interuniversity graduate school of Psychometrics and Sociometrics

Annual report 2019

- Leiden University
- University of Amsterdam
- University of Groningen
- Tilburg University
- University of Twente
- Utrecht University
- KUL University of Leuven
- Statistics Netherlands (CBS)
- Psychometric Research Center (Cito)

Contents

1 Foreword

In June 2019, the IOPS board was pleased to welcome prof. dr. Irene Klugkist, successor of prof. dr. Herbert Hoijtink (Utrecht University). We thank Herbert Hoijting, who will proceed his career as professor in Applied Bayesian Statistics in Utrecht, for his commitment to our graduate school.

This year the IOPS Best Poster Award was won by Sanne Willems (Summer 2019) and Felix Clouth (Winter 2019). Martin Schnuerch (University of Mannheim) (Summer 2019) and Adela Isvoranu (Winter 2019) won the IOPS Best Presentation Award. Robbie van Aert won the IOPS Best Paper Award, with his paper *Examining reproducibility in psychology: A hybrid method for combining a statistically significant study and replication* published in *Behaviour Research Methods*.

IOPS sponsored the first symposium organized by IOPS Phd students. This Symposium on Classification Methods in the Social and Behavioral Sciences took place on the 17th of October at the Tilburg University.

We congratulate the eight students who defended their thesis successfully. With two projects left unfinished, the number of IOPS students in 2019 remained 67.

On behalf of the IOPS board,

Rob Meijer

2 Introduction

2.1 Background

The Interuniversity Graduate School of Psychometrics and Sociometrics (IOPS) is an institute for the advanced dissertation training in psychometrics and sociometrics of PhD students in The Netherlands and Belgium. Additionally, it coordinates high-quality research taking place in these fields, and its staff members consist of internationally esteemed experts.

Since its inception in 1987, IOPS has become a cornerstone of the psychometric and sociometric community in the Netherlands and Belgium, and it has contributed to the development of several generations of psychometricians and sociometricians. It is commonly held that to be an active member of the psychometric and sociometric academic community in the Netherlands and Belgium means participating in IOPS, and PhD students working on topics related to psychometrics and sociometrics are almost always encouraged by their supervisors to become a member of IOPS since it is beneficial for the PhD student. Many former IOPS student members have become internationally renowned psychometricians and sociometricians, and many of these alumni continue to be affiliated with IOPS and contribute by providing courses for IOPS students or acting as reviewers for research proposals.

2.2 Role of IOPS (contrasted with local graduate schools)

Psychometrics and sociometrics are rather specialized topics. Therefore, IOPS fills an important role in providing both a community for persons working on related research topics, and an educational platform that is able to provide courses, conferences, and specialized support that PhD students working on psychometrics and sociometrics would not be able to obtain at their own university. IOPS does not replace the role of local graduate schools that exist at the university where the PhD student works. IOPS aims to supplement the services provided by local graduate schools, it does not aim at fulfilling the managerial role of those local graduate schools. That is, IOPS PhD students are still expected to take part in their local graduate schools, and to adhere to the rules that are specified by these graduate schools. This also means that the supervision and management of participating PhD students is still taken to be the responsibility of the university of the student, and is a role that is not fulfilled by IOPS.

Thus, IOPS supplements the services of these local graduate schools in areas where these graduate schools are unable to provide the students with services they need (i.e., specialized education on all areas of psychometrics and sociometrics, and a social research platform where students and researchers working on psychometrics and sociometrics can interact). This is a contribution that both former and current IOPS PhD students evaluate positively, and that many see as an important part of their professional development as psychometric or sociometric researchers. IOPS success and importance as an inter-university graduate school is also reflected in the fact that in September 2013. it was awarded by NWO with a NWO Graduate Program grant, which provided funding for four extra IOPS PhD positions on various topics in psychometrics and sociometrics.

2.3 Aims and activities of IOPS

The main aims of IOPS are to support the development of young researchers and the execution of high-quality research in psychometrics and sociometrics in the Netherlands and Belgium.

2.3.1 Activities

To achieve the aims mentioned above, IOPS undertakes the following activities:

- Providing multiple postgraduate courses on a variety of topics in psychometrics and sociometrics, taught by subject matter experts at participating universities and institutions (see Section 3.1).
- Providing PhD students with the opportunity of participating in the IOPS postgraduate program, which consists of a coherent set of courses and is rewarded with the IOPS certificate (see Section 3.3).
- Organizing biannual IOPS conferences at which both IOPS PhD students and international experts can present their research.
- Providing a network for both PhD students and researchers in psychometrics and sociometrics that facilitates interuniversity collaborations and informs its members of relevant news in the field (e.g., conferences and job openings). This also improves the transition of PhD students into relevant job positions after the PhD has been completed (see Section 1.3.3).
- Offering support from a students' councilor in case a PhD student encounters a conflict with their supervisor regarding the contents of the research that cannot be solved at the faculty. Conflicts in the area of human resources or confidential personal matters are to be solved by the counselor of the students' faculty.

2.3.2 Quality of PhD research

The quality of PhD research is ensured by:

- The admission procedure: review of the proposal and approval by the board (part 1.3)
- At least one of the supervisors is IOPS staff member, so the content quality of the research is being monitored.
- The requirements for the IOPS certificate, including being a discussant twice and review of a proposal twice (part 3.3)
- The research has to be concluded with an approved dissertation.

