TwinLife User Conference Book

University of Bremen | 26th to 28th March 2025 | Bremen, Germany

Contents

General Information

Welcome to the TwinLife User Conference!

It is our great pleasure to welcome you to the TwinLife User Conference 2025 in Bremen. We are delighted that you have chosen to join us for this exciting event, which brings researchers from different fields and around the world to share their latest findings and insights or simply research ideas for future studies based on the TwinLife and its satellite projects.

It is a pleasure for us to host and organize this conference. We were delighted with the many interesting contributions we received, which enabled us to put together such a diverse scientific program reflecting the many possibilities of research with TwinLife data.

We are very much looking forward to spending three days together discussing research ideas, research findings and other topics related to longitudinal research, behavioural genetics and twin and family research in the broadest sense. Our program offers a diverse range of talks, panels and workshops designed to stimulate further discussion, encourage collaboration and inspire new ideas.

Catering will be provided. And all relevant information about the conference can be found in this PDF or on the conference website: https://tluc.uni-bremen.de/.

In case of any problems or queries, please contact the organizational team anytime via mail: twinlifeuserconf@uni-bremen.de or phone: +49 (0)421 218-68770 or 68772.

We hope that you will find the conference to be a stimulating and enriching experience, and that you will take away new impulses for your research, connections and inspiration to share with your colleagues and research communities back home.

The Organizing Committee

Conference information

Registration

- for Pre-Conference Workshop Attendees: 26th of March, 09:00–09:30 (Room B2880)
- for Conference Attendees: 26th of March, 16:30–19:00 (Room B2880)
- Late Registration: 27th of March, 08:30–10:00 (Room B2880)

Organizing Committee

- Prof. Dr. Christian Kandler
- Dr. Theresa Rohm
- Marco Deppe
- Jana Instinske
- Sandra Bojahr
- Nils-Henrik Stöver
- Meike Janning
- Judith Kruse
- Sarah Sophie Siemsglüß

Access to the conference: Wearing your conference badge is mandatory during all conference activities.

Certificate of Attendance: Certificates of Attendance will be sent electronically to all registered participants after the conference.

Language: The conference will be held in English. No oral translation will be available.

WiFi: Free WiFi is available through the venue. If your home institution does not participate in eduroam or if you have problems connecting, individual codes for wifi are available at the registration desk.

Pre-Conference Workshop: The pre-conference workshop will take place on Wednesday, 26th of March at the University of Bremen. See Overview Workshop Program for more details.

Welcome Reception: The welcome reception will be held from 17:30-19:00 in Room B3009, GW2, University of Bremen.

Coffee Breaks & Lunches: Coffee Breaks will be provided in the main conference venue. See the time table for details. Lunches will be provided in the Mensa (**with vegetarian and vegan options**), located a 3min foot walk away from the GW2. With your conference badge you will receive vouchers to use at the Mensa checkout that include one main dish, a dessert and a drink per day.

Additionally, you can buy coffee, drinks, and sandwiches from the university coffee shops. These are open from 07:30-17:30.

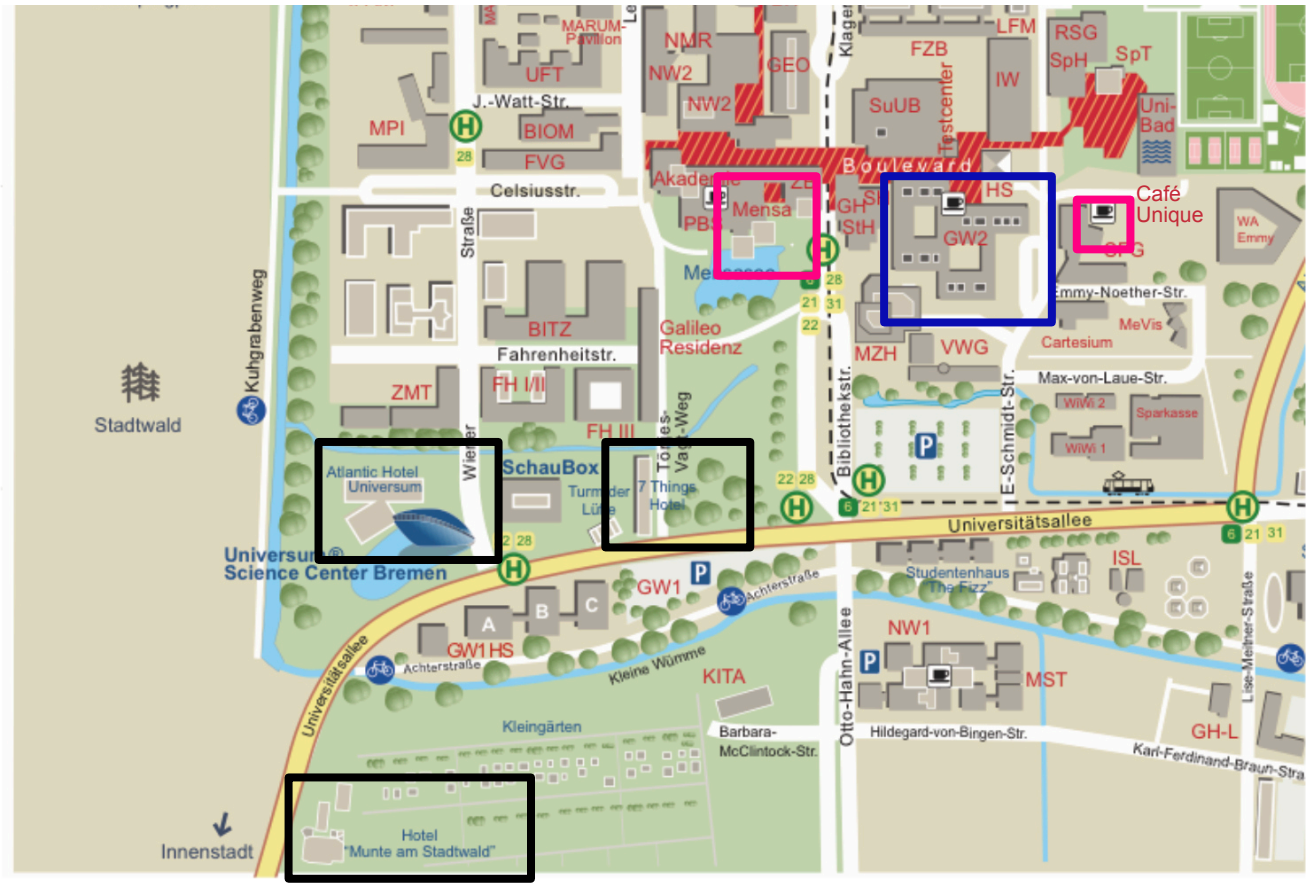
Talks: Room B2890 and Room B2900 are available to meet up with attendees to chat and exchange ideas.

In need of help?: If there are any questions that need answering or you need help finding the way etc. You can reach use via e-mail twinlifeuserconf@uni-bremen.de or phone +49 (0)421 218-68772.

Offline maps: It might be helpful to download a map of Bremen or the university area to find your way around. This is available through google and apple maps.

How to get around

Campus



Hotels | Where to eat | Conference Venue

Helpful link: [Campus map Uni Bremen]

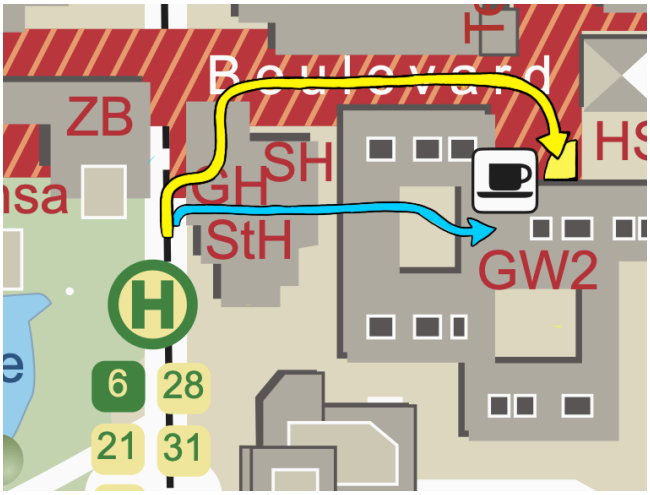
How to get around

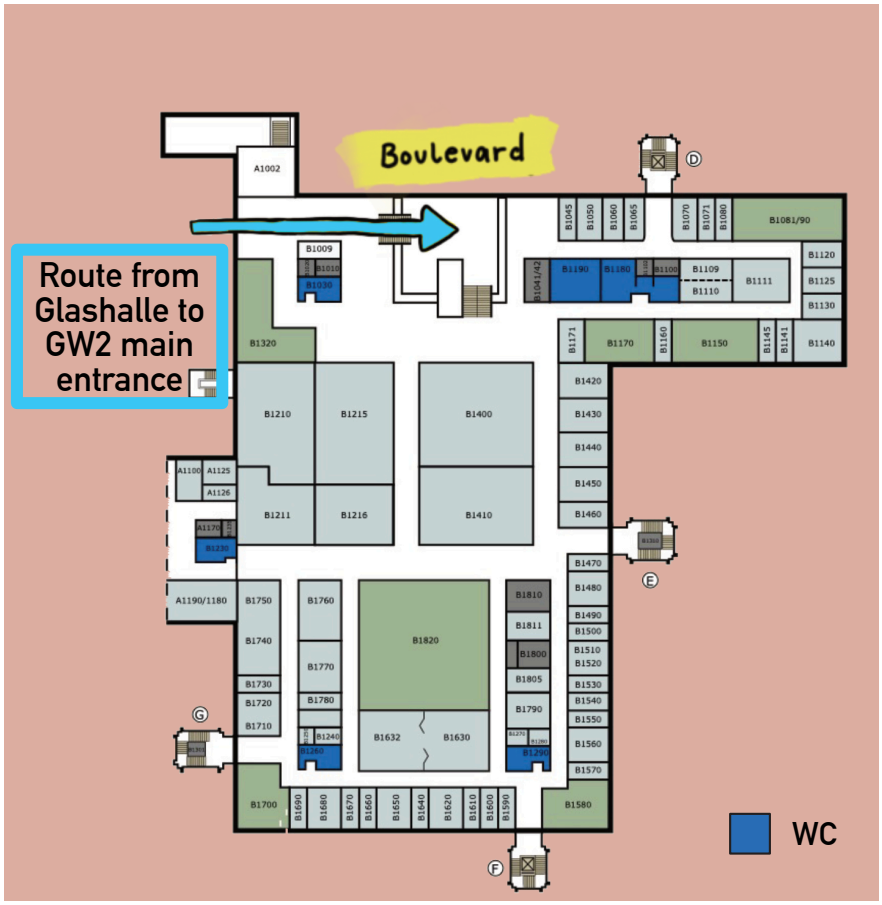
GW2

GW2 Entrances

To reach the GW2, there are multiple ways. The main entrance on the boulevard (2nd floor GW2) is marked by the yellow triangle shape. Both routes start at the bus/tram station “Universität/ Zentralbereich”.

