

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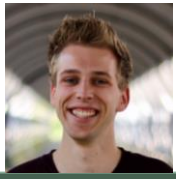
Jeroen Mulder
PhD candidate, UU
WP4, Hamaker



Concerning Causes: Evaluation of methods to study causes and their effects in developmental processes

May 2019 – May 2023

Brief description

This project is concerned with the development and evaluation of statistical models to study developmental processes. How and when can different designs and models, like mediation and instrumental variable models, be used to allow for causal inferences? This issue merits serious consideration since there is a fundamental interest in causality in all work packages of the CID.

Highlight 2018/2019

It has only been 5 months since I started working on this project. The first thing I did was getting an overview of the research and researchers within the CID. I have been talking to many CID PhD candidates at Utrecht University and I've been inspired by their expertise, their drive, and concerns when it comes to doing research. I hope my research can be applied by them in the future.

Plans 2019/2020

I hope to finish 3 subprojects: (1) a paper that sheds a multilevel light on an old issue relating to causality in mediation models, (2) a website about extensions to the random-intercept CLPM, and (3) a CID special paper about causality as a co-author.

Carien Mol
PhD candidate, UU
WP4, Bolhuis/Kager

Consortium on Individual Development

Twitter Evolution: Comparative linguistics of birdsong and child language acquisition

October 2015 – January 2020

Brief description

Previous research has shown parallels between human speech and birdsong. The aim of this project is to investigate the role of specific acoustic features in birdsong memory and recognition and compare this to human speech acquisition. A secondary aim is to develop methods to improve behavioural analysis of birds during experiments.

Highlight 2018/2019

My focus last year was to analyze behavioural data (collected from song playback experiments with zebra finches) using Python programming. Therefore, I improved working with specific Python libraries: such as *pandas* to easily handle large data structures, and Matplotlib for producing publication quality figures and graphs. In addition, I learned to use Git as an efficient version control system.

Plans 2019/2020

Currently, I'm improving my knowledge of statistics and linear models as final step in the data analysis using Python (probably using statsmodels). Then, we can finish and submit the research article, in which we investigate the role of syllable order for song recognition in zebra finches.

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Katerina Kalamari
PhD candidate, UMCU
WP4, Joëls

Environment and development of pro-social behaviour

October 2018 – October 2020

Brief description

My project focuses on the way varying environmental conditions during adolescence affect the pro-social behaviour during adulthood. To study this question I am working with animal models. Animal models allow a more controlled environment that will hopefully help us gain a better understanding of the mechanisms that affect the development of pro-social behaviour.

Highlight 2018/2019

A poster of my work presented at the Dutch Neuroscience meeting along with the opportunity to be part of the organization team for the first CIDyoung meeting.

Plans 2019/2020

The analysis of the data and preparation of the papers regarding my experiments. Additionally, starting a new project on how we can better understand pro-social behaviour by looking into new tasks.

Jelle Knop
PhD, UMCU
WP2/4, Joëls

Consortium on Individual Development

Testing Differential Susceptibility in an animal model

April 2016 – April 2020

Brief description

While some children are genetically more vulnerable to the negative effects of early-life adversity, they may also benefit more from enriched and stimulating rearing environments. However, evidence for this differential susceptibility hypothesis is mostly derived from human experiments. Animal models offer unique control over the genes and environment and are used in this project to study this susceptibility for better **and** for worse.

Highlight 2018/2019

- Started to learn programming (finally)
- Published paper in *Hormones & Behaviour*
- Submitted paper to *Psychoneuroendocrinology* with supporting evidence for differential susceptibility
- Won poster prize at the Dutch Neuroscience Meeting 2019
- Made a Twitter account

Plans 2019/2020

We're planning to study whether results from our mouse experiments with regard to the developmental effects of unpredictability in parental care can be translated to a human cohort and we plan to study the model we use for enrichment in more detail.

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Consortium on Individual Development

Mariëlle Zondervan
Postdoc, UU
WP4, Hoijtink

Longitudinal multi-cohort research synthesis

April 2019 – May 2021

Brief description

The aim of this project is to combine longitudinal CID cohort data on behavioural control and social competence. We will transform and impute the data, and apply Bayesian updating of informative hypotheses. A simulation study will be conducted to find the optimal longitudinal model for the data and research question at hand.

Highlight 2018/2019

One of my highlights was the attention by the national and international press for the multi-cohort CID research synthesis article on parental age in relation to offspring behavioural problems. I even had a radio interview with the Austrian ORF1. Besides that, I finished my PhD in March and started my post-doc with CID in April.

Plans 2019/2020

In the upcoming months, I will submit a contribution to the special issue in Developmental Cognitive Neuroscience with longitudinal adolescent data from NTR, TRAILS and RADAR.

Gabriël Beckers
Assistant Professor, UU
WP4, Bolhuis

Consortium on Individual Development

Mechanisms of vocal sequence learning in a songbird

Augustus 2018 – April 2023

Brief description

Language development shows strong individual differences, with disorders at one end of the range, affecting social competence. One factor that is linked to specific language impairment (SLI) is 'statistical learning', which enables infants to learn how the sounds of their language are structured into larger units such as words. I study this process mechanistically in the song bird model system.

Highlight 2018/2019

Implemented a computational model for word segmentation, in collaboration with colleagues in the Linguistics Department, and ran it on animal response data. Setting up for word segmentation neural experiments in zebra finches, in collaboration with René Kager. Published data paper on artificial grammar learning with colleagues from Cornell. Worked on machine vision for later behavioural study.

Plans 2019/2020

Neural recordings during Saffran-like word segmentation (i.e. /padiba/kudori/lotafe/) learning in zebra finches (ask if you do not know what this means), together with CID colleague Chiel Vellema.

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Consortium on Individual Development

Rixt van der Veen
Assistant Professor, UL
WP2/4, CID PI

Influence of early life environment on later life social behaviour in animal models

October 2013 – July 2020

Brief description

In this project we bridge WP2 (human) and WP4 (animal models) by studying early life influences on the development of the social brain in rodents. In rats, we model a complex environment during adolescence and study later life (pro) social behaviour. In mice, heterozygous for either MR or DRD4 receptor, we test differential susceptibility to a challenging or enriched postnatal environment.

Highlight 2018/2019

Jiska Kentrop skilfully defended her thesis, in which she gathered our work on maternal deprivation and complex housing and their effects on behavioural inhibition and (pro) social behaviour. We published a beautiful paper in Hormones and Behaviour (Knop et al.), in which we describe the effects of different early life conditions on puberty onset and maternal care in heterozygous MRKO mice.

Plans 2019/2020

We will be measuring early life influences on predictability of maternal behaviour in both mice and man. Moreover, we are very happy that we found Katerina Kalamari to continue the pro-social tasks in rats and dive into ultrasound communication.

WP1 The role of brain development

Work package 1, rooted in the Utrecht YOUth cohort, focuses on longitudinal changes in brain structure and the way these changes relate to genetic and environmental factors, and how this brain development in turn mediates behavioural development.

Consortium on Individual Development

Overview finished WP1 projects

9 finished projects		
Title	Project lead	Page
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Developmental trajectory of the human connectome in health and disease	Fraukje Coopmans Guusje Collin Nikita Setiamen	60
Behavioural control and reward sensitivity as predictors of adolescents' substance use	Margot Peeters	62
Connected and in control: What puts the development of neural networks underlying behavioural control at risk?	Dienke Bos	64
The power of stories: exploring the effects of (self) narrative on the development of social competence and behavioural control	Hannah de Mulder	66
Understanding children's and adolescent's differential use of and susceptibility to media entertainment	Karin Fikkers	68
Development of infant self-regulation within the early caregiver relationship: A cascade model	Sanne Geeraerts	70

Marieke Albers
PhD candidate, UMCU
WP1, Kahn

Consortium on Individual Development

3D-ultrasonograpy of fetal brain development

January 2015 – January 2019

Project summary

Aim: (1) to assess the reliability of the measurement of the volume of several foetal brain structures in 3D ultrasound images and (2) to assess the influence of prenatal environmental factors (such as maternal smoking) on foetal brain development.

Methods: For this project we used ultrasound and questionnaire data from the first 2 YOUth-study visits (around 20 weeks and around 30 weeks of pregnancy). The volume of several brain structures was measured in the ultrasound images with the VOCAL (Virtual Organ Computer-aided AnaLysis) technique.

Main findings: First, Marieke tested the reproducibility of a tool to measure the volume of foetal brain structures in 3D-ultrasound images. Once it was clear that the tool reliably measured intracranial, cerebellar and frontal lobe volume, she examined the impact of maternal caffeine consumption on the volume and growth of these foetal brain structures. She also published growth curves for the prenatal growth of frontal lobe volume.

Project output on the next page

Consortium on Individual Development

Marieke Albers
PhD candidate, UMCU
WP1, Kahn

3D-ultrasonograpy of fetal brain development

January 2015 – January 2019

Publications

Albers, M. (2019) Do maternal habits echo into Youth? Using 3D-ultrasound to show the intermediating role of the fetal brain. Persistent identifier URN:NBN:NL:UI:10-1874-380428
Marieke's PhD defence on 16 June 2019.

Albers M.E.W.A., Buisman E.T.I.A., Kahn R.S., Franx A., Onland-Moret N.C. & de Heus R. (2018) Intra-and interobserver agreement for fetal cerebral measurements in 3D-ultrasonography. Human Brain Mapping. 39(8):3277-3284. doi: 10.1002/hbm.24076.

Other output

Marieke's work on the YOUth cohort and first publication were featured on the YOUth website:
YOUth tijdens de zwangerschap, 22 December 2016
Eerste YOUth-publicatie is een feit, 3 July 2018

Jalmar Teeuw
PhD candidate, UMCU
WP1, Hulshoff Pol

Consortium on Individual Development

Imaging genetics of brain development in healthy adolescent twins

July 2015 – July 2019

Project summary

Aim: To disentangle the (epi)genetic and environmental influences on brain development in healthy adolescent twins and their siblings.

Methods: We used MRI scans, cognitive test batteries and genetic material from monozygotic and dizygotic twins and their older sibling at the ages of 9, 12, and 17 years old, acquired as part of the longitudinal BrainSCALE study.