2.3.3 Connecting PhD students to the labour market

IOPS aims at optimizing the position of participating PhD students on the labour market after the completion of their PhD. It does so by providing:

- the IOPS certificate, which communicates to future employers that the student has successfully completed the IOPS PhD postgraduate program.

- a networking platform by means of the biannual conferences, which are also attended by IOPS staff.
- information (on the website and via emails) about relevant job openings.

Additionally, many stakeholders of psychometrics and sociometrics participate in IOPS, which means that after participation in IOPS, PhD students have obtained important connections both in academic and more applied areas related to their expertise. The main participating institutes are Cito and Statistics Netherlands (CBS).

2.4 Admittance to the IOPS postgraduate program

Any PhD student in the Netherlands and Belgium can apply for admittance to the IOPS program, on condition that the following criteria are met:

- The student is in possession of a Master's degree (or equivalent) in a field related to psychometrics or sociometrics.
- He or she is registered as a PhD student at one of the universities in the Netherlands or Belgium, or he or she has a supervisor that is a staff member of IOPS.
- The research that the student performs or will perform towards achieving the title of PhD can be classified as being psychometric or sociometric research.
- The student has composed a research proposal for evaluation by the IOPS board that shows that the research is of sufficient quality.
- The student has composed a feasible educational plan that satisfies the criteria of the IOPS program (see Section 3.3).

If a student believes that these criteria can be met, he/she can submit an application to the secretary of IOPS. This application consists of the student's application detailing the research that the student will perform, and an educational plan that lists the IOPS courses that the student plans to follow and the period in which they will follow these courses.

After receiving the student's application, this is sent out for review by two IOPS staff members and two PhD student IOPS members (all four selected such that their research expertise matches the topic of the proposed research and they are not involved in the project). These four reviewers critically evaluate the entire proposal. Proposals accepted by NWO will only be reviewed by two PhD students and judged generally by the director. If necessary, the reviewers provide feedback on both the research proposal and the educational plan. Only in the case that the proposal is not accepted at once, the PhD student revises the proposal. On the basis of their comments and the possibly revised proposal, the reviewers formulate a recommendation to the IOPS board about whether the student should be admitted to IOPS based on the application as it has been submitted. After this, the board reviews the application at the upcoming board meeting. After discussing the proposal and the four reviews, the board members decide on whether the student should be admitted to the IOPS program. After the board has reached its decision, the secretary notifies the student and their main supervisor of the decision.More information about the requirements and review process can be found on the IOPS website:
http://www.iops.nl/students/becoming-an-iops-student/guidelines-for-applicants-appointed-as-phd-student/

2.5 Affiliated student membership

If a student does not meet the required criteria to be admitted to the IOPS postgraduate program, or if a student does not intend on becoming a member of the program, a student can ask to be registered as an affiliated student member of IOPS. As an affiliated student member, the option to follow IOPS courses and attend the biannual IOPS conferences will be given. However, affiliated student members do not receive the IOPS certificate after the completion of their PhD project. In addition, as opposed to the regular IOPS PhD students, they do not pay an annual participation fee but they pay for each course/conference separately

3 Organization

3.1 History

The present interuniversity school for psychometrics and sociometrics (IOPS) goes back to a national platform for collaboration in research and education active since the seventies, formalized in the "Nederlandse Stichting voor Psychometrie" (Dutch Foundation for Psychometrics, an advisory body for ZWO, as NWO was then called). IOPS was officially founded as an institute for advanced dissertation training on June 24th, 1987. IOPS then obtained a starting grant of the Ministry of Education in 1987 for a period of five years. The Royal Dutch Academy of Arts and Sciences (KNAW, ECOS committee) officially reaccredited IOPS as an interuniversity graduate school in 1994, 1999, and 2004.

Until 2000, the University of Amsterdam was commissioner ("penvoerder"), and after that the University of Leiden took over the responsibility. Since February 2014 the University of Groningen is commissioner of IOPS.

In 2010, when the KNAW accreditation period ended, the Board of IOPS considered the changes in the organization of PhD training in the Netherlands brought about by the policy change of the Association of Universities in the Netherlands with the effect that all universities started developing their own systems of local Graduate Schools. Because psychometrics and sociometrics are relatively small and highly specialized areas of expertise, it was clear that national collaboration would remain of utmost importance for IOPS to stay on the front-edge of methodological research, and therefore the Board decided to continue IOPS activities as a national platform of research and PhD training, but now under a new, less formal construction. A new Agreement of Cooperation between the participating faculties was drafted, and formally established in 2011 for the duration of four years. An adjusted Agreement of Cooperation has been established in 2015.

3.2 Participating and cooperating institutes

The partners in the Agreement of Cooperation are the academic groups of seven universities (from the Netherlands and Belgium) and the two non-academic institutes are listed in the table below. The non-academic partners CBS and CITO have strong ties with several of the academic groups, and also bring in PhD projects.