For the blue route you enter the Glashalle (GH) which remains at ground level and keep going straight until you reach the side entrance of the GW2. The yellow route takes you up the stairs in the Glashalle, then turns right onto the Boulevard. You will walk by the first entrance to the GW2 (GW2 coffee shop) until you find the second doors (main entrance) to the GW2 on your right.

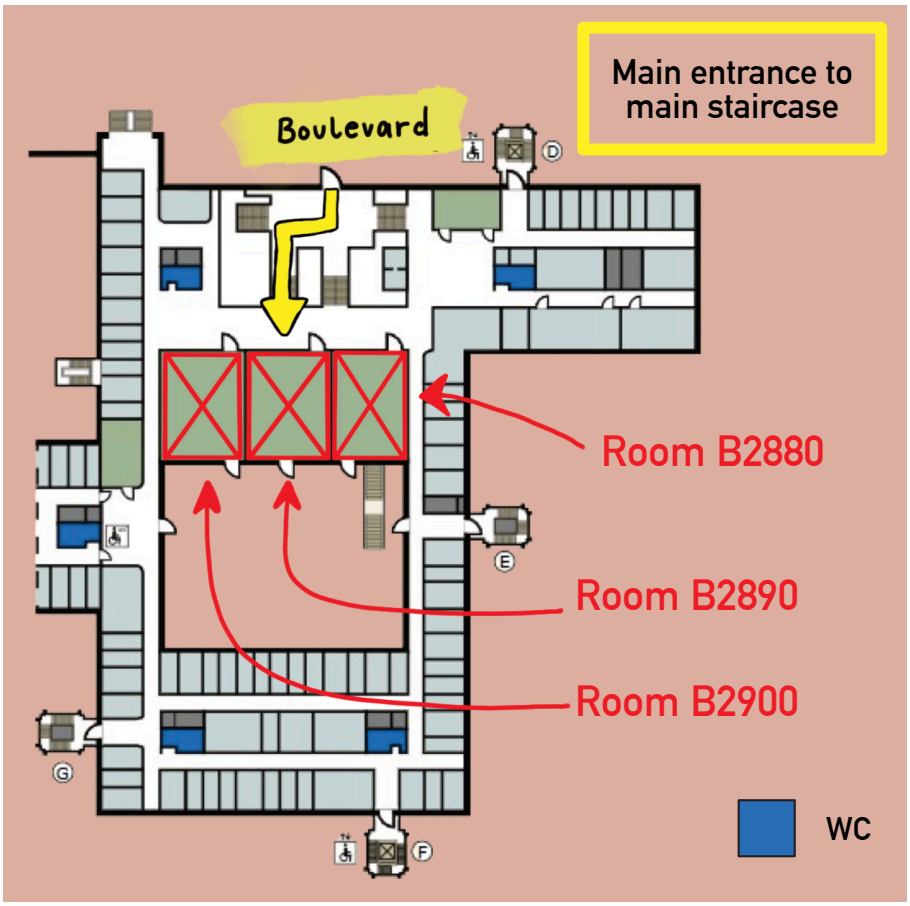




1st floor

Helpful link:

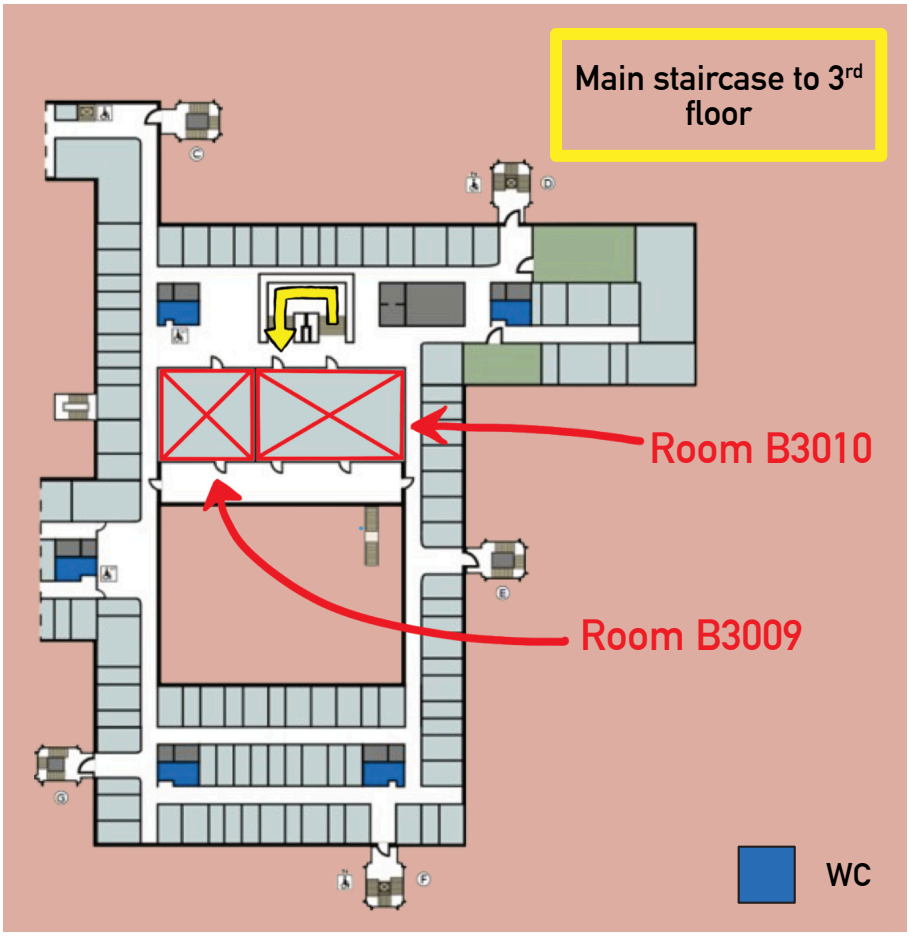
Uni Bremen GW2 floor plan details



2nd floor

Registration at B2880

Room B2890 and B2900 can be used for talks in little groups



3rd floor

Coffee breaks will be on this floor.

Overview Program

Wednesday, 26th March

Time	Location	Topic
09:00 – 09:30	**Room B2880**	**Registration** for Pre-Conference Workshop Attendees
09:30 – 16:30	**Room B2900**	**Pre-Conference Workshop** see specific workshop time table online
16:30 – 17:30	**Room B2880**	**Registration / Break** for Pre-Conference Workshop Attendees
17:30 – 19:00	**Room B3009**	**Welcome Reception: TwinLife – Past, Present, and Future** Christian KANDLER et al.: Welcome & General Introduction to TwinLife Charlotte PAHNKE: TwinSNPs Alicia SCHOWE: TwinLife Epigenetic Change Satellite (TECS) Lena WEIGEL: ImmunoTwin Moana BEYER: TwinLife Environment
19:00 – 22:00	**Café UNIQUE**	**Get Together**

Helpful links:

TwinLife User Conference Program online

Café UNIQUE Website

Thursday, 27th March

Time	Location	Topic
08:30 – 10:00	**Room B2880**	**Late Registration**
08:45 – 09:45	**Room B3009**	**Plenary Discussion** with Sabrina TORREGROZA & Svenja EIBELSHÄUSER: *TwinLife and infas: A Longitudinal Partnership*
09:45 – 10:15	**Floor GW2**	**Coffee Break**
10:15 – 11:15		**Paper Presentation Session 1**
	Room B3010	**PPS 1A Methods – Chair: Steven WEZEL** **10:15** Juan Gabriel RODRIGUEZ & Raquel Sebastián Lago: *Effort, Genes and Circumstances* **10:35** Laura BOTZET et al.: *To Adjust or to Weight? Dealing With Confounding Variables When Estimating Effects of Hormonal Contraception on Women's Sexuality in Longitudinal Data* **10:55** Steven WEZEL et al.: *Differences Between Nuclear Twin Family and Classical Twin Model Parameter Estimates in Assortative Mating Based on Simulated Data*
	Room B3009	**PPS 1B Health and Well-Being – Chair: Marco DEPPE** **10:15** Marco DEPPE: *Well-Being Research Based on Twinlife Data* **10:35** Charlotte MISCHNER & Christian Wolff: *NTFD Decomposition of Trait, State, and Slope Variance of Life Satisfaction in Childhood and Early Adulthood* **10:55** Laura HELBIG: *The Confounding Role of Household Chaos in the Association Between Mental Health Problems and School Grades*

Thursday, 27th March

Time	Location	Topic
11:15 – 11:30	**Short Break**	
11:30 – 12:30	**Paper Presentation Session 2**	
	Room B3010	**PPS 2A Politics, Values, and Religiousness – Chair: Ariel KNAFO-NOAM** ~~**11:30** Kevin CHENG: *Personality, Politics, and Pedigree: Insights From a Cross-Sequential Study of German Twins*~~ **11:30** Christoph SPÖRLEIN et al.: *Longitudinal Development of Gender Differences in Religious Participation During Adolescence* **11:50** Ariel KNAFO-NOAM: *The Genetic and Environmental Contribution to Values: New Results From the Longitudinal Israeli Study of Twins and Ideas for Collaboration*
	Room B3009	**PPS 2B Peer Victimization and School Stress – Chair: Ruyan LUO** **11:30** Ruyan LUO & Yixuan Liu: *A Co-Twin Control Study of the Association Between School Stress and Depressive Symptoms in Adolescence* **11:50** Lucy BOWES: *Does Negative Parenting Behavior Lead to Later Peer Victimization? A Longitudinal Co-Twin Control Study* **12:10** Benjamin IFFLAND et al.: *Vulnerability for Peer Victimization: Examination of Heritability and Risk Factors in a Twin-Family Study*
12:30 – 13:30	**Mensa**	**Lunch**

Thursday, 27th March

Time	Location	Topic
13:30 – 14:30	**Workshop & Paper Presentation Session 3**	
	Room B3009	**Workshop ImmunoTwin** **13:30** Jonathan TURNER: *What is ImmunoTwin?* **13:45** Jeanne Le CLÉAC'H et al.: *Impact of Psycho-Social Environment (PSE) on Immune Profiles: Immunophenotyping Adversity-Divergent Monozygotic Twins* **14:00** Archibold MPOSHI et al.: *Biological Embedding of the Psycho-Social Environment: Insights From Monozygotic Twin DNA Methylation Analysis* **14:15** Discussion
	Room B3010	**PPS 3 Birthweight and Zygosity Effects on Child Development – Chair: Robert EVES** **13:30** Robert EVES et al.: *Differences in Relative Birthweight Between Twins and Its Association With Cognitive Outcomes* **13:50** Julia KRELL et al.: *Differences in Relative Birthweight Between Twins and Its Association With Behavioural Outcomes* **14:10** Karoline LANGNER: *Effects of Zygosity and Sex on Depictions of Affection in Twin Children's Drawings*
14:30 – 14:40	**Short Break**	