Main findings Three main findings: 1. We established that thinning of the cerebral cortex is influenced by additive genetics, with indications of distinct gene pools influences cortical thickness at different ages throughout childhood and adolescence. 2. We identified "stable" components of functional connectivity throughout adolescence for connections within and between canonical cortical resting-state networks that are influenced by genetic and common environment. 3. We have found no indication that accelerated aging of the brain in schizophrenia patients is associated with accelerated aging predicted by DNA methylation in blood.

Project output on the next page

Jalmar Teeuw
PhD candidate, UMCU
WP1, Hulshoff Pol

Imaging genetics of brain development in healthy adolescent twins

July 2015 – July 2019

Publications

Currently finishing up his dissertation. Published two CID articles (see https://individualdevelopment.nl/research/publications/):

1. Teeuw J., et al (2019) Genetic and environmental influences on functional connectivity within and between canonical cortical resting-state networks throughout adolescent development in boys and girls. Neuroimage. doi: 10.1016/j.neuroimage.2019.116073

2. Teeuw J., Brouwer R.M., Koenis M., Swagerman S., Boomsma D.I., Hulshoff Pol H.E. (2018) Genetic influences on the development of cerebral cortical thickness during adolescence in a Dutch longitudinal twin sample: the BrainScale study. Cerebral Cortex, 2018 Jan 25. doi: 10.1093/cercor/bhy005

Other output

Project findings were presented at several international conferences, including OHBM 2017 and OHBM 2019.

Jalmar also spent three months at Prof. Roel Ophoff's lab at UCLA to contribute to the ENIGMA-Plasticity project.

Roy Hessels
PhD, UU
WP1, Kemner

Consortium on Individual Development

The effects of social stimulation/interaction on perceptual and social development

1 January 2014- 1 January 2017

Project summary

Aim: This project investigated the effects of social interaction (a critical aspect of social competence) on perceptual and social development.

Methods: First, by investigating face-scanning behaviour of individuals diagnosed with autism, we can model face scanning during abnormal development. If abnormal looking behaviour evokes reactive abnormal looking behaviour in controls, this can shed light on the role of social interaction in abnormal development. Second, the development of infant face scanning will be investigated in an interactive eyetracking setup.

Main findings He explored two possible early markers of Autism Spectrum Disorder (ASD) using eye-tracking technology: visual search superiority and gaze behaviour during face perception.

Project output on the next page

Consortium on Individual Development

Roy Hessels
PhD, UU
WP1, Kemner

The effects of social stimulation/interaction on perceptual and social development

1 January 2014- 1 January 2017

Publications

Dissertation: Hessels, R.S. (2017) Toward early markers for Autism Spectrum Disorder using eye tracking. Persistent identifier URN:NBN:NL:UI:10-1874-350883

Roy was awarded his PhD with distinction on 7 July 2017.

Articles: Besides the eight articles in his dissertation, Roy published two other papers as part of his CID PhD project:

Niehorster, D. C., Cornelissen, T. H. W., Holmqvist, K., Hooge, I. T. C., & Hessels, R. S. (2017). What to expect from your remote eye tracker hen participants are unrestrained. Behavior Research Methods. 396

Cousijn, J., Hessels, R. S., Van der Stigchel, S., & Kemner, C. (2017). Evaluation of the psychometric properties of the gap-overlap task in 10-month-old infants. Infancy.

Other output

Roy's dissertation attracted the attention of Dutch newspaper Algemeen Dagblad and tv-programme EditieNL

Fraukje Coopmans
Guusje Collin
Nikita Setiamen
UMCU, WP1, Kahn

Consortium on Individual Development

Developmental trajectory of the human connectome in health and disease

Project summary

Aim: The aim of this project is twofold:

(1) map the developmental changes to the brain's wiring architecture during adolescence

(2) examine whether, and if so how, deviating connectome development forms a vulnerability for the development of psychiatric symptoms later in life.

Methods: Compare the brain connectome in offspring of bipolar disorder (BDo) and schizophrenia SZo) patients to offspring of community (Co) control subjects.

Sample: 28 SZo, 60 BDo and 39 Co, average age 13 yo.

Main findings:

1. Lower structural connectivity among brain hubs in SZ-offspring

➢ Connectome signature of familial risk for schizophrenia

2. Rich club deficits impact functional connectome organization

3. No rich club deficits in BD-offspring

➢ Differential effect of familial predisposition for SZ vs BD on developmental formation of the connectome

Project output on the next page

Fraukje Coopmans
Guusje Collin
Nikita Setiamen
UMCU, WP1, Kahn

Developmental trajectory of the human connectome in health and disease

Publications

Collin G, Kahn RS, de Reus MA, Cahn W, van den Heuvel MP. (2014) Impaired rich club connectivity in unaffected siblings of schizophrenia patients. Schizophrenia Bulletin, 40(2):438-48. doi:10.1093/schbul/sbt162

Collin G, Scholtens LH, Kahn RS, Hillegers MHJ, van den Heuvel MP (2016). Schizophrenia in the Era of Brain Complexity. Journal Nervous Mental Disease, 204(8):561-3. doi: 10.1097/NMD.0000000000000545.

Collin G, Scholtens LH, Kahn RS, Hillegers MHJ, van den Heuvel MP. (2017) Affected Anatomical Rich Club and Structural-Functional Coupling in Young Offspring of Schizophrenia and Bipolar Disorder Patients. Biol Psychiatry, 15;82(10):746-755. doi:10.1016/j.biopsych.2017.06.013.

Other output

Several conference presentations by Guusje Collin, including co-organizer and presenter at 2017 American Academy for Child and Adolescent Psychiatry (AACAP) and 2017 International Conference on Schizophrenia Research.

Margot Peeters
Postdoc, UU
WP1, Vollebergh

Consortium on Individual Development

Behavioural control and reward sensitivity as predictors of adolescents' substance use

January 2015 – April 2017

Project summary

Aim: Neurocognitive studies indicate different motivational and cognitive processes underlie risk-taking among adolescents, in particular a heightened sensitivity for reward and impaired behavioural control. This project focused on the way these two processes interact with each other in impacting developmental trajectories of risk behaviour in adolescence.

Methods: Both a variable-centered and person-centered approach were used on data from the TRAILS cohort (total sample N = 2223; and data from a high risk focus cohort used in this study N = 715).

Main findings: Self-reported behavioural control at age 11 predicts initiation of alcohol use at age 16. Both effortful control and cognitive control at age 11 predict the initiation of cannabis use at age 16. For smoking no such effects were found. In addition, interaction analyses suggest that lower levels of control in early adolescence combined with higher sensitivity for reward in mid adolescence predict alcohol and cannabis use.

Project output on the next page

Consortium on Individual Development

Margot Peeters
Postdoc, UU
WP1, Vollebergh

Behavioural control and reward sensitivity as predictors of adolescents' substance use

January 2015 – April 2017

Publications

Peeters, M., Oldehinkel, A.J., & Vollebergh, W.A.M. (2017). behavioural control and reward sensitivity in adolescents' risk taking behaviour: A longitudinal TRAILS study. Front Psychol, 8, 231. Doi: 10.3389/fpsyg.2017.00231

Peeters, M., Zondervan-Zwijnenburg, M., Vink, G., & Van de Schoot, R. (2015). How to handle missing data: A comparison of different approaches. European Journal of Developmental Psychology, 12 (4), 377-394.

Zondervan-Zwijnenburg, M.A.J., Peeters, M., Depaoli, S., & Van de Schoot, R. (2017). Where do priors come from? Applying guidelines to construct informative priors in small sample research. Research in Human Development, 14:4, 305:320, doi: 10.1080/15427609.2017.1370966

Zondervan-Zwijnenburg, M.A.J., Depaoli, S., Peeters, M., & Van de Schoot, R. (2019). Pushing the Limits: The performance of ML and Bayesian estimation with small and unbalanced samples in a latent growth model. Methodology, 15, 31:43, doi: 10.1027/1614-2241/a000162

Other output

Several conference presentations, including at the Research Society on Alcoholism (RSA), 2016, New Orleans and Lisbon Addictions 2015, Lisbon, Portugal.

Dienke Bos
Postdoc, UMCU
WP1, Durston

Consortium on Individual Development

Connected and in control: What puts the development of neural networks underlying behavioural control at risk?

March 2015 – September 2018

Project summary

Aim: The aim of this project is to investigate the neurobiological processes underlying (a)typical development of behavioural control networks in a large cohort of children.

Methods: Participants will be profiled on a broad, multimodal array of characteristics, including several MRI-based measures, neurocognition and psychophysiology. This project will consist of two phases. In the first phase, a pilot study using existing data will be conducted as a proof of concept before phase 2, where we will conduct a multimodal study of the development of behavioural control.

Main findings: Using a novel paradigm, I showed that healthy adults had a slight attentional bias towards images that reflected their interests, together with activation in salience neural circuitry, implicating salience as an important factor in behavioural control[1]. In children with autism, I used an adapted version of the task on an iPad to show that reduced behavioural control to personalized affective cues was related to increased behavioural rigidity[2]. Finally, extant literature shows that in typical development adolescence is characterized by heightened sensitivity to motivating (e.g. social or emotional) cues. In a large sample of typically developing children, adolescents and adults, I showed that young adulthood (around 18-23 years of age) is characterized by protracted sensitivity to negative emotional stimuli[3]. In addition, my most recent work suggests that adolescents with autism do not show an increase in sensitivity to social and non-social cues, suggesting marked differences in the adolescent period in autism versus typical development[4]. The pilot projects investigating structural and functional connectivity in typical and atypical development are currently being analyzed and prepared for publication (2 publications).

Project output on the next page

Consortium on Individual Development

Dienke Bos
Postdoc, UMCU
WP1, Durston

Connected and in control: What puts the development of neural networks underlying behavioural control at risk?

March 2015 – September 2018

Publications

1. **D.J. Bos**, E.L. Ajodan, M.R. Silverman, J.P. Dyke, S. Durston, J.D. Power, R.M. Jones, Neural Correlates of preferred activities: development of in interest-specific go-nogo task. *Social Cognitive and Affective Neuroscience,* 2017, 12 (12), 1890-1901
2. **D.J. Bos**, M.R. Silverman, E.L. Ajodan, C. Martin, B.M. Silver, G. Brouwer, A. Di Martino, R.M. Jones, Rigidity coincides with reduced cognitive control to affective cues in children with autism, *Journal of Abnormal Psychology*, 2019, 128 (5), 431
3. **D.J. Bos** & M. Dreyfuss, N. Tottenham, T.A. Hare, A. Galvan, B.J. Casey, R.M. Jones, Vulnerabilities in emotional processing extend into young adulthood. *PsyArXiv*, 2019 (revised version submitted)
4. **D.J. Bos**, B.M. Silver, E. Barnes, E.L. Ajodan, M.R. Silverman, E. Clark-Whitney, T. Tarpey, R.M. Jones. Adolescent-specific motivation deficits in autism versus typical development. *PsyArXiv*, 2019 (revised version submitted)

Other output

2019 Poster presentation at Flux Congress 2019, New York, USA - **D.J. Bos**, D. Dobos, B. Oranje, S. Durston. *Behavioural inflexibility and inattention in Autism Spectrum Disorder and Attention-Deficit/Hyperactivity Disorders: more similarities than differences*.