In 1994, the establishment of graduate schools and the rearrangement of staff members, caused

IOPS to introduce a new category of staff for those who - for formal reasons - could not be a regular IOPS staff member: the associated staff members, working at cooperating institutes. The requirements for associated staff members are identical to those of regular staff members. PhD students of these associated staff members can be admitted to IOPS as an external dissertation student. The cooperating institutes have no representative in the board. Article 8 in the Agreement provides the conditions under which associated research groups can become full participant.

In the table below, all participating and cooperating universities and institutes, with the number of student and staff members per academic group/institute are listed.
(Information as of 31-12-2019)

Participating institutes			
Name institute	*# students*	*# prospective students*	*# staff*
Leiden University, Faculty of Social and Behavioural Sciences			
▪ Methodology and Statistics Unit, Institute of Psychology	6	0	8
▪ Unit Educational Sciences, Institute of Education and child Studies.	0	0	1
▪ Statistical Science for the Life and Behavioural Sciences, Mathematical Institute	3	0	1
University of Amsterdam, Faculty of Social and Behavioural Sciences			
▪ Psychological Methods, Department of Psychology	12	0	11
▪ Developmental Psychology, Department of Psychology	5	0	4
▪ Work and Organizational Psychology, Department of Psychology	0	0	0
▪ Methods and Statistics, Department of Development and Education	0	0	7
University of Groningen, Faculty of Behavioural and Social Sciences			
▪ Psychometrics and Statistics, Department of Psychology	11	0	8
▪ Theoretical Sociology, Department of Sociology	0	0	2
University of Twente, Faculty Behavioural, Management and Social Science (BMS)			
▪ Department of Research Methodology, Measurement and Data Analysis (OMD)	2	0	4
Tilburg University, Tilburg School of Social and Behavioural Sciences			
▪ Methodology and Statistics	24	0	23
Utrecht University, Faculty of Social and Behavioural Sciences			
▪ Methodology and Statistics	14	3	18
KU Leuven, University of Leuven, Belgium, Faculty of Psychology and Educational Sciences			
▪ Research Group of Quantitative Psychology and Individual Differences	5	0	4
Statistics Netherlands (CBS), Den Haag	0	0	2
Psychometric Research Center (Cito), Arnhem	0	0	5

Cooperating Institutes			
University of Groningen, Faculty of Behavioural and Social Sciences			
▪ Department of Education	0	0	4
VU University Amsterdam, Faculty of Psychology and Education			
▪ Department of Clinical Psychology	0	0	1
▪ Department of Biological Psychology	0	0	1
Maastricht University, Fac. of Health, Medicine and Life Sciences & Fac. of Psychology & Neuroscience			
▪ Department of Methodology and Statistics	0	0	5
▪ Department of Psychiatry and Neuropsychology			1
Erasmus University Rotterdam			
▪ Department of Econometrics	0	0	1
▪ Department of Psychology, Education & Child Studies	0	0	3
Wageningen University			
▪ Research Methodology Group	0	0	1

3.3 Board and office

The structure and organization of IOPS are formalized in articles 3-6 of the Agreement of Cooperation. The most important units are the IOPS board and the secretarial office.

The governing Board of IOPS consists of seven members delegated by the participating universities and two representatives of the participating research institutes. Board meetings are also attended by two representatives of the IOPS PhD students, appointed by the IOPS PhD students for a period of two years. The board has the ultimate responsibility with regard to the research programme, educational programme, and finances.

The institute director is also chairman, he/she is elected from the representatives of the seven participating universities

The Board delegates daily matters to its Chair, who runs the Secretarial Office, and communicates its policies and decisions in a general meeting of scientific staff and students twice a year.

3.3.1 Members IOPS Board

In 2019, the board was pleased to welcome prof. dr. Irene Klugkist, successor of prof. dr. Herbert Hoijtink (Utrecht University). Furthermore we welcome dr. Dylan Molenaar, successor of prof. dr. Denny Borsboom (University of Amsterdam). We thank both Herbert Hoijtink and Denny Borsboom for their commitment to our graduate school. On 31 December 2019 the Board consisted of:

- Prof. R.R. (Rob) Meijer, Chair, University of Groningen
- Dr D. (Dylan) Molenaar, University of Amsterdam
- Prof. M.J. (Mark) de Rooij, Leiden University

- Dr G.J.A. (Jean-Paul) Fox, University of Twente
- Dr K. (Katrijn) van Deun, Tilburg University
- Prof. I. (Irene) Klugkist, Utrecht University
- Prof. F. (Francis) Tuerlinckx, KU Leuven-University of Leuven
- Dr A.A. (Anton) Béguin, CITO (National Institute for Educational
- Prof. A.G. (Ton) de Waal, CBS (Statistics Netherlands)

3.3.2 PhD representatives

Lieke Voncken (University of Groningen) was appointed first representative, after being assistant representative in 2018.
Shuai Yuan (University of Tilburg) was appointed assistant PhD student representative.

3.3.3 Office

The Chair of the Board runs the Secretarial Office, and is supported by an Executive Secretary. The RUG-based office is responsible for the preparation and execution of IOPS policies, activities, and Annual Reports. The Executive Secretary assists the Chair and the Board, and runs the IOPS website, the student administration and manages the digital archive. She also assists the local groups in the organization of conferences and courses. Since March 1st, 2018, the Executive Secretary of IOPS is dr. Laurien Hansma. Finances are handled by the Financial Department (FSSC) of the University of Groningen.