Thursday, 27th March

Time	Location	Topic
14:40 – 15:20	**Paper Presentation Session 4**	
	Room B3009	**PPS 4A Epigenetics I – Chair: Alicia SCHOWE** **14:40** Alicia SCHOWE et al.: *Genetic and Environmental Contributions to Salivary DNA Methylation Across Development: A Longitudinal Analysis of Monozygotic and Dizygotic Twins* **15:00** Dmitry KUZNETSOV et al.: *Genetic and Environmental Contributions to Epigenetic Aging Across Adolescence and Young Adulthood* ~~**15:00** Deniz FRAEMKE et al.: *Associations of DNA Methylation Profile Scoresof Cognition With Cognitive Development, Academic Performance, and Socioeconomic Attainments*~~
	Room B3010	**PPS 4B Parent-Child Transmission – Chair: Alexandra STARR** **14:40** Alexandra STARR et al.: *Does Parent-Child Resemblance in Intelligence and Reading Ability Predict Children's School Performance?* **15:00** Christina BORNER & Uwe Sunde: *Unfolding the Intergenerational Transmission of Economic and Social Preferences*
15:20 – 15:50	**Floor GW2**	**Coffee Break**

Thursday, 27th March

Time	Location	Topic
15:50 – 16:50	**Paper Presentation Session 5**	
	Room B3009	**WPPS 5A Epigenetics II (Room B3009) – Chair: Jana INSTINSKE** **15:50** Jana INSTINSKE et al.: *Epigenetic Aging and Personality Differences: Latent Change Analyses of Twin Data* **16:10** Dmitry KUZNETSOV et al.: *Tracking Bullying Experience in Accelerated Epigenetic Aging During Adolescence* **16:30** Yixuan LIU et al.: *Evidence of Faster Pace of Aging Measured in Saliva DNA Methylation Among Educational Mobile German Young Adults*
	Room B3010	**PPS 5B Parental Environment – Chair: Bastian MÖNKEDIEK** **15:50** Jasmin WERTZ: *Associations Between Parental Symptoms of ADHD and Parenting: Evidence From a Longitudinal Cohort* **16:10** Bastian MÖNKEDIEK: *The Contributions of Genes And Environment to Leaving the Parental Home* **16:30** Ilija MILOVANOVIĆ et al.: *Genetic and Environmental Effects on Personality and Perception of Parenthood: Insights From a Serbian and German Twin Study*
17:00 – 18:00	**Room B3010**	German Twin Registry under Development (GerTRuD) Committee Meeting

Friday, 28th March

Time	Location	Topic
08:45 – 10:15	**Room B3009**	**Workshop** with Alexander CAMPBELL et al.: Introduction to ICE FALCON: Novel Twin Methods for Causal Inference
10:15 – 10:45	**Floor GW2**	**Coffee Break**
10:45 – 12:15	**Research Idea Presentation Session I & II**	
	Room B3009	**RIPS I – Chair: Theresa ROHM** **10:45** Henriette BERING & Wiebke Schulz: *Parental Separation and Children's Educational Outcomes* **11:00** Henriette BERING & Wiebke Schulz: *Extracurricular Activities and Educational Potential* **11:15** Martin FIEDER: *Musical and Artistic Abilities as a By-Product of the Evolution of Human Pro-Sociality* **11:30** Josué Jonatan Teran LINARTE: *Digital Device Usage and Cognitive Development in Children: A Longitudinal and Behavioural Genetic Approach* **11:45** Kouta SASAKI: *The Triangle of Flexible Self-Regulation, Goal Achievement and Subjective Well-Being: Benefits of a Behavior Genetic Perspective* **12:00** Alexandra ZAPKO-WILLMES & Julia M. Rohrer: *Birth-Order Effects on Individual Differences Among Twin Siblings*

Friday, 28th March

Time	Location	Topic
10:45 – 12:15	**Research Idea Presentation Session I & II**	
	Room B3010	**RIPS II – Chair: Christian KANDLER** **10:45** Sören HESE et al.: *Can High Dimensional Earth Observation Based Environmental Information Explain Epigenetic Clock Pattern Variability in Twinlife?* **11:00** Caspar GROSS: *Using Long Read Sequencing to Investigate Genetic and Epigenetic Variability in 400 Twin Pairs* **11:15** Charlotte PAHNKE: *A Systematic Investigation of Assortative Mating by Geographic Location in Germany* **11:30** Dejan PAJIÆ: *Exploring Personality and Genetic Correlates of Risky Behaviour in Virtual Reality* **11:45** Gerit LINNEWEBER: *Cross-Comparisons of Fruit Fly Behavioral Individuality With Twinlife Data* **12:00** Petri KAJONIUS & David Sjöström: *PsiTwin/Psychedelic Experiences With Twins: Genetic and Experiential Contributions and Causes in Mental Health and Well-Being*
12:30 – 13:30	**Mensa**	**Lunch**
13:30 – 14:15	**Room B3009**	**Plenary Discussion** with Moana BEYER et al.: *Challenges and Opportunities in Developing a German Twin Registry*
14:15 – 14:45	**Room B3009**	**Special Talk** about Collaborations with Tania Kiehl LUCCI & Emma Otta regarding *The USP Twin Panel*, a Brazilian twin registry
14:45 – 15:00	**Room B3009**	**Farewell**

All contributions

TwinLife – Past, Present, and Future

Christian Kandler[a], Marco Deppe[a], Jana Instinske[a], Theresa Rohm[a], Charlotte Pahnke[b], Alicia Schowe[c], Lena Weigel[d], & Moana Beyer[e,f]

[a]University of Bremen; [b]University of Bonn; [c]Max Planck Institute of Psychiatry, Munich; [d]Bielefeld University; [e]Max Planck Institute for Human Development, Berlin; [f]Humboldt University Berlin (Germany)

Different contribution format

In this array of conference-opening talks, the organizers will introduce the TwinLife conference. The presenters will then give an overview on the past achievements, the current state, and the future plans regarding the interdisciplinary TwinLife core project and its satellite projects TwinSNPs, TwinLife Epigenetic Change satellite (TECS), ImmunoTwin, and TwinLife Environment.

TwinLife and infas – A Longitudinal Partnership

Sabrina Torregroza & Svenja Eibelshäuser

infas Institute for Applied Social Science, Bonn (Germany)

Plenary Discussion

Overview on TwinLife from the perspective of the conducting institute, focussing on the survey design and its special features. Topics will be the various survey methods (incl. mixed mode design, parallelisation, modular structure of the questionnaire), the collection of biosamples, methods to support panel maintenance and the incentive concept. We will also discuss design adjustments due to the corona pandemic.

Effort, Genes and Circumstances

Juan Gabriel Rodriguez & Raquel Sebastián Lago

Universidade Complutense de Madrid (Spain)

Paper Presentation

The literature on biometrical modelling of twin and family data considers that there are only two determinants of a person's characteristics: genes and environments. However, over time, these characteristics plus the individual's free will define the choices that individuals make about such facets of life as the number of hours of study, risk-taking in behavior, patience for results, and so on. These endogenously arising decisions are called efforts in the inequality of opportunity literature and investments in labor economics. Thus, the modern theory of justice recognizes that an individual's outcome such as income is a function of genes, circumstances (socioeconomic background, sex, place of birth) and effort. However, individuals are only responsible for their effort because genes and circumstances are beyond the individual's control. Using the sample of monozygotic twin pairs born in 1990-1993 (around 31 years old in 2021) and 1997-1998 (around 25 years old in 2021) included in the TwinLife database, we first decompose total inequality (of income and educational attainment) into between-groups and within-groups inequality, where the groups are the monozygotic twin siblings. Since monozygotic twins have the same genetic information and share the same family and social starting conditions, intra-group inequality will be the part of total inequality that is explained by effort (and luck or unobserved random terms), while between-group inequality will measure the effect of genes and circumstances (plus luck). Thereafter, we will apply the same strategy to estimate the part explained by genes and the part explained by observed circumstances. On the other hand, a necessary condition for effort to have any explanatory power for the outcomes is that there exists such a thing as free will. For this reason, the later the outcome to be measured (childhood, youth, adulthood), the greater the role of choices (effort) and the less the role of genes and circumstances. To study this idea, we use the aforementioned samples and compare the explanatory power of effort (for income and educational level) at two different points in time in the life of individuals. For these two goals, we consider the Mean logarithmic Deviation index which belongs to the Generalized Entropy class -the only class of relative inequality indices that is additively decomposable into a between- and a within-group component - and has a path-independent decomposition.

To Adjust or to Weight? Dealing With Confounding Variables When Estimating Effects of Hormonal Contraception on Women's Sexuality in Longitudinal Data

Laura J. Botzet[a,b], Julia M. Rohrer[c], Lars Penke[a,b], & Ruben C. Arslan[c,d]

[a]Leibniz ScienceCampus Primate Cognition Göttingen; [b]Georg August University of Göttingen; [c]University of Leipzig; [d]Max Planck Institute for Human Development, Berlin (Germany)

Paper Presentation

Researchers are often interested in making causal inferences from longitudinal observational datasets like TwinLife. We will demonstrate analytical approaches that can approximate average treatment effects using the example of analyzing the effects of hormonal contraception on women's sexuality in the PAIRFAM dataset. Different women experience hormonal contraceptives differently and report side effects that range from negative to positive. However, research on the effects of hormonal contraceptives on psychological outcomes has struggled to identify average causal effects. In this study, we used longitudinal data to improve our ability to separate the causal effects of hormonal contraceptives from other sources of association, including observed confounding. We analyzed data from PAIRFAM, a German longitudinal panel dataset consisting of 14 waves, using Bayesian multilevel regression. To deal with confounding and to examine the robustness of the results to analytical choices, we implemented two analytical approaches: adjusted regression analyses and inverse probability of treatment weighting analyses. We found evidence for positive average treatment effects of hormonal contraceptives on sexual frequency and sexual satisfaction, but no robust effects on desired sexual frequency. While this presentation will focus on the question whether the analytical choice between these two approaches affects the conclusion, the general results of this study help to understand the impact of hormonal contraception on women's sexuality in a naturalistic setting. Our example may be useful for TwinLife users seeking to conduct similar analyses.

Differences Between Nuclear Twin Family and Classical Twin Model Parameter Estimates in Assortative Mating Based on Simulated Data

Steven Wezel[a,b], Jana Instinske[b], Markus Janczyk[b], & Christian Kandler[b]

[a]University of Basel (Switzerland); [b]University of Bremen (Germany)

Paper Presentation

The presence of partner correlation, referred to as assortative mating, increases genetic similarity between relatives, leading to a violation of the classical twin models assumption of dizygotic twins sharing 50% of additive genetic factors on average. This violation leads to an underestimation of heritability in the classical twin model. The inclusion of parents of twins in a nuclear twin family design enables to account for these effects. Populations with varying parameters using GeneEvolve were estimated to examine when and to what extent classical and nuclear twin family models provide different estimates of genetic and environmental sources of variance. The amount of additive genetic variance, shared environmental effects (sibling-specific and familial) and assortative mating were manipulated. Samples with different *N* were randomly and repeatedly drawn from simulated populations and analysed with the use of classical and nuclear twin family modeling. Results from over three million models showed the expected underestimation of heritability based on classical twin models in the presence of moderate to strong values for additive genetic variance and assortative mating with reciprocal findings for negative assortative mating. Implications of these findings for TwinLife users are discussed under inclusion of meta-analytic results to support them in evaluating model selection for their analyses.