2019 **D.J. Bos** & S. Durston. Book chapter, Hersenscans bij ADHD en autisme, *Brein in de Groei,* Stichting Biowetenschappen en Maatschappij

2018 Poster presentation at Eunethydis Conference 2018, Edinburgh, United Kingdom - **D.J. Bos**, E.L. Ajodan, C. Martin, B. Silver, A. Di Martino, R.M. Jones. *Cognitive control to affective cues across neurodevelopmental disorders*,

Hannah de Mulder
Postdoc, UU
WP1, van Berkum

Consortium on Individual Development

The power of stories: exploring the effects of (self) narrative on the development of social competence and behavioural control

1 January 2014– 1 May 2017

Project summary

Aim: The project consists of two subprojects:

1: From book smart to street smart: does exposure to fictional narrative enhance social competence?

2: What to say when you talk to yourself: the role of verbal reappraisal in behavioural control

Methods: Dedicated questionnaires and experimental tasks assess the various relevant constructs (e.g. exposure to various types of fiction, perspective-taking competence, moral profile, social competence, behavioural control, emotion regulation).

Main findings In subproject 1 we a) created fiction exposure questionnaire for YOUth, b) created measures for fiction exposure (Author Recognition Test for 8-17 year olds), c) created Bayesian analysis plan for YOUth adolescent cohort and d) gathered data about reading and adults' social competence (to be modified for adolescents at a later stage). In subproject 2 we a) gathered data in an intervention study about reappraisal strategies on adults' ability to deal with verbal insults and with social exclusion (to be modified for use with adolescents at a later stage).

Project output on the next page

Consortium on Individual Development

Hannah de Mulder
Postdoc, UU
WP1, van Berkum

The power of stories: exploring the effects of (self) narrative on the development of social competence and behavioural control
1 January 2014– 1 May 2017

Publications

Mulder H.N.M. De, Hakemulder F., Berghe M.A.J. van den & Berkum J.J.A. van (2017), Effects of exposure to literary narrative fiction: From book smart to street smart?, Scientific Study of Literature 7(1): 129-169.

Other output

Reading behaviour tasks for the YOUth cohort (see here).

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Karin Fikkers
Postdoc, UvA
WP1, Valkenburg

Consortium on Individual Development

Understanding children's and adolescent's differential use of and susceptibility to media entertainment

January 2015 – January 2019

Project summary

Aim: To understand (1) individual differences in children's and adolescents' emotional, cognitive, excitative, and behavioural responses to media entertainment, and (2) the role of parents in this process.

Methods: We use survey data on youths' media (violence) exposure, temperament, and self- and parent-reported behaviour. In addition, data collected in an observational within-subjects experiment conducted in the Nemo Science Museum (August 2016) were used to inform the aim of our study.

Main findings The data collected at Nemo (August 2016) describe children's individual differences in their emotional, cognitive, and arousal responses to positive and negative media entertainment, based on both child self-report, parent-report, and physiological data. Based on the current data set of Valkenburg's ERC-funded project on individual differences in media use and effects, analyses for a manuscript on the longitudinal relationship between parental media mediation and teens' entertainment use are currently underway. The results of these manuscripts will inform questions that can be answered using data of the YOUth cohort.

Project output on the next page

Consortium on Individual Development

Karin Fikkers
Postdoc, UvA
WP1, Valkenburg

Understanding children's and adolescent's differential use of and susceptibility to media entertainment

January 2015 – January 2019

Publications

Fikkers, K.M., Piotrowski, J. T., & Valkenburg, P. M. (2017). A Matter of Style? Exploring the Effects of Parental Mediation Styles on Early Adolescents' Media Violence Exposure and Aggression. Computers in Human behaviour, 70, 407-415. doi:10.1016/j.chb.2017.01.029.

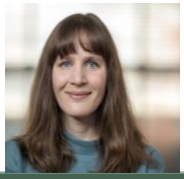
Fikkers, K.M., Piotrowski, J.T., & Valkenburg, P.M. (2017). Assessing the reliability and validity of television and game violence exposure measure. Communication Research, 44, 117-143. doi:10.1177/0093650215573863

Fikkers, K.M., & Piotrowski, J.T. (2019). Content and person effects in media research: Studying differences in cognitive, emotional, and arousal responses to media content. Media psychology, doi:10.1080/15213269.2019.1608257

Fikkers, K.M., Piotrowski. J.T., & Valkenburg, P.M. (2019). Child's play? Assessing the Bidirectional longitudinal relationship between gaming and intelligence in early childhood. Journal of Communication, 69(2), 124-143. doi:10.1093/joc/jqz003

Other output

Several conference presentations. Also, organizer of and speaker at preconference "Moving beyond self-report: Measuring arousal, emotional, and cognitive responses to media through physiological measures". January 2017 Etmaal van de Communicatiewetenschap, Tilburg, The Netherlands.



Sanne Geeraerts
PhD candidate, UU
WP1, Deković

Consortium on Individual Development

Development of infant self-regulation within the early caregiver relationship: A cascade model

October 2014 – September 2019

Project summary

Aim: (1) examine the mean-level development and early markers of self-regulation; (2) identify family factors that might play a role in the development of self-regulation, including parental characteristics, parenting practices, and features that define the broader rearing context; and (3) examine problems related to self-regulation that manifest in the preschool years.

Methods: We relied on four multi-method longitudinal datasets spanning the first years of life. Measurements included observations (micro and macro coded), questionnaires, eye-tracking, daily diaries, and lab tasks.

Main findings Together, the results demonstrate that both child (visual attention and negative reactivity), parent (sensitivity, non-intrusiveness and reactive negative parenting), and family factors (household chaos) contribute to the early development of self-regulation. These factors can already be assessed in infancy and toddlerhood, which comes with relevant implications for prevention strategies aimed at promoting healthy self-regulation development.

Project output on the next page

Consortium on Individual Development

Sanne Geeraerts
PhD candidate, UU
WP1, Deković

Development of infant self-regulation within the early caregiver relationship: A cascade model

October 2014 – September 2019

Publications

Five articles are part of Sanne's dissertation (2 published, 2 revised and resubmitted, 1 submitted):

Geeraerts, S. B., Hessels, R. S., Van der Stigchel, S., Huijding, J., Endendijk, J. J., Van den Boomen, C., ... & Deković, M. (2019). Individual differences in visual attention and self-regulation: A multimethod longitudinal study from infancy to toddlerhood. Journal of Experimental Child Psychology, 180, 104-112.

Geeraerts, S. B., Deutz, M. H. F., Deković, M., Bunte, T., Schoemaker, K., Espy, K. A.,... & Matthys, W. (2015). The child behavior checklist dysregulation profile in preschool children: a broad dysregulation syndrome. Journal of the American Academy of Child & Adolescent Psychiatry, 54, 595-602.

Sanne also published two other articles:

Deutz, M. H., Geeraerts, S. B., van Baar, A. L., Deković, M., & Prinzie, P. (2016). The Dysregulation Profile in middle childhood and adolescence across reporters: factor structure, measurement invariance, and links with self-harm and suicidal ideation. European Child & Adolescent Psychiatry, 25, 431-442

Deutz, M. H., Geeraerts, S. B., Belsky, J., Deković, M., van Baar, A. L., Prinzie, P., & Patalay, P. (2019). General Psychopathology and Dysregulation Profile in a Longitudinal Community Sample: Stability, Antecedents and Outcomes. Child Psychiatry & Human Development, 1-13.

Other output

Gave a family lecture on coping strategies

WP2 Effects of interventions

Work package 2 aims to dissect the reason why not all children are equally responsive to variations in the social environment. It is based on the Leiden – CID Intervention Cohort, where large-scale experimental-longitudinal interventions of parent and peer behaviour allow for testing of which child characteristics shape the effect of (manipulated) environmental factors.

Overview finished WP2 projects

6 finished projects		
Title	Project lead	Page
Neural correlates of social rejection and aggression in young children	Ilse van Wijk	74
The way to success: Identifying factors related to individual differences in behavioural control and prosocial behaviour	Claudia Vrijhof	76
Hormonal correlates of social and behavioural development in childhood	Elisabeth Bilo	78
Parenting and prosocial development in childhood	Rani Damsteegt	79
Integrating behavioural genetics across cohorts in longitudinal perspective	Jizzo Bosdriesz	80
Integrating neural intervention effects in a longitudinal twin study with a sequential cohort design	Bianca van den Bulk	82

Ilse van Wijk
PhD, LU
WP2, Bakermans

Consortium on Individual Development

Neural correlates of social rejection and aggression in young children

1 February 2014- 1 May 2018

Project summary

Aim: Within the L-CID study (a randomized controlled trial with longitudinal brain imaging), I focused on brain activity differences in frontal asymmetry and the relation with social behaviour (i.e. social rejection and aggression, temperamental factors like fear and effortful control and prosocial behaviour).

Methods: Frontal asymmetry was measured during a resting state EEG. Ilse also examined two new tasks to measure social behaviour in reaction to social exclusion and social judgments: Prosocial Owl Game (POG) and Social Network Aggression Task for Early Childhood (SNAT-EC). In the POG, two cartoon owls exclude a third owl, and the participant can compensate for this exclusion by giving the excluded owl the next turn. In the SNAT-EC participants react to peer feedback by pressing a button that destroys the peer's balloons. Balloon bursts (duration of button press) were used as a behavioural index of aggression.

Main findings Ilse validated the two new tasks for use in the L-CID early childhood cohort. Using the POG, she showed that children compensate for social exclusion.