Secretary:	dr. Laurien Hansma
E-Mail:	secretariaat.iops@rug.nl
Web:	www.iops.nl
Phone	050 36 32 668
Address:	University of Groningen Faculty of Social and Behavioral Sciences Grote Kruisstraat 2/1 9712 TS Groningen, The Netherlands

3.4 Cooperation with Related Master programmes

All academic board members are in direct contact with the directors of the related Master programmes. Although there are six different locally organized Master programmes, there is close collaboration with the programme directors and a considerable degree of coordination between them. The reason is that the faculty members who are charged with teaching responsibilities in the IOPS PhD programme also occupy central roles in education and management of the local Master programmes. In several cases, there is even a personal union between IOPS scientific staff members and directors of Master programmes. Generally, collegial ties are flexible, but directors of Master programmes take binding decisions with respect to the Master phase, and the IOPS Board takes binding decisions with respect to the PhD education activities IOPS has to offer. In practice, cooperation is very smooth.

3.5 Board & plenary meetings

In 2019 board meetings were held on 14 June and 12 December and a Spring and Autumn session by email.

Plenary meetings for all IOPS members (staff and PhD students) are held twice a year during the IOPS conferences. In 2019 two plenary meetings took place, one on 14 June, and one on 12 December.

3.6 Archive

The IOPS archives the following:

- Registration of new PhD students *(aanmelddossier)*
  - registration form, including an educational plan
  - reviews, possibly response to the reviews and the recommendation of the reviewers
- The transition of number of PhD students
  - new students (*instroom*)
  - leaving students (*uitloop*), both due to completing their PhD and dropping out,
- Courses
  - the grades for all the students in that year's course
  - evaluations of the courses

(Note: IOPS gives instructions to the teachers how and when to do this and checks whether the grades and evaluations are received.)

All data are archived in Groningen on the local workspace Y/staff/gmw/IOPS/…

4 The IOPS post graduate programme

The IOPS post-graduate programme consists of the educational programme and the research training programme. After succesfully completing the post-graduate programme, the IOPS PhD candidate will receive the IOPS certificate.

4.1 Educational programme

4.1.1 IOPS curriculum

During the period as an IOPS PhD student, the student needs to participate in the IOPS curriculum. Every participating university organizes at least one course. These courses include two mandatory courses ("What is psychometrics" and "Statistical Consulting to Behavioral Scientists") and multiple elective courses. All courses are free for IOPS students (it is included in the annual contribution fee). Courses are open for non-IOPS members, but IOPS-members have priority. An overview of the IOPS curriculum can be found in the table below and on the IOPS website.

Month	Course	University	EC	Even years	Odd years
January	Generalized latent variable modeling	TU	1		2019, 2021…
January	Statistical Learning	LU	2	2020, 2022…	2017 only
February	What is Psychometrics?	UA	2	2020, 2022…	2019, 2021…
March	Statistical Consulting to Behavioral Scientists	UA & LU	3		2019, 2021…
April	Meta-analysis Transparency in Science	UM UG	1 1	2020, 2022…	2019, 2021…
May	Applied Bayesian Statistics	UU	2	2020, 2022…	2019, 2021…
June					
July					
August					
September	Survey Design	UU	2	2020, 2022…	2019, 2021…
October	Bayesian Item Response Modelling	UT	2	2020, 2022…	
November	Optimization & Numerical Methods	UL	2	2020, 2022…	2019, 2021…
December					

Note. UA: University of Amsterdam; UM: University of Maastricht; UU: Utrecht University; UT: University of Twente; UL: University of Leuven; TU: Tilburg University; UG: University of Groningen; LU: Leiden University.

4.1.2 Courses in 2019

In 2019 five courses of the IOPS curriculum were organized:

- **Statistical Consulting to Behavioral Scientists (mandatory)**

Leiden University, 21-22 March, 4-5 April 2019
Coordinator: dr. E. Dusseldorp, dr. R.J. Zwitser

- **What is Psychometrics? (mandatory)**

University of Amsterdam, 13-15 May, 2019
Coordinator: Prof. D. Borsboom

- **Applied Bayesian Statistics (elective)**

Utrecht University, April 15 – May 19, 2019
Lecturers: Prof. H. Hoijtink, Dr Milica Miočević, Dr E. Hamaker, Dr Caspar van Lissa, Kimberley Lek & Lion Behrens

- **Survey Design (elective)**

Utrecht University, 2-5 September, 2019
Lecturers: Dr P. Lugtig & Dr B. Struminskaya

- **Optimization & Numerical Methods in Statistics (elective)**

KU Leuven-University of Leuven , 26-27 November, 2019
Lecturers: Prof G. Molenberghs, Prof F. Tuerlinckx, Dr K. van Deun & Dr T. Wilderjans

4.1.3 Number of IOPS students per course

In the table below the numbers of IOPS students that participated in IOPS courses in the period 2013 - 2019 are stated.