Well-Being Research Based on TwinLife Data

Marco Deppe

University of Bremen (Germany)

Paper Presentation

TwinLife offers a wide array of data on well-being and related phenotypes. Life satisfaction has been measured continuously throughout the panel, while life-domain specific satisfactions, such as family, work, or partnership satisfaction have been measured on specific occasions. Furthermore, the dataset includes information on related phenotypes such as self-esteem, self-efficacy, or depressive symptoms and anxiety symptoms. A number of research projects on well-being have been conducted based on the TwinLife data. This talk showcases the available data on well-being phenotypes within TwinLife. Additionally, it portrays two ongoing research projects as examples: One on the stability and change of life satisfaction based on a classical twin design, extended by an analysis of polygenic scores – and another one on the potential overlap of Big Five personality traits and life domain satisfactions in a genetically informative design.

Nuclear Twin Family Design Decomposition of Trait, State, and Slope Variance of Life Satisfaction in Childhood and Early Adulthood

Charlotte Mischner & Christian Wolff

Georg August University Göttingen (Germany)

Paper Presentation

Introduction: The present study examines the heritability of individual differences in systematic developmental trajectories using the example of life satisfaction. More specifically, we investigate the extent to which trait levels change beyond genetics. We understand life satisfaction as reflective of the adaptivity of the cumulative causes of human development. It is likely that distinct social and biological processes influence developmental trajectories during youth and early adulthood.

Method: We use data from seven measurement occasions from the TwinLife project including approximately 4,000 twin families. We model development of twins and siblings in youth (10-18) and early adulthood (18-31) in one integrated piecewise latent growth curve model (PLGCM) with a latent intercept at age 18. This allows us to separate measurement error from stable trait variance and individual differences in development. More specifically, systematic developmental trends (linear or quadratic) and unsystematic state fluctuations can be decomposed into genetic and environmental sources (shared, twin-specific, or individual). Parents' trait levels are included in the same PLGCM enabling NTFD analyses only for trait levels.

Results: Preliminary analyses indicate moderate u-shaped decreases in life satisfaction in both age periods. Environmental influences occurred in both youth (twin-specific and individual) and early adulthood (shared, individual, and direct influence from father). Genetic influences only appeared in early adulthood (additive and direct influence from father).

Discussion: The analytical approach promotes a differentiated understanding of developmental patterns and their potential sources. In particular, it highlights that systematic change in life satisfaction is possible beyond genetic influence. In a next step, it will be interesting to investigate codevelopment with traits that might affect development in life satisfaction (e.g., self-efficacy).

The Confounding Role of Household Chaos in the Association Between Mental Health Problems and School Grades

Laura Helbig

Institute for Employment Research, Nürnberg (Germany)

Paper Presentation

It is well established that educational achievement is a key determinant of an individual's live chances and circumstances. The obtained educational degree is associated with various outcomes, including access to vocational training, income, and happiness. However, children and adolescents do not have equal opportunities to successfully progress through the educational system. Studies show that diverse social-structural factors - such as family size, neighbourhood characteristics, and physical and mental health - influence the educational achievement of young people. Mental health problems are, for example, associated with lower grades and grade repetition. Nevertheless, the exact relationship between mental health problems and educational attainment remains unclear. It is possible that confounding factors, such as household chaos, influence both mental health and educational processes simultaneously and establish a significant relationship between the two. This project therefore aims to examine the confounding role of young adolescents' individually experienced household chaos in the association between mental health problems and school grades. I use data of cohort 2 of the German TwinLife Study, wave 1 (10 - 12 years). I restrict the sample to monozygotic twins who live in the same household and attend the same school track (n= 534). Applying pooled OLS models, the results show a significant influence of externalising and internalising problem behaviour on math and partially on German grades. Including the household chaos scale as a confounding factor, however, shows a non-significant influence of both kinds of problem behaviour on school grades, while the influence of household chaos on grades is positive and significant. This picture remains unchanged when controlling for further variables. In the next step, I apply twin fixed effects models to fully eliminate shared environmental and genetic influences on mental health problems and school grades. Consistent with the POLS-models, these analyses show a non-significant influence of mental health problems on school grades. However, the influence of household chaos on school grades persists despite controlling for shared environmental and genetic influences. The results suggest that the impact of internalising and externalising problem behaviour on school grades is due to confounding factors such as household chaos, which has a unique influence on school grades.

Personality, Politics, and Pedigree: Insights from a Cross-Sequential Study of German Twins

Kevin Cheng

University of Birmingham (UK)

Paper Presentation

This study leverages the "TwinLife" dataset, a longitudinal, cross-sequential study with an extended twin family design conducted throughout Germany. The TwinLife databank encompasses four age cohorts of monozygotic and dizygotic same-sex twin pairs aged 5, 11, 17, and 23 at the initial survey, integrating data from twins, their parents, siblings, partners, and children, where applicable. The TwinLife study uniquely investigates the genetic and environmental influences on political behaviors by comparing personality traits across twin and non-twin family members. The methodology by TwinLife incorporates a national probability-based sampling procedure to select 4,096 families from urban and rural communities across Germany. This methodological framework provides a robust basis for examining the interaction between genetic predispositions and environmental factors influencing political engagement. We analyze the influence of personality traits such as Neuroticism, Conscientiousness, and Openness on political behaviors, adjusting for covariates including zygosity, sex, age, and life satisfaction, aligning with previous findings that highlight the role of personality in political participation. Initial results indicate a significant negative correlation between Neuroticism and political engagement, with higher levels of this trait associated with less involvement in politics ($p < 0.001$), supporting the work of a previous study who found similar trends. In contrast, traits like Conscientiousness and Openness are anticipated to positively affect political participation, corroborating research that linked these traits to greater civic involvement and political activism. The study's comprehensive sampling and sequential survey design facilitate an in-depth analysis of these traits' impacts while controlling for a myriad of confounding factors. This research elucidates the complex interplay between personality and political behaviors and offers insights into how both genetic and environmental factors shape political attitudes. The findings have important implications for understanding the psychological foundations of political participation and developing targeted strategies for enhancing civic engagement.

Longitudinal Development of Gender Differences in Religious Participation During Adolescence

Christoph Spörlein[a], Elmar Schlueter[b], & Josué Jonatan Teran Linarte[a]

[a]Heinrich Heine University of Düsseldorf; [b]Justus Liebig University Giessen (Germany)

Paper Presentation

Comprehensive review studies enumerate wide-ranging lists of individual-, family-related and contextual factors contributing to gender differences in the formation and changes in religious participation during adolescence. Despite substantial heritability estimates of religious participation, genetic differences contributing to differences among individuals rarely if ever feature in review studies. In this article, we rely on four waves of the German TwinLife-Panel to model the formation and development of religious participation during adolescence explicitly considering genetic contributions to these processes. We rely on genetic simplex models to decompose the variance in religious participation into genetic, shared and non-shared environmental components. Each component is further differentiated into an innovation and transmitted component highlighting the fact that new sources of differences may enter the picture during development and older patterns may still exert an effect over time. By conducting our analyses separately for boys and girls, we provide insights into differences in the relative importance of each component (A, C, E) as well as its subcomponents (innovation, transmission). The results suggest a strongly gendered pattern where genetic differences matter less for girls whereas shared-environmental components are substantially larger with strong (transmitted) environmental consistency over time. We discuss these findings with respect to patterns identified in the review literature and provide alternative interpretations based on our genetically sensitive research findings.

The Genetic and Environmental Contribution to Values: New Results From the Longitudinal Israeli Study of Twins and Ideas for Collaboration

Ariel Knafo-Noam

The Hebrew University of Jerusalem (Israel)

Paper Presentation

Values as abstract, desirable goals that underlie actions are important predictors of behaviors and attitudes. Despite their importance for moral development, surprisingly little is known about how values develop. Research typically assumes, with little direct evidence, that values are mainly formed in adolescence, and that they result from familial socialization processes during childhood. In recent years, however, the developmental literature has begun exploring the emergence of values in childhood, suggesting that value development is a protracted process that starts in early childhood and takes place at least throughout adolescence. I will present data from the Longitudinal Israeli Study of Twins, documenting mean level change in values, from childhood to adolescence. Furthermore, I will test the hypothesis that within-culture individual differences in value priorities are in part due to genetic variation across individuals. These findings support the recent view that values start their development at earlier ages than had been assumed previously, and they further our understanding of the genetic and environmental factors involved in value formation at young ages and at the transition to adolescence. Ideas for collaboration with TwinLife users are welcome.

A Co-Twin Control Study of the Association Between School Stress and Depressive Symptoms in Adolescence

Ruyan Luo & Yixuan Liu

Bielefeld University (Germany)

Paper Presentation

Purpose: The aim of the study was to investigate the magnitude of the independent association between school stress and depressive symptoms in adolescence, after adjusting for both unmeasured and measured confounding factors. Methods: Using the German Twin Family Panel (TwinLife), we examined same-sex twins born between 2003 and 2004 ($N = 934$). Twins self-reported school stress at age 15 and depressive symptoms at age 15. We created confirmatory factor scores from 7 school stress items and the 7-item Beck's Depression Inventory. Depressive symptoms were regressed in three models: (1) among unrelated individuals, adjusting for previous school stress and depressive symptoms at age 13, and biological sex; (2) among co-twins, comparing a twin exposed to more school stress with their co-twin exposed to less while adjusting for previous school stress and depressive symptoms at age 13; and (3) among co-twins, additionally controlling for biological sex and zygosity. Results: Among unrelated individuals, while controlling for previous school stress and depressive symptoms, and biological sex, a one standard deviation increase in school stress was associated with a one standard deviation increase in depressive symptoms (standard coefficent $\beta = 0.33$, 95% CI [0.265, 0.396]). Among co-twins, the coefficient attenuated to 0.29 (95% CI [0.193, 0.387]) when accounting for previous school stress and depressive symptoms. Finally, when adjusting for biological sex and zygosity, the interaction term between biological sex and school stress was not statistically significant, but the interaction term between zygosity and school stress showed a significant effect. The coefficient decreased to 0.14 and became marginally statistically significant (95% CI [–0.029, 0.348]) among monozygotic twin pairs and increased to 0.44 among dizygotic twin pairs, remaining statistically significant (95% CI [0.084, 0.472]). Conclusions: The results suggest that school stress is marginally significant associated with depressive symptoms, with a small effect size after controlling for both unmeasured and measured confounding factors among monozygotic twins. This indicates a need for additional interventions and screenings to address adolescents' mental health beyond school stress interventions.