Project output on the next page

Ilse van Wijk
PhD, LU
WP2, Bakermans

Neural correlates of social rejection and aggression in young children

1 February 2014- 1 May 2018

Publications

Dissertation: Wijk, I. van (2019) Social behavior in young twins. Are fearfulness, prosocial and aggressive behavior related to frontal asymmetry? Handle: http://hdl.handle.net/1887/73910
Ilse successfully defended her dissertation on 12 June 2019.

Articles: Besides the articles in her dissertation, co-author:
Euser, S. et al (2016). Efficacy of the Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline in Twin Families (VIPP-Twins): Study protocol for a randomized controlled trial. BMC Psychology, 4:33.

Other output

Several (inter)national conference presentations:

Social judgments, frontal asymmetry and aggressive responses in young children: A replication study using EEG. Oral presentation 2016 VNOP/ISED. Poster 2016 Donders Discussion, 2017 SRCD, 2017 ECDP.

The social network aggression task – Early Childhood: a new task to measure aggression in response to social judgments in young children. Poster 2017 SRCD

Claudia Vrijhof
PhD, LU
WP2, van IJzendoorn

Consortium on Individual Development

The way to success: Identifying factors related to individual differences in behavioural control and prosocial behaviour

1 November 2013 – 1 April 2018

Project summary

Aim: To explore the relations between child characteristics and children's social, physical and economic environment on the one hand and children's behavioural control (preschool period) and prosocial behaviour (early to mid-adolescence) on the other hand.

Methods: Different aspects of behavioural control were assessed, including the ability to internalize and follow rules, even when tempted (cheating game), inhibitory control (stop-signal task), and delay of gratification (marshmallow test). We also used parental reports of children's behavioural control (Child Behavior Questionnaire). Prosocial behaviour was assessed with the Prosocial Cyberball Game.

Main findings Individual differences in effortful control were associated with the social environment, whereas differences in cheating behaviour were related to the physical environment. There is also evidence for social environment influencing children's delay of gratification and response inhibition. Finally adolescents' prosocial behaviour, child characteristics, and factors were related to the social environment of the child.

Project output on the next page

Claudia Vrijhof
PhD, LU
WP2, van IJzendoorn

The way to success: Identifying factors related to individual differences in behavioural control and prosocial behaviour

1 November 2013 – 1 April 2018

Publications

Dissertation: Vrijhof C.I. (2018) The way to success: Identifying factors related to individual differences in behavioral control and prosocial behavior. Handle: http://hdl.handle.net/1887/61151

Claudia successfully defended her dissertation on 28 February 2018.

Articles: Besides the articles in her dissertation, co-author:

Euser, S. et al (2016). Efficacy of the Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline in Twin Families (VIPP-Twins): Study protocol for a randomized controlled trial. BMC Psychology, 4:33.

Van Wijk, I.C. et al (2019). Behavioral genetics of temperament and frontal asymmetry in early childhood. Journal of Experimental Child Psychology, 179,348 -361

Other output

Several (inter)national conference presentations, including:

The relation between a stressful family environment and children's behavioural control: A multimethod test and replication study with twins. Presentation 2016 VNOP-ISED-CAS.

The Prosocial Cyberball Game: Compensating behaviour in typically and atypically developing children after observing social exclusion. Poster 2017 SRCD

Parenting effects on children's hot and cool behavioural control: the role of sensitivity and sensitive discipline. Poster 2017 ECDP.

Elisabeth Bilo
PhD candidate, LU
WP2, van IJzendoorn

Consortium on Individual Development

Hormonal correlates of social and behavioural development in childhood

1 April 2015 – 31 December 2018

Project summary

Aim: To explore the hormonal correlates of social competence and behavioural control of twins in childhood, with special emphasis on diurnal cortisol.

Methods: We collected various measures for behavioural and hormonal development. To assess cortisol development, saliva and hair samples will be used.

Progress Elisabeth Bilo transferred to another research project at the institute of Education and Child Studies of UL.

Publications

Van der Meulen, M., Steinbeis, N., Achterberg, M., Bilo, E., Van den Bulk, B.G., Van IJzendoorn, M.H., & Crone, E.A. (2017). The neural correlates of dealing with social exclusion in childhood. Neuropsychologia, 103, 27-39.

Other output

Contributed to data collection of the L-CID study. Specifically, processing and analysing salivary cortisol data from the first pre-test home visit.

FINISHED PROJECT

Consortium on Individual Development

Rani Damsteegt
PhD candidate, LU
WP2, Bakermans

Parenting and prosocial development in childhood

1 May 2013 – 1 August 2016

Project summary

Aim: To examine the effects of an intervention focused on positive parenting and sensitive discipline on prosocial behaviour (a hallmark of social competence) of preschoolers.

Methods: In 3 or 4-year-old twins, prosocial behaviour was measured annually with the Owl task (non-costly prosocial behaviour), the Donating task (costly prosocial behaviour) and Strengths and Difficulties questionnaire.

Progress Rani Damsteegt left the L-CID project to pursue her career as a teacher in higher vocational education.

Publications

Damsteegt, R.C. et al (2014). Tympanic membrane temperature in adopted children associated with sleep problems and pre-adoption living arrangements: an exploratory study. BMC Psychology. doi:10.1186/s40359-014-0051-2.

Euser, S., et al (2016). Efficacy of the Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline in Twin Families (VIPP-Twins): Study protocol for a randomized controlled trial. BMC Psychology,

Other output

Owl task: Measuring prosocial behaviour in early childhood.

Presentation March 2015 CID meeting

Jizzo Bosdriesz
Postdoc, VU
WP2, Bakermans

Consortium on Individual Development

Integrating behavioural genetics across cohorts in longitudinal perspective

1 March 2018 – 1 June 2019

Project summary

Aim: To investigate the behavioural genetic aspects of child behavioural control and social competence across age and cohorts, and determine the relative influence of genetic and environmental factors.

Methods: Structural equation modelling to assess to what extent individual differences in behavioural control and social competence can be explained by genetic (A), shared environmental (C), or unique environmental (E) factors. Outcomes are derived from MRI, EEG, observational, and questionnaire data taken from two partially overlapping cohorts of same-sex monozygotic and dizygotic twins, starting at age 3-4, and 7-8.

Main findings Several papers are currently in progress, one published and three submitted (revised and resubmitted). The topics of these papers are in order: the associations between fear, effortful control, and frontal asymmetry; hot and cool behavioural control; heritability of sleep quality and sleep variability; heritability of parenting; and genetic and environmental influences on a broad range of neurobiological, cognitive, and social outcomes.

Project output on the next page

Consortium on Individual Development

Jizzo Bosdriesz
Postdoc, VU
WP2, Bakermans

Integrating behavioural genetics across cohorts in longitudinal perspective

1 March 2018 – 1 June 2019

Publications

Van Wijk, I.C., Huffmeijer, R., Bosdriesz, J.R., Bakermans-Kranenburg, M.J., Kolijn, L., Van IJzendoorn, M.H., Vrijhof, C.I., Van den Bulk, B.G. (2019). Behavioral genetics of temperament and frontal asymmetry in early childhood. Journal of Experimental Child Psychology, 179:348-361. Doi:10.1016/j.jecp.2018.11.015

Other output

Jizzo supported analyses for several papers. He also provided statistical support and consultation for other L-CID researchers. Moreover, he supervised bachelor and master thesis students.

He presented his findings with an oral presentation at the 49th BGA annual meeting of the Behavior Genetics Association, Stockholm, Sweden, 26-29 June 2019. Genetic and environmental influences on neurobiological, cognitive, and social outcomes in pre-school and school-age twins.

Bianca van den Bulk
Postdoc, LU
WP2, Crone

Consortium on Individual Development

Integrating neural intervention effects in a longitudinal twin study with a sequential cohort design

21 August 2014 – 1 January 2019

Project summary

Aim: To investigate the effect of the intervention on neurobiological measurements like EEG/ERP in both parents and children and the relation to the development of social competence and behavioral control in early childhood.

Methods: Parent-child observation, behavioural data in social competence and behavioural control in children and several neurophysiological measures like rest EEG and ERP's.

Main findings Data collection for wave five (early childhood cohort) and wave four (middle childhood cohort) will be finished by November 2019. In both cohort about 200 families are still participating. Several papers are recently accepted (1), under revision (3) or in preparation (3). The topics of these papers are: intervention effects on parental EEG activation, prosocial behaviour in early childhood, hot and cool behavioural control in children, heritability of parental sensitivity and intervention effects on parental sensitivity. PhD supervision: Ilse van Wijk (PhD defence June 12 2019) and Laura Kolijn (expected end date summer 2020)/

Progress Since January 2019 Bianca fulfils the role of project manager within L-CID

Project output on the next page

Bianca van den Bulk
Postdoc, LU
WP2, Crone

Integrating neural intervention effects in a longitudinal twin study with a sequential cohort design

21 August 2014 – 1 January 2019

Publications (2019)

Kolijn, L., Huffmeijer, R., Van Den Bulk, B.G., Vrijhof, C.I., Van IJzendoorn, M.H., & Bakermans-Kranenburg, M.J. (2019). Effects of the Video-feedback intervention to promote positive parenting and sensitive discipline on mothers' neural responses to child faces: A randomized controlled ERP study including pre- and post-intervention measures. *Social Neuroscience, 9, 1-15.*

Van Wijk, I.C., Huffmeijer, R., Bosdriesz, J.R., Bakermans-Kranenburg, M.J., Kolijn, L., Van IJzendoorn, M.H., Vrijhof, C.I., Van den Bulk, B.G. (2019). Behavioral genetics of temperament and frontal asymmetry in early childhood. Journal of Experimental Child Psychology, 179:348-361. Doi:10.1016/j.jecp.2018.11.015

Other output

Bianca supervised two PhD students (Ilse van Wijk and Laura Kolijn) and several BSc and MSc students. She also provided consultation for other L-CID researchers and coordinated the L-CID project on a daily basis.

WP3 The role of generational transmission in families

Work package 3 focuses on the continuity of thriving (or failure to thrive) across three generations, and uses information available in large existing Dutch cohorts. The aim is to determine which factors are involved in transmission of behaviour between grandparents, parents, and children.