IOPS Course	2013	2014	2015	2016	2017	2018	2019
Generalized latent variable modeling (TiU)			20		20		
Statistical Learning (UL)					24	13	
What is psychometrics? (UvA)	10		24	20	14	17	18
Advising on research methods (UvA)	n.a.		14				
Statistical Consulting to Behavioral Scientists (UL, UvA)					8		13
Applied Bayesian Statistics (UU)	n.a.	10	5	n.a.	n.a.	3	11
Optimization & Numerical Methods in Statistics,(KU L)	13	6	22	18	16	2	10
Meta-Analysis (UM)		5		7		5	
Analysis of Measurement Instruments (UT)		6					
Survey Design (UU)	8			4	3	4	3
Bayesian Item Response Modeling				9		7	
Transparency in Science					3		

4.1.4 Examination

Courses differ in the requirements that need to be met to receive the course credit (EC): essay exams, multiple-choice exams, assignments, computer practical, and individual presentations are being used.

4.1.5 Course evaluation

All individual courses are evaluated by evaluation forms that are administered to the participants at the end of every course. The results of these evaluations are discussed at the board meeting. Two IOPS representative PhD students also attend this meetings.

4.1.6 Research training programme

The research-training program consists of reviewing research proposals of fellow students and the participation in IOPS conferences.

4.1.7 Peer review

With the exception of PhD projects funded via NWO, FWO and ERC, which are reviewed by two PhD students only, each new proposal submitted to the IOPS is reviewed by two IOPS PhD students and two IOPS staff members. This implies that every student has to review a proposal twice. Participating in the IOPS review process is intended to make the IOPS PhD student acquainted with the peer-review process.

4.1.8 Conferences: aims and programme

The conferences are intended for the IOPS PhD students to

- practice in presenting his/her research (poster and oral presentation) in a conference setting
- practice in having public discussions after a conference presentation
- practice in acting as 'discussant' and start the academic discussion after an oral presentation
- get feedback on his/her research from experts in the field
- develop a social network
- get to know the field of psychometrics and sociometrics in a broader perspective.

The IOPS biannual conferences takes place in June and December and are organized by the participating universities in turns. Each conference programme consists of the following elements:

- student poster presentations
- student oral presentations
- presentation by IOPS staff members
- presentation by an international expert outside IOPS (optional)
- conference dinner Awards at the conferences:
- At each conference, a prize is awarded to the best student presentation and the best student poster. The Board has established these prizes to emphasize the importance of the presentations at the conferences.
- Once a year, at the summer conference, a prize is awarded for the best single research article by an IOPS PhD student that has been published or accepted for publication in the previous year. Papers in internationally peer-reviewed journals will be given more weight than

chapters in books. The award is sponsored by the Foundation for the Advancement of Data Theory.

4.1.9 Conferences in 2019

- 34th IOPS Summer Conference, 13 and 14 June 2019, Utrecht University. See appendix 2 for the programme.
- 29th IOPS Winter Conference, 12 and 13 December 2019, University of Leiden. See appendix 3 for the programme.

4.2 IOPS certificate

A student is eligible for the IOPS certificate when the research project is completed and he/she have met the requirements of the IOPS post-graduate programme.

Educational requirements
The PhD student should complete

- the two mandatory courses ("What is psychometrics" and "Statistical Consulting to Behavioral Scientists"), which are 5 EC in total. Exemption for these courses can be granted in case an equivalent course has been completed earlier. [exemption for What is Psychometrics is not possible]
- elective IOPS courses up to at least 5 EC (exemption is not possible).

Research requirements
All students are required to

- review two research proposals of fellow students
- attend at least four IOPS conferences
- present twice at an IOPS conference: a poster at the start of the project and an oral presentation at the end of the project
- have been discussant at an IOPS conference twice.

5 Students and their projects

5.1 Introduction

Applicants for the IOPS dissertation training must have a Master's degree in one of the following disciplines. Behavioural Sciences, Technical Sciences, Mathematics or Econometrics. They are appointed as PhD student, or as an indirectly financed PhD student. PhD students within IOPS are financed by internal research funds of the participating institutes, NWO (Netherlands Foundation of Scientific Research) or European funding, or other external funds of third parties.

5.1 Admissions, deregistrations and dissertations

	2012	2013	2014	2015	2016	2017	2018	2019
Student admissions	22	18	14	21	20	11	27	16
Premature deregistrations	0	0	2	2	1	2	3	2
Dissertations	17	7	12	11	17	11	18	8
Projects that exceeded the project time limit on 31 December	3	4	5	11	8	7	8	19
Students on 31 December	53	61	60	62	65	61	67	67

5.1.1 Dissertations in 2019

1. Laura **Boeschoten** (Tilburg University) - *Consistent estimates for categorical data based on a mix of administrative data sources and surveys*
2. Jolien **Cremers** (Utrecht University) - *One Direction? Modelling Circular Data in the Social Sciences using the Embedding Approach*
3. Kees **Mulder** (Utrecht University) - *Bayesian Circular Statistics: von Mises-based solutions for practical problems*
4. Alexander **Savi** (University of Amsterdam) - *Towards an idiographic education*
5. Riet **van Bork** (University of Amsterdam) - *Interpreting psychometric models*
6. Iris **Yocarini** (Erasmus University Rotterdam) - *Testing in Higher Education: Decisions on students' performance*
7. Eva **Zijlmans** (Tilburg University) – *Item-Score Reliability – Estimation and Evaluation*
8. Mariëlle **Zondervan-Zwijnenburg** (Utrecht University) - *Standing on the shoulders of giants. Formalizing and evaluating prior knowledge*