Does Negative Parenting Behavior Lead to Later Peer Victimization? A Longitudinal Co-Twin Control Study

Lucy Bowes

University of Oxford (UK)

Paper Presentation

Negative parenting behavior is associated with peer victimization. However, we do not know if this association changes across development. It is also unclear whether associations hold after adjusting for genetic factors. Peer victimization and negative parenting behavior were examined using data from TwinLife age 5 and age 11 cohorts. We used maternal reports of parenting at baseline and child self-reports of peer victimization measured two years later. We used a co-twin design among monozygotic twins to control for shared environmental and genetic factors. At the population level, exposure to negative parenting behavior was associated with increased likelihood of peer victimization. The strength of the association was similar for participants in both age cohorts. However, the associations between negative parenting behavior and peer victimization did not remain statistically significant after accounting for genetic and shared environmental factors among monozygotic twins. Our findings suggest that the relationship between negative parenting behavior and children's risk for peer victimization may reflect shared underlying environmental and genetic risks.

Vulnerability for Peer Victimization – Examination of Heritability and Risk Factors in a Twin-Family Study

Benjamin Iffland, Dana Martinschledde, & Frank Neuner

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Paper Presentation

Background: Peer victimization is associated with serious short- and long-term consequences, including mental health problems. The close link between victimization and psychopathology highlights the importance of examining potential risk factors that may increase vulnerability to victimization. Objective: The present study aimed to better understand mechanisms underlying transgenerational transmission of victimization risk by examining the interplay between genes and environment. Method: We used a nuclear twin family design, including data from monozygotic and dizygotic twin pairs and their parents and siblings. Direct and indirect forms of peer victimization were assessed in a German population-based sample of 1,915 twin families. Structural equation modeling was used to estimate heritability and the size of environmental effects shaping the vulnerability for peer victimization. The role of parental and child psychopathology as risk factors for victimization was analyzed in path analyses. Results: Genetic effects accounted for approximately one-third of the variance, which is most likely due to the presence of genetically predisposed characteristics that increase an individual' risk of being victimized by peers. Non-shared environmental influences accounted for the rest of variance, underscoring the importance of environmental factors that are unique to each sibling and eventually emphasizing the role of shared family factors affecting each sibling differently. Longitudinal path analysis revealed that the relationship between parental psychological well-being and children's victimization was mediated by parenting style. Children's problem behavior mediated the association between parenting style and children's victimization. Conclusions: Implications for maximization of the effectiveness of intervention approaches targeting both individual and family-level factors are discussed.

Impact of Psycho-Social Environment (PSE) on Immune Profiles: Immuno-Phenotyping Adversity-Divergent Monozygotic Twins

Jeanne Le Cléac'h[a,b], Archibold Mposhi[a], Sophie Mériaux[a], Dominika Repcikova[b], Lena Weigel[c], Dmitry Kuznetsov[d], Bastian Mönkediek[c], Conchita D'Ambrosio[b], Claus Vögele[b], Martin Diewald[c], & Jonathan D. Turner[a]

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Workshop

Early life adversities (ELA), particularly psycho-social environment (PSE) stresses, are significant drivers of non-communicable disease development in adulthood, contributing to long-term health inequalities. These diseases are closely associated with distinct features of immune aging, including chronic inflammation and immune senescence. While these biological consequences of ELA are well-documented, the mechanisms connecting PSE exposure to altered immune function remain poorly understood. Here, we hypothesize that variations in PSE stress perception during early life disrupt immunological development, shaping a pro-inflammatory immune phenotype. To disentangle genetic influences from environmental effects, we employed a robust approach using the TwinLife ImmunoTwin subcohort, comprising 28 monozygotic twin pairs. Participants completed six standardized questionnaires assessing different PSE dimensions and provided blood and saliva samples for biosampling. Immune profiling was conducted by single-cell flow and mass cytometry using both supervised and unsupervised analysis techniques. To explore the mechanistic effects of PSE perception, questionnaire responses were categorized based on the two-dimensional model of threat and deprivation. The threat dimension demonstrated the strongest correlations with immune profile variations within twin pairs. Specifically, physical and emotional threats were linked to differences in cytotoxic T cells (CD8+), T helper cells (CD4+), and Natural Killer (NK) cell frequencies, alongside expression of senescence markers such as CD57, CD27, and CD28. These findings align with prior studies, and further functional assays of these cell types will be conducted, alongside investigations of DNA methylation and RNA expression profiles. The ImmunoTwin cohort offers valuable insights into the biological underpinnings of social health inequalities. By unraveling these mechanisms, our research aims to inform the development of future prevention strategies and interventions.

Biological Embedding of the Psycho-Social Environment: Insights from Monozygotic Twin DNA Methylation Analysis

Archibold Mposhi[a], Jeanne Le Cléac'h[a,b], Sophie Mériaux[a], Dominika Repcikova[b], Lena Weigel[c], Dmitry Kuznetsov[d], Bastian Mönkediek[c], Conchita D'Ambrosio[b], Claus Vögele[b], Martin Diewald[c], & Jonathan D. Turner[a]

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Workshop

The psycho-social environment (PSE) is a well-established risk factor for a wide range of health conditions, yet the underlying molecular mechanisms remain largely unknown. In the ImmunoTwin study, we investigated the effects of psycho-social stress on the epigenome in 28 pairs of monozygotic twins with discordant adversarial life experiences. Each pair consisted of one individual classified as "control" and the stress-exposed twin classified as "divergent," based on psychological assessments. Whole blood samples were obtained and DNA methylation was quantified using the Infinium EPICv2 BeadChips arrays. We then performed a paired differential methylation analysis and used the partial least squares discriminant analysis (PLS-DA) to identify 3868 CpG loci with variable importance in projection scores (VIP > 3) that differentiated the divergent twin from their respective control twin. Gene Ontology and KEGG pathway analysis of genes associated with these CpGs revealed significant enrichment in pathways linked to stress-sensitive biological processes. Our key preliminary findings include alterations in pathways associated with neurotransmitter signaling (dopaminergic and cholinergic synapses), endocrine regulation (cortisol and thyroid hormone synthesis), and metabolic function (insulin signaling, central carbon metabolism). Immune-related pathways, such as chemokine signaling and Fc gamma R-mediated phagocytosis, as well as cardiovascular pathways (cardiomyopathy, atherosclerosis), were also enriched, indicating the systemic effects of PSE mediated stress. Additionally, we identified critical pathways that have been previously implicated in cancer biology (PI3K-Akt, mTOR, and p53 signaling) suggesting that PSE mediated stress may increase cancer susceptibility through epigenetic modifications. Our preliminary results suggest that the PSE is biologically embedded. Furthermore, epigenetic changes such as DNA methylation may serve as biomarkers for PSE mediated stress exposure and could provide insights into the molecular mechanisms underlying stress-related health outcomes. Of note, pathways associated with the brain and nervous system further entrench the notion that PSE is a critical modulator of synaptic plasticity and neurotransmitter regulation, which affects how the brain functions.

Differences in Relative Birthweight Between Twins and Its Association With Cognitive Outcomes

Robert Eves[a], Julia Krell[a], Marco Deppe[b], Bastian Moenkediek[a], Christian Kandler[b], & Sakari Lemola[a]

[a]Bielefeld University; [b]University of Bremen (Germany)

Paper Presentation

There are numerous population studies investigating the association of infants being born at risk and later multiple developmental outcomes. In particular, lower birthweight, lower gestational age, and relatively low birthweight for gestation (i.e. small for gestational age- SGA) have all been consistently associated with lower IQ scores in childhood and adolescence. However, whether the association between relatively low birthweight for gestation and IQ is confounded by genetic effects is largely unknown. Twin studies allow a unique opportunity to control for genetic effects with twins still potentially differing in anthropometrics such as their relative birthweight for gestation. In preliminary linear mixed models accounting for clustering, using 2172 twin pairs from TwinLife, a 1 SD increase in relative birthweight for gestation was associated with a 1.05 increase ($p < 0.001$) in IQ scores across development (ages 5-25 years). Further investigation into whether effects are non-linear, differ by gestational age, or differ depending on age of assessment will be presented. In sum, results currently indicate that birth anthropometrics are associated with cognitive development even after controlling for potential genetic confounding.

Differences in Relative Birthweight Between Twins and Its Association With Behavioural Outcomes

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Paper Presentation

There are numerous population studies investigating the association of infants being born at risk and later multiple developmental outcomes. In particular, lower birthweight, lower gestational age, and relatively low birthweight for gestation (i.e. small for gestational age- SGA) have all been consistently associated with more behavioural problems in childhood, adolescence and adulthood. However, whether the association between relatively low birthweight for gestation and behavioural problems is confounded by genetic effects is largely unknown. Twin studies allow a unique opportunity to control for genetic effects with twins still potentially differing in anthropometrics such as their relative birthweight for gestation. In preliminary linear mixed models accounting for clustering, using 1598 twin pairs from TwinLife, a 1 SD increase in relative birthweight was associated with self-reported SDQ total problem score at ages 10-25 decreasing by 0.07 SD ($p < 0.001$). Further investigation into whether effects are moderated by age of assessment or when parent report is instead used will be presented. Overall, this result indicates that birth anthropometrics are associated with later behavioural outcomes after controlling for genetic confounding.

Effects of Zygosity and Sex on Depictions of Affection in Twin Children's Drawings

Karoline Langner

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Paper Presentation

Research has demonstrated that the experience of being part of a twin pair has significant effects on children's sense of identity, potentially impacting how they perceive and represent themselves. This influence appears to vary based on factors such as zygosity (whether twins are monozygotic or dizygotic) and gender composition (whether the pair consists of two girls, two boys, or one of each). These variations can be particularly evident in drawings, as children often express nuanced aspects of their self-concept and interpersonal relationships visually. In the present study, we seeked to understand the influence zigosity sex, and sex composition of a twin has on the different depiction of four indicators of affection in the drawing; physical proximity of the figures, heart drawings, the depicted author of the drawing smiling and the depicted twin smiling. We analysed drawings by 76 Brazilian pairs of twins aged 6- 14. The children drew themselves with their co-twin and these drawings were produced by each child in a laboratory without the presence of their co-twin. The four markers of affection were rated on a binary scale. To analyse the given data, a mixed model logistic regression with the twin pair as a random intercept were performed for each affective variable. Neither zygosity, sex composition nor age had any significant influence on the presence of either of the four variables. Female twins produced significantly more heart symbols ($p = 0.02$, $\beta = 2.04$) and depicted significantly more instances of their depicted twin smiling ($p = 0.02$, $\beta = 1.57$). Male twins produced significantly more depictions of physical proximity ($p = 0.04$, $\beta = -0.79$). There were no significant sex differences for the depiction of the author of the drawing smiling ($p = 0.09$, $\beta = 1.34$). These results suggest that expressions of affection in twin children's drawings may reflect gendered tendencies in how boys and girls conceptualize and display emotions. Male twins may view physical proximity as a form of closeness or bonding, while female twins may use more explicit symbols of affection, such as hearts, and emphasize positive expressions like smiling. Furthermore, zygosity does not seem to be a relevant factor in the way in which twin children display their affection in drawings.