Overview finished WP3 projects

8 finished projects		
Title	Project lead	Page
The epigenetics of intergenerational transmission	Alexander Neumann	86
Why some pupils thrive and others do not. The role of genes and the environment	Sabine Veldkamp	88
Why some adolescents thrive and others don't: The role of uncertainty dynamics	Andrik Becht	90
Longitudinal development and intergeneration transmission of psychopathology versus wellbeing	Eveline de Zeeuw	92
Development of internalizing symptoms in adolescence and early adulthood: Over-time links with biological, psychological, and social factors	Stefanie Nelemans	95
Examining the complex interplay between relationship experiences and individual factors to understand adolescent development	Tina Kretschmer & Jennifer Klop-Richards	97
Developmental models of psychopathology an life outcomes	Odilia Laceulle & Anoek Sluiter-Oerlemans	99
Determinants and consequences of (low) cognitive control	Annelene Bloemen	101

Alexander Neumann
PhD candidate, Erasmus MC
WP3, Tiemeier

Consortium on Individual Development

The epigenetics of intergenerational transmission

August 2014 – January 2018

Project summary

Aim: Co-occurrence of mental disorders is commonly observed, but the etiology underlying this observation is poorly understood. The aim of the project was to study and distinguish general and specific (epi-)genetic risk factors to develop psychological problems, as well as related hormonal and brain profiles in school-aged children.

Methods: This project utilized data from the population based Generation R cohort, as well as multiple cohorts from the EAGLE, PACE and CORNET consortia. Children's psychopathology was measured with questionnaires, genome and methylome with genome-wide microarrays, white matter with diffusion tensor imaging and physiological stress with hair cortisol measurements.

Main findings General psychopathology was substantially SNP heritable and was associated with three specific loci. Higher global white matter co-occurred with lower general but higher specific externalizing psychopathology levels. DNA methylation at birth, but not school-age, was associated with ADHD development (9 genome—wide significant probes).

Project output on the next page

Consortium on Individual Development

Alexander Neumann
PhD candidate, Erasmus MC
WP3, Tiemeier

The epigenetics of intergenerational transmission

August 2014 – January 2018

Publications

Dissertation: Neumann A. (2019) General Psychopathology in Children: Epidemiological studies of Biological Mechanisms. Persistent URL hdl.handle.net/1765/117365
Successful PhD defence on 21 June 2019.

Articles: In addition to the eight articles part of the dissertation:

- Viuff, A., …, Neumann A., … , & Relton, C. (2018). Maternal depression during pregnancy and cord blood DNA methylation: Findings from the Avon Longitudinal Study of Parents and Children. Translational Psychiatry. DOI: 10.1038/s41398-018-0286-4.
- Vojinovic D, …, Neumann A., … , & Fornage. (2018). Genome-wide association study of 23,500 individuals identifies 7 loci associated with brain ventricular volume. Nature Communications. DOI:10.1038/s41467-018-06234-w
- Cortes Hidalgo, A., Neumann, A., Bakermans-Kranenburg, M., Jaddoe, V., Rijlaarsdam, J., Verhulst, C., … & Tiemeier, H. (2018). Prenatal Maternal Stress and Child IQ. Child Development. DOI: 10.1111/cdev.13177
- Cardenas A., … Neumann A., … & Burris H.H. (2019) Prenatal maternal antidepressants, anxiety, and depression and offspring DNA methylation: epigenome-wide associations at birth and persistence into early childhood. Clinical Epigenetics. DOI: 10.1186/s13148-019-0653-x

Other output

Presentations at various conferences, such as World Congress of Psychiatric Genetics (2015), Society for Research in Child Development (2017), International Society for Research in Child and Adolescent Psychopathology (2017).

Sabine Veldkamp
PhD candidate, VU
WP3, Boomsma

Consortium on Individual Development

Why some pupils thrive and others do not. The role of genes and the environment

1 May 2015 – 30 April 2019

Project summary

Aim: Two main research questions:
1) What are the causes of individual differences in bullying/victimization? Is variation caused by genetics or the environment? And what are the influences of twin specific factors on the prevalence of bullying perpetration and bullying victimization? More specifically: Are twins - having a co-twin by their side - at higher, equal, or lower risk than non-twin children (called singletons)? Should twins share a classroom in primary school? The last question is an important question, also in the light of the policy of many schools to separate twins and not allow them to be in the same classroom
2) To what extent is a children's development influenced by parental age at birth? We focused on the influences of parental age on the children's socio-emotional and cognitive development
Methods: Cross-sectional and/or longitudinal multiple rater data and school-test scores from twin pairs and their non-twin siblings in the Netherlands Twin Register (NTR). The second part of my research project was a collaboration with all four large CID cohorts of WP3 (Gen-R, RADAR-Y, and TRAILS).
Main findings *For bullying*, there are general risk factors (i.e. being a boy) as well as general protective factors (i.e. classroom sharing for girl-girl twins). After accounting for these general factors, large individual differences remained that were mainly due to genetics. *For parental age*, offspring of older parents tend to have fewer behavioural- and neurodevelopmental problems and higher cognitive functioning. This effect was mostly due to parental socioeconomic status (SES).

Project output on the next page

Consortium on Individual Development

Sabine Veldkamp
PhD candidate, VU
WP3, Boomsma

Why some pupils thrive and others do not. The role of genes and the environment

1 May 2015 – 30 April 2019

Publications

PhD dissertation '*Childhood individual development: risk and protective factors in twin and population cohorts*' defence on 18 September 2019.

Published four CID articles:

1. Veldkamp, S.A.M., Van Bergen, E., de Zeeuw, E.L., van Beijsterveldt, C.E.M., Boomsma, D.I. & Bartels, M. (2017). Bullying and victimization: The effect of close companionship. Twin Research and Human Genetics, 20 (10), 19-27.
2. Veldkamp, S.A.M.*, Zondervan-Zwijnenburg, M.A.J. *, van Bergen,, E., Barzeva, S.A. , Tamayo Martinez, N., Becht, A.I., van Beijsterveldt, C.E.M., Meeus, W., Branje, S., Hillegers, M.H.J., Oldehinkel, A.J., Hoijtink, H.J.A., Boomsma, D.I.*, & Hartman, C.* (2019). Effect of parental age on offspring's neurodevelopment. Journal Of Clinical Child And Adolescent Psychology. Under review.
   *These authors contributed equally to this work
3. Zondervan-Zwijnenburg M.A.J., Veldkamp S.A.M., Nelemans S.A., Neumann A., Barzeva S.A., Branje S.J.T., Van Beijsterveldt C.E.M., Meeus W.H.J., Tiemeijer H.W., Vollebergh W.A.M., Hoijtink H.J.A., Oldehinkel A.J., & Boomsma D.I. (2019). Parental age and offspring childhood mental health: A multi-cohort, population based investigation. Child development. doi: 10.1111/cdev.13267. * Mariëlle Zondervan and Sabine Veldkamp shared first authorship
4. Veldkamp, S. A.M, Boomsma, D. I., de Zeeuw, E. L., van Beijsterveldt, C. E., Bartels, M., Dolan, C. V., & van Bergen, E. (2019). Genetic and environmental influences on different forms of bullying perpetration, bullying victimization, and their co-occurrence. Behavior genetics, 49(5), 432-443.

Other output

Several conference presentations including:
2019: poster presentation, Behavior Genetics Association, Stockholm, Sweden
2017: presentation, European Conference on Developmental Psychology, Utrecht, the Netherlands
2016: poster presentation, International Statistical Genetics Workshop, Boulder, Colorado.

Media attention related to the 2019 paper on bullying, including:
Television interview on the heritability of bullying behaviour, EditieNL, RTL4
Radio interview, De Ochtendspits, BNR
'Genen hebben invloed op pestgedrag' in the Metro (national Dutch newspaper)'Pestgedrag in de genen' in the Telegraaf (national Dutch newspaper)

Andrik Becht
PhD candidate, UU
WP3, Meeus/Branje

Consortium on Individual Development

Why some adolescents thrive and others don't: The role of uncertainty dynamics.

September 2014 - August 2018

Project summary

Aim: There is massive evidence that uncertainty is a major risk factor in adolescent development. However, information on the development of uncertainty, the transmission of uncertainty in parent-adolescent relationships and how uncertainty predicts adaptive development is lacking. Aim of this CID-project is to overcome these limitations.

Methods: An intensive longitudinal design is used including 75 between day measures across five years to tap into certainty-uncertainty dynamics across adolescence.

Main findings

Findings in this dissertation reveal that establishing a strong identity is a complex developmental task that is embedded in adolescents' daily lives. Also, results indicate that the adolescent brain is involved in the development of a strong identity over time. Finally, findings highlight that establishing a strong identity can buffer against the development of psychopathology and improves social relationships. Hence, a strong identity serves as an important psychological resource that guides adolescents in their daily lives.

Project output on the next page

Andrik Becht
PhD, UU
WP3, Meeus/Branje

Why some adolescents thrive and others don't: The role of uncertainty dynamics

September 2014 - August 2018

Publications

Dissertation: Becht A.I. (2019) Becoming certain of the self: Longitudinal studies into the dynamics of (daily) identity development. Persistent identifier URN:NBN:NL:UI:10-1874-378080 Cum laude PhD defence on 12 April 2019.

Articles: In addition to the eight articles part of the dissertation:

- Becht, A. I., Prinzie, P., Deković, M., van den Akker, A., & Shiner, R. L. (2016). Child Personality Facets and Overreactive Parenting as Predictors of Aggression and Rule-Breaking Trajectories from Childhood to Adolescence. Development and Psychopathology, 28, 399-413. doi:10.1017/S0954579415000577
- Hawk, S., Becht, A. I., & Branje, S. J. T. (2016). "Snooping" as a Distinct Parental Monitoring Strategy: Comparisons With Overt Solicitation and Control. Journal of Research on Adolescence, 26, 443-458. doi:10.1111/jora.12204

Other output

The result were presented at several (inter)national conferences, including SRCD 2017 (chair), ISRI 2017 (chair and presenter), ECPD 2017, SRA 2018 and FLUX 2019.

Eveline de Zeeuw
UD, VU
WP3, Boomsma

Consortium on Individual Development

Longitudinal development and intergeneration transmission of psychopathology versus wellbeing

December 2014 - November 2017

Project summary

Aim: To collect intergenerational genetically informative data, to disentangle in a multi-rater design genetic and environmental influences on psychopathology and to investigate intergenerational transmission of psychopathology.

Methods: The mechanisms were investigated using multigenerational and genetically sensitive designs. Four types of intergenerational data were collected in the Netherlands Twin Register: 1) parents of young twins who are twins themselves, 2) sisters who are mothers of twins, 3) young twins who become parents themselves and 4) adult twins with adult offspring.