5.1.2 New projects in 2019

9. Giuseppe **Arena** (Tilburg University) – *The Time is Now: Understanding Social Network Dynamics Using Relational Event Histories*

10. Mingyang **Cai** (Utrecht University) – *Transition models for individual causal effects*
11. Felix **Clouth** (Tilburg University) – *Personalized Treatment Options Model*
12. Mihai **Constantin** (Tilburg University) – *Tools for Aiding Empirical Research Based on Intensive Longitudinal Data*
13. Damiano **D'Urso** (Tilburg University) – *Unraveling measurement non-invariance in multilevel data in the Social Sciences*
14. Ria **Hoekstra** (University of Amsterdam) - *Within, Between and Beyond: A network perspective on intra- versus inter-individual data*
15. Diana **Karimova** (Tilburg University) – *Multinomial Choice Model for Relational Events Networks*
16. Simon **Kucharsky** (University of Amsterdam) – *Inferring cognitive strategies from eye movements: A Bayesian model-based approach*
17. IJsbrand **Leertouwer** (Tilburg University) – *Understanding vulnerability to stress-related disorders from a complex dynamic systems perspective*
18. Hidde **Leplaa** (Utrecht University) – *Replication in the behavioural sciences*
19. Danielle **McCool** (Utrecht University) – *Using surveys and smartphone sensors to produce time use and travel statistics*
20. Jeroen **Mulder** (Utrecht University) – *Concerning Causes: Evaluation of Methods to Study Causes and Their Effects in Developmental Processes*
21. Marvin **Neumann** (University of Groningen) – *Bridging the scientist-practitioner gap in judgement and prediction*
22. Anton **Olsson Collentine** (Tilburg University) – *(Data-dependent) choices and (statistical) consequences in psychology*
23. Angelika **Stefan (**University of Amsterdam) – *Bayes Factor Design Analysis for the Efficient Collection of Informative Data*
24. Chuenjai **Sukpan** (Utrecht University) – *Inequality-constrained model selection (for dynamical models)*

5.1.3 Projects in progress beyond the project time limit

On December 31st 2019, the projects of the following PhD students are still in progress, but have exceeded the project time limit. Therefore, these projects are no longer mentioned in the list of projects.

25. Hilde **Augusteijn** (Tilburg University) – *Getting it right with meta-analysis: Assessing heterogeneity and moderator effects in the presence of publication bias and p-hacking*
26. Frank **Bais** (Utrecht University) – *Respondent profiles and questionnaire profiles in mixed-mode surveys*
27. Nitin **Bhushan** (University of Groningen) – *PhD Network dynamics of households' energy consumption after interventions*
28. Tessa **Blanken** (University of Amsterdam/NIN) – *From heterogeneous insomnia to homogeneous subtypes – and beyond: how do different subtypes of insomnia relate to (first-) onset depression?*
29. Daniela **Crisan** (University of Groningen) – *Practical Implications of the Misfit of Item Reponse Theory Models*
30. Mathijs **Deen** (Leiden University) – *Resampling methodology for longitudinal data analysis*
31. Giulio **Flore** (Leiden University) – *Predictive Unfolding Models for Single-Peaked Items with*

Binary and Graded Response Data

32. Zhengguo **Gu** (Tilburg University) – *Monitoring Individual Change in Mental Health Care and Education*
33. Chris **Hartgerink** (Tilburg University) – *Detecting potential data fabrication in the social sciences*
34. Jonas **Haslbeck** (University of Amsterdam) – *Modeling Dynamics in Psychopathology*
35. Maarten **Kampert** (Leiden University) – *Distance-based analysis of (gen)omics data*
36. Jolanda **Kossakowski** (University of Amsterdam) – *The PsychoGraph: Developing a Seismograph for Psychology*
37. Kimberly **Lek** (Utrecht University) – *How to hedge our bets in educational testing: combining test results with teacher expertise*
38. Xinru **Li** (Leiden University) – *Meta-CART: An integration of classification and regression trees into meta-analysis*
39. Oisín **Ryan** (Utrecht University) – *Not straightforward: Mediation and networks in continuous time*
40. Sanne **Smid** (Utrecht University) – *The use of expert data in Bayesian Latent Growth Curve Models with a distal outcome*
41. Sara **van Erp** (Tilburg University) – *Advancing structural equation modeling with unbiased Bayesian methods*
42. Daan **van Renswoude** (University of Amsterdam) – *Gaze-Patterns Tell the Tale: A Model-Based Approach to Free-Scene Viewing in Infancy*
43. Lieke **Voncken** (University of Groningen) – Norming Methods for Psychological Tests
44. Beibei **Yuan** (Leiden University) – *The δ-machine: A new competitive and interpretable classifier based in dissimilarities*

5.1.4 Projects left unfinished

45. Matthias **Haucke** (University of Groningen) – *Back to Bayesics: Using Bayes Factors as a Tool for Establishing Studies in Need of Replication*
46. Rianne **Schouten** (Utrecht University) – *About the evaluation of missing data methodologies*