Genetic and Environmental Contributions to Salivary DNA Methylation Across Development: A Longitudinal Analysis of Monozygotic and Dizygotic Twins

Alicia Schowe[a,b], Jana Instinske[c], Charlotte Pahnke[d], Andreas Forstner[d,e], Markus Nöthen[d], Christian Kandler[c], Darina Czamara[a], Elisabeth Binder[a]

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Paper Presentation

Variation in DNA methylation (DNAm) is influenced by both genetic and environmental factors and is associated with various health and disease outcomes. Previous studies on whole blood in adults have shown that the influence of genetic and environmental factors on DNAm differences varies with age, sex, and CpG site. To the best of our knowledge, this is the first study to date investigating the extent of genetic and environmental contributions to CpG site specific DNAm across different developmental stages (childhood, adolescence, and adulthood) and its stability over time in saliva. We apply bivariate twin models to analyze variances and covariances in CpG site-specific DNAm across two timepoints among 489 twin pairs (263 monozygotic and 226 dizygotic pairs) from the TwinLife Epigenetic Change Satellite (TECS) project. Preliminary analyses of the top 30% most variable CpG sites indicate a mean heritability of 5.0% at baseline and 3.4% at follow-up, with shared environmental contributions of 21.7% and 21.1%, respectively. The genetic contribution to DNAm stability (mean r = 0.13) was found to be 16.0%. Further analyses will include the decomposition of all epigenome-wide CpG sites and an exploratory investigation of heritability across DNAm variability, DNAm reliability, genomic regions, and developmental stages. Additionally, we will compare heritability estimates between saliva and blood and test highly heritable and stable CpG sites for enrichment of methylation quantitative trait loci. Overall, our epigenome-wide findings will provide insights into the cross-tissue generalizability of genetic and environmental sources of DNAm variation and will serve as a valuable resource for the scientific community, facilitating the interpretability of CpG-level associations.

Associations of DNA-Methylation Profile Scores of Cognition With Cognitive Development, Academic Performance, and Socioeconomic Attainments

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Paper Presentation

Recently, general cognitive abilities (g) have been quantified in blood DNA-methylation samples of adults that can be applied as methylation profile scores in separate target samples (Epigenetic-g). Here, we evaluate whether Epigenetic-g in children, adolescents, and adults is associated with cognitive development, academic performance, and socioeconomic attainments. Our preregistered analyses include n = 1,830 8-18-year-olds from the US Texas Twin Project, n = 5,432 5-32-year-olds from the German Twin Family Panel Study (TwinLife), and n = 2,262 0-72-year-olds from the German SOEP-Gene cohort. In the Texas Twin Project, which provided saliva DNA-methylation samples, Epigenetic-g is associated with levels of general cognitive ability, longitudinal gains in g, and math and reading school grades. For instance, no child with below average Epigenetic-g attended advanced math classes. In contrast, in German SOEP-Gene, which provided buccal DNA-methylation samples, quantifications of Epigenetic-g were not associated with cognitive performance, in line with previous reports of low blood-to-buccal cross-tissue correspondence. These results suggest that Epigenetic-g quantified in saliva samples, but not buccal tissue, is sensitive to individual differences in levels and developmental gains in g as well as real-world academic outcomes in children and adolescents. Similar to widely used measures of biological aging, DNA-methylation quantifications of psychological phenotypes may be useful tools to study the etiology of individual differences across the lifespan.

Does Parent-Child Resemblance in Intelligence and Reading Ability Predict Children's School Performance?

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Paper Presentation

Parents' abilities, such as their intelligence and reading skills, inform the rearing environments that they provide for their children, including the learning opportunities and interactions that children experience in the family home. Children differ between and within families in the extent to which their own abilities resemble their parents'. We hypothesise here that parent-child resemblance in intelligence and reading ability affects children's development in those domains that involve proximal, learning-related processes, such as school performance. Using data from twin children and their mothers from two longitudinal cohort studies, TwinLife (N = 1,043 families) and E-Risk (N = 1,116 families), we tested if early life differences in parent-child resemblance in intelligence (e.g., verbal and reasoning ability) and reading ability (e.g., word recognition, sight word efficiency) predict children's differences in later school performance. Results show that children who resemble their mothers more closely in reading ability at age 7 perform better in school at the ages 7 and 10 years after controlling for children's and mothers' ability and family socio-economic status. The prediction remained significant when accounting for unmeasured family-level confounding shared by siblings, which indicates that mother-child resemblance in reading ability is likely a causal factor for children's school performance. By contrast, mother-child resemblance in intelligence was not predictive of children's school performance. Our findings demonstrate that person-environment fit influences school performance, yet this effect is likely not universal. Personalising education might be most beneficial to children's learning development when targeting proximal, learning-related factors in children's rearing environment, such as reading ability.

Unfolding the Intergenera-tional Transmission of Economic and Social Preferences

Christina Borner & Uwe Sunde

Ludwig Maximilian University of Munich (Germany)

Paper Presentation

Economic and social preferences shape individual decisions and thereby determine a wide range of economic outcomes, including savings, education, and incomes. While preferences have long been treated as a black box, the formation of preferences has shifted into focus of intensified research efforts in recent years. In this project, we study the intergenerational transmission of risk, patience, and trust within families. Specifically, we examine how these preference types are transmitted from parents to children and which factors influence the transmission. A central focus is on the relative importance of genetic transmission as opposed to socialization and oblique transmission through environmental factors. The analysis applies a multi-method approach, including variance decompositions using classical twin designs and regression-based decomposition analysis. The analysis makes use of data from the German Twin Life Family Panel (TwinLife), a representative panel covering 4,096 families with data on both parents, their twin children and a third child if available. This data set provides us with the unique opportunity to integrate an analysis of genetic transmission based on twin data with parent-to-child transmission. This allows us to extend two largely distinct strands of existing literature and to provide novel insights in the formation of preferences in the family context by shedding new light on the validity and compatibility of the results obtained in previous twin studies compared to studies using alternative methodologies. Preliminary findings reveal that parents' preferences are transmitted to children. The intergenerational transmission coefficients are very similar in size for both parents. Based on the results of a twin decomposition model, we find that a significant portion of preference persistence is due to genetic heritability, with transmission shares due to genetic factors of 34% for risk, 20% for patience, and 25% for trust. However, the transmission estimates also suggest that social factors represent an important channel for preference transmission, even if contributing quantitatively slightly less to the positive correlation in preference across generations than genetics.

Epigenetic Aging and Personality Differences: Latent Change Analyses of Twin Data

Jana Instinske[a], Alicia M. Schowe[b,c], Darina Czamara[b], Dmitry V. Kuznetsov[d], Bastian Moenkediek[e], & Christian Kandler[a]

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Paper Presentation

Personality stability and change is not only attributable to the net contributions of genetic and environmental factors but also to their complex interplay. So can environmental factors induce changes in the expressions of genetic factors underlying personality differences. These epigenetic changes can be age-related, so that individual differences in epigenetic aging processes could account for variance in personality change over time. Reversely, personality differences could drive experiential differences that accelerate or decelerate epigenetic aging. So far, such associations have not been investigated. The present study approached these associations using saliva-based DNA methylation and self-reported personality data from 1,088 early adolescent to young adult twins from the TwinLife Epigenetic Change Satellite Project. Using chronological and biological clocks as measures of epigenetic aging, we applied (biometric) latent change analyses to explore the patterns, sources, and links of epigenetic aging and Big Five personality trait differences across a two-year time interval, coinciding with the COVID-19 pandemic. Besides significant mean-level acceleration in epigenetic aging and decreases in all personality traits (except neuroticism), variance in intraindividual change was mainly attributable to individual-specific environmental factors. Acceleration in epigenetic aging based on chronological clocks was associated with higher baseline levels of agreeableness and conscientiousness and with decreases in conscientiousness. Epigenetic aging based on biological clocks and conscientiousness were negatively related at baseline. These links involving stable personality differences were rather genetically driven, whereas the change correlation was primarily environmental. Findings are discussed considering epigenetic aging and personality differences in a system of interacting genetic and environmental factors.

Tracking Bullying Experience in Accelerated Epigenetic Aging During Adolescence

Dmitry V. Kuznetsov[a,b], Lena Weigel[a], Alicia Schowe[c,d], Yixuan Liu[a], Anastasia Andreas[e], & Martin Diewald[a]

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Paper Presentation

Background: Research has extensively documented that bullying victimization leads to a wide range of adverse health, psychosocial, and socioeconomic outcomes. However, the possible role of underlying epigenetic mechanisms remained largely speculative. To extend our understanding of how bullying victimization (frequency and perceived stress) and epigenetic markers, such as accelerated epigenetic aging, are interconnected, this study aimed to examine their linear and curvilinear associations over time in the presence of controlling familial, environmental, and individual factors. Methods: The investigated associations were examined using structural equation modeling in a sample of 760 individuals aged from 8.6 to 18.8 (M = 12.61, SD = 3.1 at the first time point; M = 14.92, SD = 3.0 at the second time point), whose epigenetic aging estimates (PedBE Accel., GrimAge Accel, and DunedinPACE) were measured twice, two years apart. Results: After controlling for familial and individual factors, no significant linear associations for all epigenetic aging measures were observed. Two inverted U-shaped quadratic associations were noted between bullying frequency and stress caused by victimization on the one hand, and GrimAge Acceleration on the other hand. No associations survived after the correction for the false discovery rate. Conclusions: The observed results and their absence illustrate the complexity, possibly non-linearity, and measure the specificity of the relationships between bullying victimization and epigenetic aging.

Evidence of Faster Pace of Aging Measured in Saliva DNA Methylation Among Educational Mobile German Young Adults

Yixuan Liu[a], Lena Weigel[a], Dmitry Kuznetsov[a], Anastasia Andreas[b], Alicia Schowe[c], Charlotte Pahnke[d], & Andreas Forstner[d]

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Paper Presentation

Background: Educational mobility may be a stressful experience that gets under the skin. This study aimed to test whether upward or downward educational mobility adversely affects the pace of aging. Methods: The analysis included 280 individuals from 140 twin pairs in the German Twin Family Panel (TwinLife). Pace of aging was assessed with the DunedinPACE epigenetic clock using saliva DNA methylation data. A co-twin control design identified effects of educational mobility by examining the interaction between within-family differences in tertiary education and parental tertiary education. Results: A significant interaction between within-family tertiary education differences and parental tertiary education was observed. Among twin pairs with tertiary-educated parents, the twin without tertiary education (downward educational mobility) exhibited a significantly faster pace of aging than the twin with tertiary education. Conversely, for twin pairs without tertiary-educated parents, the twin with tertiary education (upward educational mobility) showed a faster pace of aging compared to the twin without tertiary education, although this result did not reach statistical significance. Conclusion: These findings indicate that downward educational mobility in young adults is associated with a faster pace of aging. Additionally, there are indications that upward educational mobility may also be associated with a faster pace of aging, though this requires confirmation in studies with sufficient statistical power.