Main findings 1) Differences between children in academic skills, arithmetic, reading and writing were to a large extent due to genes across all primary school grades. The influence of the home environment on individual differences in academic skills was negligible. 2) The negative association between ADHD and lower educational achievement was mainly driven by inattention and not hyperactivity. The link between ADHD and school performance could at least partly be explained by a causative relationship. 3) Heritability of autistic traits was already very high in preschoolers when taking rater bias (mothers and fathers) into account. One third of the identical twin pairs was discordant for high autistic traits possibly due to resilience. 4) Children from a higher SES background had on average a higher genetic propensity for learning and scored better on an educational achievement test (CITO). Children from lower SES families had a lower educational achievement even when taking part of the genetic differences between children into account.

Project output on the next page

Consortium on Individual Development

Eveline de Zeeuw
UD, VU
WP3, Boomsma

Longitudinal development and intergeneration transmission of psychopathology versus wellbeing

December 2014 - November 2017

Publications

- de Zeeuw, EL, et al. (2019). The moderating role of SES on genetic differences in educational achievement in the Netherlands. *npj Science of Learning, 4,* 13.
- Willems, YE, et al. (2018). Genetic and environmental influences on self-control: Assessing self-control with the ASEBA self-Control scale. *Behavior Genetics, 48 (2),* 135-146.
- van Bergen, E, et al.(2018). Why do children read more? The influence of reading ability on voluntary reading practices. *Journal of Child Psychology and Psychiatry, 59 (11),* 1205-1214.
- de Zeeuw, EL, & Boomsma, DI (2017) Country-by-genotype-by-environment interaction in childhood academic achievement. *PNAS, 114 (510),* 13318-13320.
- de Zeeuw, EL, et al. (2017). The etiology of autistic traits in preschoolers: A population-based twin study, *Journal of Child Psychology and Psychiatry, 58 (8),* 893-901.
- de Zeeuw, EL, et a. (2017). Attention Deficit Hyperactivity Disorder symptoms and low educational achievement: Evidence supporting the causal hypothesis. *Behavior Genetics, 47 (3),* 278-289.
- de Zeeuw, EL, et al. (2016). Arithmetic, reading and writing performance has a strong genetic component: A study in primary school children. *Learning and Invididual Differences, 47,* 156-166.

Other output

- *Socioeconomic status, genes and children's educational achievement* on npj Science of Learning community channel.
- *Twin tots reveal autism traits arise mostly from genes* on Spectrum News.
- *Research shows possible link ADHD and low educational achievement* on Open Forest.

Stefanie Nelemans
Postdoc, UU
WP3, Meeus

Consortium on Individual Development

Development of anxiety symptoms in adolescence and early adulthood: over/time links with biological, psychological, and social factors

September 2014 – December 2018

Project summary

Aim: To gain insight in the development of anxiety and depressive (i.e., internalizing) symptoms from adolescence to emerging adulthood, including over-time links with individual characteristics (e.g., genetics and stress reactivity) and social relationships (e.g., parenting and the parent-adolescent relationship).

Methods: Longitudinal questionnaire data, physiological and cognitive data during a laboratory setting, and genetic data from RADAR (UU), CONAMORE (UU), and potentially TRAILS RUG/UMCG). Analysesinclude a combination of person-centered and variable-centered longitudinal modelling techniques.

Main findings From 2017 onwards, the focus was on biological correlates and predictors of adolescent depressive and anxiety (particularly Social Anxiety) symptom development from early to late adolescence, as well as interactions between biological and psychosocial factors (particularly parenting of parent-adolescent relationship quality) or a more in-depth focus on the relevance of the parental context in predicting this development. Resulting in several papers (see next page).

Project output on the next page

Consortium on Individual Development

Stefanie Nelemans
Postdoc, UU
WP3, Meeus

Development of anxiety symptoms in adolescence and early adulthood: over/time links with biological, psychological, and social factors

September 2014 – December 2018

Publications

Nelemans, S. (2017). The role of stress reactivity in the long-term persistence of adolescent social anxiety symptoms. Biological Psychology, 125, 91-104.

Nelemans, S. (2017). Social anxiety scale for adolescents (SAS-A) short form: Longitudinal measurement invariance in two community samples of youth. Assessment. Advance online publication.

Nelemans, S. (2019). Transactional links between social anxiety symptoms and parenting across adolescence: Between- and within-person associations. Child development. Advance online publication. doi:10.1111/cdev.13236

Nelemans, S. (2017). Individual differences in anxiety trajectories from grades 2 to 8: Impact of the middle school transition. Development and Psychopathology.

Nelemans, S. (2016). Discrepancies between perceptions of the parent-adolescent relationship and early adolescent depressive symptoms: An illustration of polynomial regression analysis. Journal of Youth and Adolescence, 45, 2049-2063.

Nelemans, S.A. (2016). Longitudinal associations between social anxiety symptoms and cannabis use throughout adolescence: The role of peer involvement. European Child & Adolescent Psychiatry, 25, 483-492.

Nelemans, S.A. (2014). Maternal criticism and adolescent depressive and Generalized Anxiety Disorder symptoms: A 6-year longitudinal community study. Journal of Abnormal Child Psychology, 42, 755-766. doi: 10.1007/s10802-013-9817-x

Nelemans, S.A. (2014). Heterogeneity in development of adolescent anxiety disorder symptoms in an 8-year longitudinal community study. Development and Psychopathology, 26, 181-202. doi: 10.1017/S0954579413000503

Nelemans, S.A. (2014). Persistent heightened cortisol awakening response and adolescent internalizing symptoms: A 3-year longitudinal community study. Journal of Abnormal Child Psychology, 42, 767-777. doi: 10.1007/s10802-013-9820-2

Nelemans, S. A. (2018). Parenting interacts with oxytocin polymorphisms to predict adolescent social anxiety symptoms: A novel polygenic approach. Journal of Abnormal Child Psychology. Advance online publication. doi:10.1007/s10802-018-0432-8

Other output

Several conference presentations, including at SRCD 2015 and SRCD 2017. Also chaired the session '*Biological underpinnings of internalizing symptoms in childhood and adolescence*' at ECPD 2017.

Tina Kretschmer(until 1/12/15)
Jennifer Klop-Richards(since 1/12/15)
Postdocs, UMCG
WP3, Oldehinkel

Consortium on Individual Development

Examining the complex interplay between relationship experiences and individual factors to understand adolescent development

1 December 2015 – 30 September 2018

Project summary

Aim: Project component #1 asked whether experiences in parent-child relationships are associated with experiences in relationships with peers and intimate partners and project components #2 and #3 focus on the interplay between relationship experiences and individual factors in predicting positive and negative outcomes.

Methods: Data from all waves of the Tracking Adolescents' Individual Lives Survey (TRAILS) have been used, though the focus was on measures of social relationships with parents, peers, and romantic partners and measures of adjustment.

Main findings In December 2015 Jennifer succeeded Tina Kretschmer on this project who has published a number of articles on the subject. Since then, an article on the social predictors of young adult's wellbeing and functioning has been published in Psychological Medicine. Papers in-progress include a paper on the developmental stability of the p-factor and a review on parenting and resilience in children. Jennifer also coordinated the TRAILS Next data-collection, including developing a micro-coding scheme for parent-child interactions. Jennifer continues to work on the same topic in a follow-up project.

Project output on the next page

Tina Kretschmer(until 1/12/15)
Jennifer Klop-Richards(since 1/12/15)
Postdocs, UMCG
WP3, Oldehinkel

Examining the complex interplay between relationship experiences and individual factors to understand adolescent development

1 December 2015 – 30 September 2018

Publications

Richards JS et al (2018). Beyond not bad or just okay: Social predictors of young adults' wellbeing and functioning (a TRAILS study). *Psychological Medicine* 1-11.

Kretschmer, T. et al (2018). How competent are adolescent bullying perpetrators and victims in mastering normative developmental tasks in early adulthood? Journal of Abnormal Child Psychology, 46, 41-56.

Kretschmer, T. et al (2017). Bullying development across adolescence, its antecedents, outcomes, and gender-specific patterns. Development and Psychopathology, 29, 941-955.

Kretschmer T. et al (2016). Configurations of adolescents' peer environments: Associations with parent-child relationship quality and parent problem behavior. Journal of Research on Adolescence, 26, 474-491.

Kretschmer, T. et al (2015) Parent-child positivity and romantic relationships in emerging adulthood – Congruence, compensation, and the role of social skills. International Journal of Behavioral Development, doi: 10.1177/0165025415612228.

Other output

The above work has been presented at several conferences, including oral presentations at the European Congress of Psychology (ECP, Amsterdam 2017), International Society for Research in Child and Adolescent Psychopathology (ISRCAP, Amsterdam 2017), and European Association for Research on Adolescence (EARA, Cadiz, 2016).

Odilia Laceulle(until 1/9/15)
Anoek Sluiter-Oerlemans(since 1/9/15)
Postdocs, ICPE/UMCG
WP3, Prof. J. Ormel

Consortium on Individual Development

Investigating developmental models of psychological distress

15 October 2013 – 1 November 2018

Project summary

Aim: In addition to work related to the enrichment of TRAILS study with measurements of a third generation (TRAILS Next), we started to investigate developmental models of psychopathology. The main aim was to use longitudinal data to disentangle the structure of psychopathology, the complex interplay between individuals and their environments (transactional models) in the prediction of psychopathology and life outcomes.

Methods: Data from all six waves of the Tracking Adolescents' Individual Lives Survey (TRAILS) are used, though the focus to date has been on measures of mental health, temperament/personality, social relationships, life events and early adult life outcomes.

Main findings Seven papers have been published, reporting on temperament/personality and stress/stressful situations, (negative) social interactions, psychopathology and outcomes, the relationship between psychopathology and personality and autism symptoms and prosocial skills. In addition, we identified individuals who have experienced long-term, persistent change in their mental health development and found that they differ from those who do not report such a change in terms of genetic vulnerability, temperamental characteristics and experienced life events (work in progress).