5.2 Dissertations

LAURA BOESCHOTEN

Consistent estimates for categorical data based on a mix of administrative data sources and surveys

25 October 2019
Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. dr. J.K. Vermunt, Prof. dr. A.G. de Waal, dr. D.L. Oberski Financed by Tilburg University and Statistics Netherlands
1 March 2015 – 1 March 2019

Summary of thesis
When producing official statistics, Statistics Netherlands (CBS) uses existing administrative sources as much as possible. However, sometimes there is interest in a statistic on a subject that is not measured in these sources. In that case, the information is obtained through surveys.
Both administrative sources and surveys are not perfect and contain all kinds of measurement errors. This dissertation introduces a method that simultaneously tackles various problems related to those measurement errors.
First, the quality of the various sources is estimated. This is done on the one hand by investigating inconsistencies between variables that measure the same concept, but that originate from other sources. On the other hand, improbable or impossible combinations of scores on different variables are examined. For example, the combination of “age = younger than 5 years” and “marital status = married” is not possible because this is prohibited by law.
Secondly, statistics are produced that are corrected for the estimated measurement error. These produced statistics are consistent. This means that when a crosstab is produced between the variables “education level X gender X region “, and also a crosstab “education level X gender X marital status”, that, for example, the total number of highly educated men in both cross tables is exactly equal. In addition, the statistics are provided with variance estimates incorporate uncertainty due to the missing and conflicting values in the original sources.

JOLIEN CREMERS

One Direction? Modelling Circular Data in the Social Sciences using the Embedding Approach

24 May 2019
Utrecht University, Methodology and Statistics
Supervisors: Prof. dr. H. Hoijtink, prof. dr. I. Klugkist
Financed by NWO-Vidi
1 September 2014 – 1 September 2018

Summary of thesis

This project focuses on developing Bayesian methods for the analysis of circular longitudinal data. Several methods have already been proposed in the literature and the research in this project will focus on investigating and elaborating on those methods. In the first part of the project, a Bayesian embedding approach to circular longitudinal data using a mixed effects model is investigated. Tools for interpreting the results from this model will be developed in such a way that applied researchers may use them for their own data (e.g. to assess the size of a circular fixed or random effect and perform hypothesis tests). Additionally, tools for model comparison will be developed. In the future alternative approaches and extensions to the embedding approach to circular longitudinal data will be investigated.

MAARTEN KAMPERT

Improved Strategies for Distance Based Clustering of Objects on Subsets of Attributes in High-Dimensional Data

13 July 2019
Leiden University, Methods and Statistics
Supervisor: Prof.dr. J.J. Meulman, Prof. dr. W.J. Heiser
Financed by IBM / SPSS Leiden
1 December 2012 – 13 July 2019

Summary of thesis

This monograph focuses on clustering of objects in high-dimensional data, given the restriction that the objects do not cluster on all the attributes, not even on a single subset of attributes, but often on different subsets of attributes in the data. With the objective to reveal such a clustering structure, Friedman and Meulman (2004) proposed a framework and a specific algorithm, called COSA. In this monograph we propose various improvements to the original COSA algorithm. The first improvement targets the optimization strategy for the tuning parameters in COSA. Further, a reformulation of the COSA criterion brings down the number of tuning parameters from two to one, enables incorporation of pre-specified initial weights for the attribute distances and allows for a solution that consists of zero-valued attribute weights. The third improvement consists of a new definition of the COSA distances that yields a better separation between objects from different clusters. We compared the `old' and the improved COSA with other state of the art methods. The comparison is based on simulated and real omics data sets.

KEES MULDER

Bayesian Circular Statistics: von Mises-based solutions for practical problems

21 June 2019
Utrecht University, Methods and Statistics
Supervisor: Prof. dr. Herbert Hoijtink, prof. dr. Irene Klugkist
Financed by NWO-Vidi

1 September 2014 – 31 August 2018

Summary of thesis

Researchers often analyze data that is either numerical, such as height in centimeters, or is divided into categories, such as level of education. However, you can also encounter data like wind directions in degrees. Such data are best visualized on a circle, and are therefore called circular data. We run into this type of data in almost all fields, from psychology to astronomy.
Why is circular data different? Moving one way around the circle means that at some point, we end up back where we started, because 0 = 360. As a result, a lot of the statistician's toolkit, even something as simple as the mean, can not be used on circular data.
We take a look at several applications, and provide new ways to analyze circular data for practical problems, usually using solutions from Bayesian statistics.
For example, in cognitive psychology of haptic behavior there are experiments with a circular outcome. To relate both numerical and categorical predictors to the circular outcome, we made a new circular regression model, which uses the predictors in a better way than earlier models. Other problems we worked on are testing whether directions are spread evenly on the circle, analysis of the times at which people listened to certain music genres, models for eye movement directions obtained in eye tracking research, and modeling crime times in criminology.
Finally, we've created an R package, circbayes, that can perform these analyses in a user-friendly way. As a result, the field of Bayesian circular statistics has both been expanded in the scope of its analyses, as well as the accessibility of its methods.