Associations Between Parental Symptoms of ADHD and Parenting: Evidence From a Longitudinal Cohort

Jasmin Wertz

University of Edinburgh (UK)

Paper Presentation

ADHD is increasingly diagnosed in adults, which has led to research into how adults with ADHD fare in various life domains, including education, employment, relationships and mental and physical health. However, comparatively little is known about how adults with ADHD experience being a parent. Here we used data from the German TwinLife Study, a longitudinal cohort of twins and their families, to test how parental symptoms of ADHD are associated with parenting stress and parenting styles. Our findings indicate that both mothers and fathers' symptoms of ADHD are associated with increased parenting stress, but associations with parenting styles were more mixed. We discuss implications of this work for future research and clinical practice.

The Contributions of Genes and Environment to Leaving the Parental Home

Bastian Mönkediek

Bielefeld University (Germany)

Paper Presentation

On average, children in Germany leave home at the age of around 24. This study examines the extent to which genes and environments contribute to the timing of the first move out of the parental home. The analysis is based on data from the German Twin Family Panel (TwinLife). First results showed that particularly environments shared by both twins contribute to their age of leaving home.

Genetic and Environmental Effects on Personality and Perception of Parenthood: Insights From a Serbian and German Twin Study

Ilija Milovanović[a], Selka Sadiković[a], Dušanka Mitrović[a], & Rainer Riemann[b]

[a]University of Novi Sad (Serbia); [b]Bielefeld University, (Germany)

Paper Presentation

Relationships between personality traits and family environment have long been the subject of twin research. However, in previous research, cultural specificities in this research design were somewhat neglected. Twin studies have consistently shown a high degree of heritability in the perception of family support. However, these studies also highlight the significant influence of environmental factors in shaping perceptions of family organization. Some findings suggest that personality traits may act as moderators in the relationship between genetic influences and the perception of parenthood. This study aims to examine the cross-cultural differences in the etiology of the relationship between personality traits and perceived parenthood. Personality traits were assessed using the NEO-Personality Inventory, while the Blocks Environmental Questionnaire (BEQ) measured two dimensions of perceived parenthood: support and organization. Both instruments were applied to the sample of 188 Serbian (GENIUS project) and 394 German (JeTSSA project) twin pairs. Genetic factors explained 63–79% of the variance in BEQ dimensions across both samples and accounted for approximately 50–60% of the variance in Big Five personality traits, except Neuroticism in the Serbian sample, where genetic effects were smaller. The findings revealed similar genetic and environmental pathways linking personality traits to perceived parenthood, with cultural differences emerging in Neuroticism and Extraversion. Specifically, the environmental relationship between Neuroticism and support was stronger in the Serbian sample, as was the positive association between Extraversion and organization. In contrast, genetic overlaps were more pronounced in the German sample, except for the relationship between organization and Conscientiousness/ Extraversion. Overall, the results suggest that the link between personality and perceived parenthood is predominantly mediated by genetic factors, though environmental influences remain crucial for individual adaptation within the family context.

Introduction to ICE FALCON: Novel Twin Methods for Causal Inference

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[a]University of Melbourne (Australia); [b]University of Bonn (Germany)

Workshop

Researchers from the University of Melbourne have developed a new statistical method for analysing data from twins to make Inference about Causation from Examination of FAmiliaL CONfounding (ICE FALCON). ICE FALCON provides more robust evidence on the causes of diseases than methods that are currently used to study twins. ICE FALCON uses observational data for related individuals and, by considering changes in a pair of regression coefficients, makes inferences about the causal relationships between exposures and outcomes. This workshop will be facilitated by University of Bonn researchers and University of Melbourne researchers. Our workshop will provide an introduction to ICE FALCON methods. This includes: Theoretical background - Comparison with traditional twin studies and Mendelian randomisation - A worked example using TwinLife data from a manuscript - Discussion of recent criticisms of ICE FALCON and responses to these criticisms.

Parental Separation and Children's Educational Outcomes

Henriette Bering, & Wiebke Schulz

University of Bremen (Germany)

Research Idea Presentation

Parental separation has consistently been associated with poorer educational outcomes in children. In this study, we plan to explore [process of data access and approval is in preparation] whether genetic predispositions in parents, particularly those that increase the likelihood of separation, might contribute to the adverse academic outcomes observed in children of separated families. Notably, research suggests a connection between specific personality traits, such as neuroticism, and an elevated risk of separation. These traits may not only be transmitted genetically to children but may also shape family environments and dynamics in ways that impact children's educational development. By investigating both the genetic transmission of these traits and their influence on the home environment, this study aims to provide a deeper understanding of how parental genetic predispositions may play a role in shaping the educational trajectories of children in separated families.

Extracurricular Activities and Educational Potential

Henriette Bering, & Wiebke Schulz

University of Bremen (Germany)

Research Idea Presentation

Research has shown that children's participation in extracurricular activities is linked to better educational achievement. However, an important question is whether this link arises from an unequal selection into activities, with those with more potential for educational success participating more frequently, or from the intrinsic benefits of extracurricular participation itself. We plan to examine [process of data access and approval is in preparation] whether children with a higher genetic predisposition for educational achievement, as measured by polygenic scores (PGS), are more likely to participate in extracurricular activities, and whether the benefits of participation are dependent on this inherent potential. By analyzing patterns of selection and potential educational benefits, we aim to determine if extracurricular participation amplifies educational outcomes only for those with higher PGS or if educational advantages persist when controlling for genetic potential, shedding light on whether extracurricular activities reveal or realize educational potential.

Musical and Artistic Abilities as a By-Product of the Evolution of Human Pro-Sociality

Martin Fieder

University of Vienna (Austria)

Research Idea Presentation

Based on phenotypic data, there is usually a strong positive association between many forms of prosocial activities (helping, volunteering, donating blood, etc.) and especially music performance and other artistic activities. Therefore, from an evolutionary point of view, we suggest that musical and artistic aptitude may be a by-product of our social evolution. Accordingly, we aim to investigate pleiotropic associations, e.g. genetic correlations between musical, artistic aptitudes and pro- sociality, using twin data. In addition, as religious activities also tend to have a strong social component, we aim to examine the genetic correlation between indicators of religiosity and artistic aptitude.

Digital Device Usage and Cognitive Development in Children: A Longitudinal and Behavioural Genetic Approach

Josué Jonatan Teran Linarte

Heinrich Heine University of Düsseldorf (Germany)

Research Idea Presentation

The rise of new technologies in recent decades has led to the pervasive presence of smartphones, computers, and other digital devices in everyday life. As a result, there is increasing attention to the consequences of such integration. Although early exposure to digital devices has been linked to cognitive benefits, there is growing evidence of significant risks with excessive use. The potential benefits in problem-solving skills and logical reasoning may be offset by attentional deficits, reduced academic outcomes, and weakened social interactions. Cognitive load theory posits that working memory has limited capacity, and information overload can diminish learning and retention. Digital devices, with their ability to deliver multiple streams of information simultaneously, can often exceed the brain's processing abilities, particularly in young children. Indeed, recent literature emphasizes the fundamental relevance of not overusing these instruments, as excessive use can lead to addiction-like symptoms. From a social perspective it is expected that a social gradient exists in digital use, driven by differences in child-rearing methods across social classes. Uncontrolled usage is often more prevalent among lower social classes, potentially leading to more significant issues related to cognitive development and educational outcomes for toddlers. Nevertheless, considering the genetic endowment of infants is crucial. From a behavioural genetic perspective, certain children may be more inclined towards digital devices usage, while others less so. The cognitive outcomes of such usage could be influenced by genetic predispositions, either enhancing or impairing their abilities.

The Triangle of Flexible Self-Regulation, Goal Achievement and Subjective Well-Being – Benefits of a Behavior Genetic Perspective

Kouta Sasaki

Saarland University (Germany)

Research Idea Presentation

Previous scientific research has shown that good self-regulators are physically and mentally healthier and achieve many other positive life outcomes. However, self-regulation in terms of, for example, rigid inhibition as strategy combined with the persistence in pursuing one specific goal is not always adaptive and can even have negative consequences (e.g., anhedonia, strain, and distress). Moreover, recent work emphasized the importance of flexibility in self-regulation as demands can vary between context and over time. This project will examine how flexibility in self-regulation in terms of (1) multiple mechanisms toward goal pursuit (psychological flexibility and regulatory flexibility), (2) goal adaptation (TGP and FGA), and (3) the ability of hedonic goal pursuit and self-control are linked to SWB. Building on a longitudinal twin-family panel, TwinLife, a sample of young adult twins (2.000 twins, aged 15 and 21) will be contacted for this study and assessed with respect to the above-mentioned constructs. First, within phenotypic multilevel multiple regression models, a joint consideration of these different aspects and conceptualizations of flexibility will allow us to identify specific as well as overlapping effects in the prediction of SWB. Second, multivariate behavior genetic analysis will offer the possibility to disentangle the relative contribution of genetics and environmental effects and the extent to which they are common or specific for the traits under study.

Birth-Order Effects on Individual Differences Among Twin Siblings

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[a]University of Siegen; [b]University of Leipzig (Germany)

Research Idea Presentation

Past research on birth-order effects has yielded mixed findings. While there are consistent associations with intelligence and self-reported intellect, results for a range of broad and narrow personality traits have been inconsistent. Most studies on birth-order effects have either relied on non-twin sibling designs or used severely underpowered or methodologically flawed twin studies. This may have contributed to a missed potential to uncover the unique insights that twin comparisons can provide. Given that twins are of the same age, birth-order effects among them are unlikely to be explained by mechanisms proposed by the family niche theory or the confluence model. Rather, sibling deidentification in twins could be linked to self-schemata related to being the "older" or "younger" twin and the dynamics among twin siblings this distinction creates. Studying birth-order differences in twins can thus help clarify how the subjective component of birth order influences sibling differences while controlling for age. Our study aims to investigate birth-order effects on a range of individual characteristics in twins using TwinLife data. We plan to employ an exploratory approach, analyzing a wide array of individual dispositions – such as Big Five personality traits, narcissism, risk aversion, life goals, self-efficacy beliefs, intelligence, and skills – that may largely differ regarding the effect of birth-order-related self-schemata. Analyses will be conducted considering mono- and dizygotic twins and both within and across age cohorts. Potentially relevant covariates (e.g., birth weight, sex, twin relationship) will be taken into account.

Can High Dimensional Earth Observation Based Environmental Information Explain Epigenetic Clock Pattern Variability in TwinLife?