FINISHED PROJECT

Consortium on Individual Development

Odilia Laceulle (until 1/9/15)
Anoek Sluiter-Oerlemans (since 1/9/15)
Postdocs, ICPE/UMCG
WP3, Prof. J. Ormel

Investigating developmental models of psychological distress

15 October 2013 – 1 November 2018

Publications

Ormel, J., Oerlemans, A.M., Oldehinkel, A.J. & Laceulle, O.M. (2019). Mental Disorder during Adolescence: Evidence of Arrested Personality Development – forthcoming in Clinical Psychological Science

Oerlemans, A.M., Rommelse, N.N.J., Buitelaar, J.K. & Hartman, C.A. (2018). Examining the intertwined development of prosocial skills and ASD symptoms in adolescence. European Child & Adolescent Psychiatry, 27(8), 1033-1046

Ormel, J., Oerlemans, A.M., Raven, D., Laceulle, O.M., Hartman, C.A., Veenstra, R., Verhulst, F., Vollebergh, W.A.M., Rosmalen, J.G.M., Reijneveld, S.A. & Oldehinkel, A.J. (2017). Functional outcomes of child and adolescent mental disorders. Current disorder most important but psychiatric history matters as well. *Psychological Medicine, 47*(7), 1271-1282

Ormel, J., Laceulle, O.M., & Jeronimus, B.J. (2015). Why personality and psychopathology are correlated: developmental perspective is a first step but more is needed. European Journal of Personality, 28, 396-398.

Laceulle, O.M., Jeronimus, B.F., van Aken, M.A.G., & Ormel, J. (2015). Why not everybody gets their fair share of stress: Adolescent's perceived relationship affection mediates associations between temperament and stressful social events. European Journal of Personality, 29: 125–137.

Laceulle, O.M., Nederhof, E., van Aken, M.A.G. & Ormel, J. (2015). Adolescent personality: associations with basal, awakening and stress-induced cortisol responses. Journal of Personality, 83, 262–273.

Laceulle, O.M., Vollebergh, W.A.M. & Ormel, J. (2015). The Structure of Psychopathology in Adolescence: Replication of a General Psychopathology Factor in the TRAILS Study. Clinical Psychological Science 3, 850–860.

Other output

Since 2018: two (invited) presentation at (inter)national conferences (2018), publication of a Dutch translation of the 2017 paper on functional outcomes of child and adolescent mental disorders in *Kind en Adolescent* (2018).

Annelene Bloemen
PhD, UMCG
WP3, Oldehinkel

Consortium on Individual Development

Determinants and consequences of (low) cognitive control

December 2014 – December 2017

Aim

Adolescence is characterized by extensive neurodevelopmental changes. It has been hypothesized that disorders with a high incidence during adolescence, such as depression and anxiety, are neurodevelopmental disorders that result from premorbid vulnerabilities of the brain. Low cognitive control is an often-used marker of such brain vulnerabilities. Within the context of CID, cognitive control is highly relevant because it is a prerequisite for behavioral control, one of the two core outcomes. Whereas prior research suggests that low cognitive control is not a strong predictor of depression and anxiety in general, it may still do so in particular subgroups, e.g. youth with a vulnerable temperament. Cognitive control is important in regulating our behaviors and emotions, which may be particularly relevant in the context of specific risk factors. The central aim of this project is to examine the role of cognitive control in relation to the question why some individuals develop psychiatric problems while others do not, and why some remit while others have chronic and even worsening psychopathology. Insight will be gained by investigating how cognitive (behavioral) control may provide a buffer in the context of a vulnerable temperament, stress exposure, comorbid childhood psychopathology, and a high familial presence of psychopathology.

Methods

Existing (multiwave) cohort data were used from TRAILS (TRacking Adolescents' Individual Lives Survey), LifeLines, ARIADNE, and NeuroIMAGE. Cognitive control was measured using either paper-and-pencil or computerized tasks. All other variables were measured by interviews or questionnaires.

Output

Bloemen AJP et al. The association between executive functioning and psychopathology: general or specific? Psychol Med. 2018 Aug;48(11):1787-1794. doi: 10.1017/S0033291717003269.

FINISHED PROJECT

WP4 Animal and mathematical models of development

Work package 4 complements the studies in work packages 1-3 with advanced mathematical modelling and animal research. Both behavioural rodent and avian models of social and adaptive behaviour are used, with the additional possibility of detailed analyses focusing on development of involved brain structures. Mathematical models allow better description of longitudinal effects and ensure better data quality.

Overview finished WP4 projects

7 finished projects		
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Formalization and evaluation of prior knowledge	Mariëlle Zondervan	104
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Genetic resilience to early life stress effects on the behavioural trajectory in mice	Angela Sarabdjitsingh	110
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Mariëlle Zondervan
PhD candidate, UU
WP4, Hoijtink

Consortium on Individual Development

Formalizing and evaluating prior knowledge

July 2014 – March 2019

Project summary

Aim: The aim of this dissertation was to explore, propose, and demonstrate several ways in which information other than the data at hand can be used to strengthen analyses.

Methods: A simulation study was used to evaluate the impact of prior information. A procedure was developed to search for prior information systematically, and an elicitation procedure was developed to elicit prior knowledge from experts. The prior predictive *p*-value was introduced as a method to test replication while using the deviance from an informative hypothesis as a test-statistic. Finally, Bayesian research synthesis was used to combine results over cohort studies.

Main findings: Prior information promotes convergence and the non-null detection rate. The prior predictive *p*-value is a useful addition to the meta-scientific toolbox, and by using informative hypotheses, new replication research questions can be answered. Bayesian research synthesis can combine different operationalisations of the same construct and leads to robust evidence.

Project output on the next page

Consortium on Individual Development

Mariëlle Zondervan
PhD candidate, UU
WP4, Hoijtink

Formalizing and Evaluating Prior Knowledge
July 2014 – March 2019

Publications

Zondervan-Zwijnenburg, M.A.J.*, Veldkamp, S.A.M.*, Neumann, A., Barzeva, S.A., Nelemans, S.A., Van Beijsterveldt, C.E.M. Branje, S., Meeus, W.H.J., Hillegers, M.H.J., Tiemeier, H., Hoijtink, H.J.A., Oldehinkel, A.J., & Boomsma, D.I. (2019). The impact of parental age on child behavior problems: Updating evidence from multiple cohorts. *Child Development*. doi: 10.1111/cdev.13267

* These authors contributed equally.

Zondervan-Zwijnenburg, M.A.J., Depaoli, S., Peeters, M., & Van de Schoot, R. (2019). Pushing the Limits: The performance of ML and Bayesian estimation with small and unbalanced samples in a latent growth model. *Methodology, 15*, 31-43. doi: 10.1027/1614-2241/a000162

Zondervan-Zwijnenburg, M.A.J., Peeters, M., Depaoli, S., & Van de Schoot, R. (2017). Where do priors come from? Applying guidelines to construct informative priors in small sample research. *Research in Human Development, 14*(4), 305-320. doi: 10.1080/15427609.2017.1370966

Zondervan-Zwijnenburg, M.A.J., Van de Schoot-Hubeek, W., Lek, K., Hoijtink, H., & Van de Schoot, R. (2017). An expert judgment elicitation procedure for correlations. *Frontiers in Psychology, 8*, 90. doi: 10.3389/fpsyg.2017.00090

Zondervan-Zwijnenburg, M.A.J., & Rijshouwer, C.D.N. (2020). Testing Replication with Small Samples: Applications to ANOVA. In: R. van de Schoot, M. Miocević (Eds.), *Small sample size solutions: A guide for applied researchers and practitioners. Routledge*

Other output

Zondervan-Zwijnenburg, M.A.J. (2019). How to Test Replication for Structu- ral Equation Models. PsyArXiv. doi: 10.31234/osf.io/uvh5s

Zondervan-Zwijnenburg, M.A.J. (2015). Ontwikkeling van jonge cannabisge- bruikers vergeleken met leeftijdsgenoten: Een Bayesiaans avontuur. *STAtOR, 15* (2), 4-9.

Zondervan-Zwijnenburg, M.A.J. (2019). Replication: Test Replications by Means of the Prior Predictive p-Value. R-package version 0.1.0. https://CRAN. R-project.org/package=Replication

Zondervan-Zwijnenburg, M.A.J. (2018). ANOVAreplication: Test ANOVA Replication by Means of the Prior Predictive p-Value. R-package version 1.1.3. https://CRAN.R-project.org/package=ANOVAreplication

Jiska Kentrop
PhD, UMCU
WP4, Marian Joëls

Consortium on Individual Development

Challenging early life environments: Impact on behavioral inhibition and (pro-)social behavior in rats

1 July 2014 – 1 November 2018

Project summary

Aims:

1) to determine the effects of early life stress on behavioral control, social competence and pro-social behavior in rats in adolescence and adulthood

2) to investigate the possibility of reversing these behavioral effects using either environmental or pharmacological interventions in early adolescence

Methods: A rat model was used to study how early life stress, through 24h deprivation of maternal care on the third day after birth, affects adult behaviour. She also examined whether the potential negative effects of maternal deprivation could be normalized with two adolescent interventions (enriched housing conditions or administering glucocorticoid receptor antagonist mifepristone).

Main findings: Early life stress has a negative impact on behavioural inhibition and social behaviour. However, because the effects are modest, it is difficult to interpret the results of the two tested interventions. Therefore further research is necessary to draw more solid conclusions.

Project output on the next page

Jiska Kentrop
PhD, UMCU
WP4, Marian Joëls

Challenging early life environments: Impact on behavioral inhibition and (pro-)social behavior in rats

1 July 2014 – 1 November 2018

Publications

Dissertation: Kentrop, J. (2019) Challenging early life environments: Impact on behavioral inhibition and (pro-)social behavior in rats. Persistent identifier URN:NBN:NL:UI:10-1874-380350

Bonapersona V., Kentrop J. et al (2019). The behavioral phenotype of early life adversity: A 3-level meta-analysis of rodent studies. Neuroscience & Biobehavioral Reviews. doi: 10.1016/j.neubiorev.2019.04.021

Van der Veen R., Kentrop J. et al (2015) Complex living conditions impair behavioral inhibition but improve attention in rats. Front. Behav. Neurosci. doi: 10.3389/fnbeh.2015.00357.

Kentrop, J. et al (2016). Mifepristone Treatment during Early Adolescence Fails to Restore Maternal Deprivation-Induced Deficits in Behavioral Inhibition of Adult Male Rats. Frontiers in Behavioral Neuroscience. doi:10.3389/fnbeh.2016.00122

Kentrop J et al (2018) Effects of Maternal Deprivation and Complex Housing on Rat Social Behavior in Adolescence and Adulthood. Front. Behav. Neurosci. doi: 10.3389/fnbeh.2018.00193

Other output

Organisation of the 2016 CID Tour the Consortium day in Utrecht and 2018 CID symposium and retreat for CID researchers.