Sören Hese[a], Paul Renner[a], Kerstin Schepanski[b], & Bastian Moenkediek[c]

[a]Friedrich-Schiller-University Jena; [b]FU Berlin; [c]Bielefeld University (Germany)

Research Idea Presentation

Satellite based Earth observation data can provide comprehensive high dimensional spatial environmental information to describe the various living environments of people in multiple scales. The environmental datasets originally developed for the environMENTAL EU project focuses on urbanicity, imperviousness, buildup density related indices, amount of greenness, water bodies and elevation information but also longitudinal climate data is used. We utilize global datasets such as the TanDEM-X Digital Elevation Model (DEM) and derived surface descriptors, the World Settlement Footprint (WSF) 3D data and its products, longitudinal night time lights data, local sun incidence angel corrected sun energy data, multi-spectral satellite data and spectral indices sensitive for vegetation density, we use percent tree cover data, atmospheric data (NO2, SO2, CO, O3, and CO2 concentrations), cloud cover, air temperature, precipitation statistics, and air pollution data. Some of these datasets are also calculated for different neighborhood distances to fully account for the near and far home-address living conditions.

In 2024 we started attributing this European dataset to different national cohorts (NAKO for Germany, UK Biobank for UK and MOBA for Norway) for mental health correlation analysis.

A combined analysis with TwinLife data would allow an extension of this research and an investigation of the importance of objective living conditions for epigenetic ageing (e.g., age acceleration). Epigenetic age appears to be particularly important for the course of a person's physical and mental health. In addition, this new study could help to better correct for genetic differences and other unobserved factors that make spatial analysis very difficult and influence the correlation between living environment and health indicators. Here, we would work primarily with twins that live at different places and changed their place of residence early in their lifetime. Later, we likely will extend the analysis to a larger number of TwinLife participants. Overall, the project would try to find and isolate the link between the extreme large scale geo-environmental spatial dimension and the biochemical scale of epigenetic aging and their specific DNA methylation patterns.

Using Long Read Sequencing to Investigate Genetic and Epigenetic Variability in 400 Twin Pairs

Caspar Gross

University Clinic Tübingen (Germany)

Research Idea Presentation

With twin studies it is possible to investigate the causal relationship between genetic, epigenetic and environmental factors and phenotypic and behavioural responses. Reaching enough statistical power to differentiate between genetic, epigenetic and environmental components requires high sample sizes. Until recently, generating accurate genetic and epigenetic datasets in bulk was a costly and labour intensive process. With long read sequencing methods we can obtain complete genome sequences with associated methylation patterns in a single experiment. Our project will sequence 400 pairs of healthy, mostly monozygotic, twins with Oxford Nanopore Technology. While our institute is experienced with genomics and bioinformatics, we can still learn a lot about the empirical methods used to quantify different aspects in the life of the analysed subjects. We look forward to a constructive exchange with other researchers about the intricacies of twin studies.

A Systematic Investigation of Assortative Mating by Geographic Location in Germany

Charlotte Pahnke

University of Bonn; University Hospital Bonn (Germany)

Research Idea Presentation

Assortative mating, the tendency for individuals to select partners with similar phenotypic or genetic traits, plays a significant role in shaping genetic and social structures within populations. This project aims to systematically examine the influence of geographic location on assortative mating patterns across Germany. The primary objective is to determine if, and to what extent, geographic location modulates spousal phenotypic and polygenic score correlations and whether the effect varies across traits. We have calculated spousal correlations using TwinLife's polygenic scores for a range of behavioral and physical traits. As a next step, we plan to control these correlations for geographic region to identify patterns of regional assortative mating. If regional assortative mating differences are detected, we plan to follow these up by, e.g., incorporating geographic variables such as population density, urbanization level, and socioeconomic status. We will further evaluate if phenotypic and genetic DZ correlations as well as assortative mating estimates derived from extended twin family modeling mirror the results of the spousal correlation analyses. Ultimately, this study will offer insights on how geographic location may influence partner selection and the implications for trait distribution and genetic variability within the German population.

Exploring Personality and Genetic Correlates of Risky Behaviour in Virtual Reality

Dejan Pajiæ

University of Novi Sad (Serbia)

Research Idea Presentation

Virtual reality (VR) offers an innovative way to study human behaviour by creating immersive, real-world simulations that enhance engagement and innovates data collection. Building on the use of BART to assess risk-taking, we propose integrating VR into TwinLife research to expand the study of risk behaviour by offering more realistic scenarios. A team of STAR researchers conducted a pilot study on a non-twin sample to explore how personality traits, reward and punishment anticipation, and physiological arousal influence risky decision-making. A custom-designed VR game in Unity required participants to collect diamonds along a nature path and choose between safe routes and risky bridge crossings. We measured elapsed game time, steps taken, average score, and decision-making time. Risk Sensitivity Questionnaire (RSQ) was used to assess individual differences in risk preferences. Physiological measures such as heart rate, skin conductance, and respiratory rate were also recorded. Our results revealed significant relationships between personality traits, including Fight and Freeze, and risk-related behaviours in the VR environment. Personality traits influenced decision-making before negative feedback, i.e. bridge collapse, while emotional arousal, measured via respiratory rate amplitude, became more prominent after it. This pilot study highlights the motivational advantages of using VR in research, as VR-based tasks increase engagement, immersion, and sense of presence. These factors make participation more appealing while enhancing ecological validity, as participants are more likely to behave naturally in immersive VR scenarios. Integrating VR-based assessments into TwinLife's research framework could significantly advance the understanding of gene-environment interactions. By combining VR data with TwinLife's genetically informative dataset, future studies could explore how genetic predispositions and environmental factors influence physiological and behavioural responses to risk, reward, and feedback. Expanding TwinLife research with VR has the potential to improve data quality, enhance ecological validity of risk-taking measures, and contribute to longitudinal studies predicting real-world behaviour.

Cross-Comparisons of Fruit Fly Behavioral Individuality with TwinLife Data

👤 Gerit Linneweber

📍 FU Berlin (Germany)

📎 Research Idea Presentation

Behavioral individuality in vertebrate and invertebrate model systems shares many similarities with human personality. A fundamental feature of animal individuality is the stability of idiosyncratic behavior over time and, to a lesser degree, across situations. In my fly lab, we are currently investigating three major lines of research:

1. The impact of the sex determination cascade on behavioral individuality distributions and their neuronal underpinnings.

2. The individuality of sleep/wakefulness cycles and their neuronal mechanisms.

3. The relative contributions of genetic, environmental, and stochastic processes to individuality using a twin-like Drosophila model system.

Based on these three lines of research, we propose to use the TwinLife database to cross-correlate our findings in animals with human twin data. This approach aims to provide a comprehensive understanding of the similarities and differences between our animal model and humans.

PsiTwin/ Psychedelic Experiences with Twins: Genetic and Experiential Contributions and Causes in Mental Health and Well-being

👤 Petri Kajonius, & David Sjöström

📍 Lund University, (Sweden)

📎 Research Idea Presentation

We represent the Departments of Clinical and Psychological Sciences at the research university, Lund, Sweden. We are currently in the process of contacting the largest Twin Registries in Europe on an innovative study exploring the genetic and experiential factors in the effects of psychedelic experiences on mental health and well-being. Our project has received approval to introduce new questionnaires on psychedelic use, Big Five personality, and overall mental health in the Swedish Karolinska Institute Twin Register for 15-, 18-, and 24-year-olds for at least three years. In similar ways, we further aim to pool data from multiple European twin registries, allowing us to conduct high-powered analyses of discordant twin pairs and to investigate longitudinal impact of psychedelic use on life outcomes. Our team includes experts in psychology and psychiatry, and we have the infrastructure to conduct robust longitudinal analyses using advanced structural equation modelling techniques. If this proposal aligns with the interests of the TwinLife audience, we would greatly appreciate the opportunity to present research ideas and to further discuss avenues for collaboration and improvement with experts present.

Challenges and Opportunities in Developing a German Twin Registry

Moana Beyer[a], Jan Beucke[b], Christian Kandler[c], Dmitry Kuznetsov[a,d], Miriam Mosing[e], & Simone Kühn[a,f]

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Research Idea Presentation

GerTRuD—the German Twin Registry under Development—is the first national twin registry in Germany, enabling monozygotic and dizygotic twins of all ages to participate in scientific research. Established in 2022, GerTRuD is an initiative by the Centre for Environmental Neuroscience at the Max Planck Institute for Human Development, in collaboration with the University of Bielefeld, University of Bremen, University Hospital Tübingen, Medical School Hamburg, Max Planck Institute for Empirical Aesthetics, and Saarland University. The registry aims to centralise the recruitment of twins across Germany, providing a secure and structured platform for engaging twin pairs in a variety of research studies. It is modelled after successful international registries in Sweden, Australia, and the UK. This plenary session will delve into the challenges and opportunities of establishing a national twin registry like GerTRuD, focusing on both the scientific potential it offers and the logistical complexities involved.

USP Twin Panel

Tania Kiehl Lucci & Emma Otta

Universidade de São Paulo (Brazil)

Different contribution format

The Panel USP de Gemeos (USP Twin Panel), based at the Institute of Psychology at Universidade de Sao Paulo, and created in early 2017 by a group of faculty members under the coordination of Prof. Emma Otta, is a Brazilian twin registry aimed at voluntary participation in research on behavior and basic psychological processes in twins, as well as activities related to issues of interest to this group. We have conducted censuses that have resulted in 6,479 respondents connected to the University, including twins and parents of twins. The registry is open to twins from all over the country. The various research subprojects that make up this interdisciplinary initiative share an ontogenetic perspective, focusing on prenatal risk factors for the overall development of children, and an interest in understanding how genetic and biological, environmental, and behavioral influences interact to promote education, health, and well-being. The successful collaboration between Psychology, Dentistry, and Medicine is a key feature of this work. We share an interest in twin designs within our respective research fields. We believe that twins continue to represent an important study design that will advance our understanding of how environmental and genetic factors combine to create human traits and behaviors. However, twin research in South America remains underrepresented, with only three active twin registries: two in Mexico and the USP Twin Panel in Brazil. The Brazilian population is characterized by a highly heterogeneous genetic composition. Heritability is a statistical measure of a given population and environment. The predominance of WEIRD (Western, Educated, Industrialized, Rich, and Democratic) populations in twin studies can limit the generalizability of findings, affecting their external validity. Brazil holds great potential for twin studies, given its vast, culturally, ethnically, and economically diverse non-WEIRD population. Our group conducts research on various topics, including population studies on twinning rates, zygosity determination, nonverbal behavior, and twin relationships. Since the foundation, we have been contacted by twins and their relatives, asking for help with twinship-related psychological difficulties. To meet this demand, we created a new branch of our main research line called The Psychological Care Branch. In Brazil, there is a need for researchers specialized in twin study and therapists focused on twin-related issues. This initiative at our university could be pioneering and may inspire similar programs at other schools.

Bremen Info

General Information on Bremen

All of this information can be found on our website TLUC your stay. For specific tips on where to eat, what to see and where to hangout, just follow the adjacent links.

About Bremen

Places to See

Places to Shop

Places to Eat

Places to Hang Out

Thank you for coming and participating!

These are TwinLife satellite projects. You might be interested in working with them …