Several conference presentations for the Dutch Neuroscience Meeting (2016, 2018) and European Brain and Behaviour Society conference (2017)

Manila Loi
PhD, UMCU
WP4, Joëls

Consortium on Individual Development

Intervention at puberty after early life adversity

September 2013 – September 2015

Aim

Early life adversity is a risk factor for the development of psychopathology in humans. This project aimed to understand how early life stress in a well-controlled rodent model affects various cognitive domains and whether this can be reversed by pharmacological intervention during a critical peri-pubertal developmental stage.

Method

Wistar rat pups were removed from the mother for 24 h on postnatal day (PND) 3. Weaning was at PND21. Between PND26 and 28 the pups were treated twice daily with a glucocorticoid receptor antagonist (mifepristone), since this receptor is known to exacerbate damage to the brain. In adulthood (after PND90), rats were tested for spatial memory and decision-making.

Main findings

We observed that particularly in male rats (much more than in females), cognitive function was disturbed by maternal deprivation. This was normalized by brief peri-pubertal treatment with mifepristone. A very similar pattern was observed for glutamatergic transmission in key areas involved in these behaviors. Given the rapid but lasting reversal due to mifepristone treatment, we tested the possibility that this compound works through epigenetic programming. Indeed, the efficacy of mifepristone to restore cognitive function disturbed by maternal deprivation was hampered by co-treatment with a methyl-donor and facilitated by a histone deacetylase inhibitor infused into the area of interest.

FINISHED PROJECT

Consortium on Individual Development

Sofia Kanatsou
Postdoc, UMCU
WP4, Joëls

Genetic resilience in a combined model of stress early in life and later in adulthood on behavior and neurogenesis in mice

August 2015 – April 2016

Aim

The general aim of this project is to model the neurodevelopmental aspects of behavior (social competence and behavioral control) and structural plasticity after stress early in life and later in adulthood in male mice. Mineralocorticoid receptor (MR) function is considered important in mediating stress resilience. We therefore aim to study whether combined exposure of early life stress and stress in adulthood affects memory and neurogenesis and whether these effects can be prevented by increased transgenic overexpression of MR's.

Method

We have used a novel approach for developmental behavioral and structural analysis in which mice are assessed in adulthood on a series of behavioral tasks measuring neuroendocrinological markers, locomotor activity, anxiety, learning and memory and adult hippocampal neurogenesis.

Main findings

1) We have established and validated (neuroendocrine and behaviorally) the limited nesting and bedding model (ELS) to induce early life stress in mice through fragmented mother care. 2) We have established and validated (neuroendocrine and behaviorally) the chronic unpredictable stress model (CUS) to induce stress in adulthood in mice through a combination of physical and psychological stressors. 3) We have successfully imported the genetically modified mouse lines necessary to generate the forebrain specific overexpression mice.
Recently we have shown that increased MR functionality partially prevents chronic-stress induced reductions in hippocampal memory and structural plasticity in male mice (Kanatsou et al., 2015). Moreover overexpression of MRs protects against the consequences of early life stress on spatial memory, cell maturation and synaptic function in the dentate gyrus in male mice (Kanatsou et al., in preparation). Based on these findings, it is important to further explore the genetic resilience of MRs on behavioral and structural domains in a combined model of stress early in life and later in adulthood.

Angela Sarabdjitsingh
Assistant Professor, UMCU
WP4, Joëls

Consortium on Individual Development

Genetic resilience to early life stress effects on the behavioural trajectory in mice

November 2013 – September 2018

Aim

The general aim of this project is to model the neurodevelopmental aspects of behavioral and cognitive domains after early life stress (ELS) in male and female mice. Mineralocorticoid receptor (MR) function is considered important in mediating stress resilience. We therefore aim to study the contribution of high/low brain-specific MR expression to ELS and the behavioral trajectory.

Method

We have used a novel approach for developmental behavioral analysis in which mice are assessed at different developmental stages on a series of behavioral tasks (behavioral control) measuring general health, neurological reflexes, locomotor activity, anxiety, short- and long-term memory and cognitive flexibility (Molenhuis et al., 2014). We use this longitudinal testing battery to assess the effects of early stress in males and females. Additionally we look at acute stress reactivity in these mice

Main findings

All experimental work has been concluded and data analysis is ongoing for the behavioural assessments. Several manuscripts are being drafted in which we discuss the effect of MR and ELS on the development of behavioural domains in male and female mice. Another paper will address acute stress reactivity in this experimental setup. Additionally, one final paper will discuss the effects of MR and ELS on neuronal excitability and morphology in the mPFC (in collaboration with dr Henk Karst).

FINISHED PROJECT

Consortium on Individual Development

Sita ter Haar
Postdoc, UU
WP4, Bolhuis

A neurogenetic analysis of birdsong learning as a model for infant development

March 2015 – January 2016

Aim

This research aims to study the neurogenetic mechanisms behind song learning in zebra finches, which is extensively used as a model for speech and language acquisition in human infants. The first question to be answered is whether individual differences in learning performance are associated with differences in gene expression.

Method

We perform neurobehavioral research in combination with innovative genetic techniques: song analyses, behavioral responses and RNA-sequencing or microarray.

Main findings

An ethical proposal has been written for the animal experimentation committee to be able to start the research on animals. The plans have been discussed with a genetic birdsong expert collaborator (Prof. Claudio Mello). Before we can start genetic analyses we need to develop methods to quantify individual differences in development. In order to be able to distinguish gene expression patterns in good and poor learners, it is necessary to find precursors in vocal development that indicate good or poor learning. Therefore I have started to analyze vocal development of already existing song recordings during development. I investigate whether specific song elements or syllables (the units of which song consists) are acquired early in development and if this acquisition is more accurate and/or faster in good learners than poor learners. Also, I study if fast development (i.e. early song stabilization) leads to better or worse song performance as an adult. Once we know the developmental precursors, we can start measuring genetic variation associated with individual differences.

Gabriël Beckers
Assistant Professor, UU
WP4, Bolhuis

Consortium on Individual Development

Tracking sleep slow waves during avian vocal development

October 2015 – January 2018

Project summary

Aim: Sleep is strongly involved in learning, including vocal learning in songbirds and grammar learning in human infants. We studied the phenomenology and role of cortical oscillations that occur during deep sleep in perception and learning of vocalizations in birds that are used as model system for speech acquisition in human infants.

Methods: We record neuronal action potentials and local field potentials in cortex at 32 and 64 sites in parallel (under anesthesia in zebra finches, and natural sleep in pigeons, respectively).

Main findings

* Slow oscillations are involved in learning of simple 'artificial grammars', at a level comparable to human phonology.

* REM and NREM travelling sleep waves in humans and birds are phenomenologically comparable, including how they are organized in overall sleep architecture.

* Hippocampal sharp-wave-ripples and thalamocortical spindles, implicated in memory consolidation in humans, appear to be absent in birds.

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Project output on the next page

Consortium on Individual Development

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Tracking sleep slow waves during avian vocal development

October 2015 – January 2018

Publications

- Van der Meij, J.*, Ungurean, G., Rattenborg, N.C., **Beckers, G.J.L.*** (submitted) Evolution of sleep in relation to cognition – A birds' brain view, *Current Opinion in Behavioral Sciences*.

- Van der Meij, J., Rattenborg, N.C.*, **Beckers, G.J.L.*** (in revision) Divergent neuronal activity patterns in the avian hippocampus and nidopallium. *European Journal of Neuroscience*.

- Van der Meij, J., Martinez-Gonzalez, D., **Beckers, G.J.L.*** and Rattenborg, N.C.* (2019) Intra-'cortical' activity during avian non-REM and REM sleep: variant and invariant traits between birds and mammals. *SLEEP*, 42:2.

- Van der Meij, J., Martinez-Gonzalez, D., **Beckers, G.J.L.*** and Rattenborg, N.C.* (2019) Neurophysiology of avian sleep: comparing natural sleep and isoflurane anesthesia. *Frontiers in Neuroscience, Sleep and Circadian Rhythms*, 13, 262--

- Rattenborg, N.C., van Der Meij, J., **Beckers, G.J.L.**, and Lesku, J.A. (2019) Local aspects of avian non-REM and REM sleep. *Frontiers in Neuroscience, section Sleep and Circadian Rhythms,* 13, 567--

- Tisdale, R.K., Lesku, J.A., **Beckers, G.J.L.***, Rattenborg, N.C.* (2018) Bird-like propagating brain activity in anesthetized Nile crocodiles. *SLEEP*, 41(8), zsy105.

- Tisdale, R.K., Tieri, L., Rattenborg, N.C., **Beckers, G.J.L.**, and Lesku, J.A. (2018) Spectral properties of brain activity under two anesthetics and their potential for inducing natural sleep in birds. *Frontiers in Neuroscience, Sleep and Circadian Rhythms*, 12.

- Tisdale, R.K., Lesku, J.A., **Beckers, G.J.L.**, Vyssotski, A.L, Rattenborg, N.C. (2018) The low-down on sleeping down low: Pigeons shift to lighter forms of sleep when sleeping near the ground. *Journal of Experimental Biology*, 221 (19).

- Bolhuis, J.J., **Beckers, G.J.L.**, Huybregts, M.A.C., Berwick, R.C., Everaert, M.B.H. (2018) The slings and arrows of comparative linguistics. *PLoS Biology*.

- Bolhuis, J.J., **Beckers, G.J.L.**, Huybregts, M.A.C., Berwick, R.C., Everaert, M.B.H. (2018) Meaningful syntactic structure in songbird vocalizations? *PLoS Biology*.

Other output

Data science tool: **Darr**, a Python science library for memory-mapped numeric arrays, based on a format that is self-explanatory and tool-independent. See: https://github.com/gbeckers/Darr

Consortium on Individual Development

Colofon

ORGANIZATION

CID involves researchers from Utrecht University (UU, applying university), University of Amsterdam (UvA), Leiden University (LU), University Medical Centrum Groningen (UMCG), Erasmus Medical Center (Erasmus MC), University Medical Center Utrecht (UMCU), Vrije Universiteit Amsterdam (VU).

FUNDING

The Consortium on Individual Development (CID) is funded through the Gravitation programme of the Dutch Ministry of Education, Culture, and Science and the Netherlands Organization for Scientific Research (NWO grant number 024.001.003)

MORE INFORMATION

www.individualdevelopment.nl

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