ALEXANDER SAVI

Towards an idiographic education

17 May 2019
University of Amsterdam, Psychological Methods
Supervisors: Prof. dr. Gunter K.J. Maris, prof. dr. Han L.J. van der Maas
Financed by NWO
1 February 2014 – 31 January 2018

Summary of thesis

Picture education as a long chain of interventions in a self-organizing developmental system. On the one extreme, such educational sequences can be identical for each and every student, whereas on the other extreme, each sequence may be perfectly tailored to the individual. The latter is what is meant with idiographic education. All educational programs can be seen to lie somewhere in between those extremes, and in this book, methods are explored that may help increase the tailoring of education. The book covers advances in three fundamental approaches. First, it discusses and illustrates an experimental approach: online randomized experiments, so-called A/B tests, that enable truly double-blind evidence-based educational improvements. Second, it introduces a diagnostic approach: a scalable method that helps identify students' misconceptions. Third and finally, it introduces a theoretical approach: a formal conceptualization of intelligence that permits a novel educational, developmental, and individual perspective, and that may justify and ultimately guide the tailoring of education.

RIET VAN BORK

Interpreting psychometric models

24 June 2019
University of Amsterdam, Psychological Methods
Supervisors: Prof. dr. Mijke Rhemtulla, prof. dr. Denny Borsboom
Financed by University of Amsterdam and European Research Council
1 November 2014 – 1 November 2018

Summary of thesis

The field of psychometrics aims to develop theories on how to measure psychological constructs through observable behavior. This dissertation focuses on two psychometric theories that differ in how the psychological construct is related to observable behaviors. Latent trait theory understands psychological constructs as underlying common causes of observed behavior that explain the associations between certain behaviors. Alternatively, in the psychological network theory, behaviors correlate because they mutually reinforce each other and the psychological construct refers to the resulting cluster of associated behaviors. These different theories about how to conceptualize psychological constructs and how to relate these constructs to observable behavior can be formally defined in a set of equations and assumptions that make up a psychometric model. The chapters in this dissertation focus on two types of psychometric models: Latent variable models and network models. Part I of the dissertation focuses on the interpretation of the latent variable model. Part II of the dissertation makes a comparison between latent variable models and network models. While psychometric models can be interpreted as representations of a theory about the data-generating mechanism, this is not necessary. Psychometric models are often viewed as mere descriptions of data. This dissertation shows the importance of thinking through the choice of interpreting psychometric models either as a representation of a causal mechanism or as a description of the data and provides insights in the implications of that choice.

IRIS YOCARINI

Testing in Higher Education: Decisions on students' performance

27 September 2019
Erasmus University Rotterdam, Institute of Psychology
Supervisors: Prof. dr. Lidia Arends, dr. Samantha Bouwmeester, dr. Guus Smeets
Financed by Erasmus University Rotterdam
1 April 2015 – 1 April 2019

Summary of thesis

In higher education curricula, students' performance is continuously evaluated by administering tests. Students' performance is estimated using these tests, based on which different decisions are

made. The aim of this dissertation is to evaluate these decisions and assess their accuracy using simulation studies. The first part of the dissertation focusses on decisions made at the curriculum level, where tests are combined to determine whether students are allowed to continue their studies in an academic dismissal policy (in Dutch, the so-called binding study advice; BSA). Results show that allowing compensation within the BSA, where students are allowed to compensate within boundaries a failing grade on one course with a passing grade on another course, results in relatively more false positives than false negatives compared to traditional decision rules in which students should pass each individual course. Whether the compensatory decision rule is more accurate depends on the specific requirements and the tests that are combined. Allowing compensation is further studied by evaluating performance on a second-year sequel course when students were allowed to compensate the first-year precursor course. Results show that compensating the precursor course relates to low performance on the sequel course for students with overall low performance. The second part of the dissertation focuses on decisions made at the course level, evaluating possible methods to correct for guessing and methods to assign grades to test scores on individual tests. Both studies show that estimation of students' performance might in certain situations be improved by incorporating some overall sample information.

EVA ZIJLMANS

Item-Score Reliability – Estimation and Evaluation

15 February 2019
Tilburg University, Methods and Statistics
Supervisors: Prof. dr. K. Sijtsma, dr. J. Tijmstra, dr. L.A. van der Ark
Financed by Tilburg University
1 September 2014 – 1 September 2018

Summary of thesis

In psychology and education, tests are used to measure intelligence and school performance. Test scores are used to make decisions about individuals (who is admitted to a particular school level or a job?) and have impact on people's lives as well as on schools and organizations. Thus, test scores must be reliable to guarantee that decisions based on test scores are correct. Reliability is the degree to which retesting a person provides the same result. In practice, re-testing the same persons to determine reliability is unrealistic, because memory and other unwanted effects will influence the test result. Estimation of a test score's reliability therefore is based on the test results of a sample of people who took the test just once. This approach has produced several methods to estimate reliability of the test score.

Methods for estimating the reliability of a test score all relate to a test consisting of multiple items (problems to be solved, questions to be answered). However, individual items also must have high reliability, and thus it is important to assess the reliability of a single item, that is, the item-score reliability. So far, items were assessed using indices that address aspects of item quality other than reliability, but methods to assess item-score reliability were hardly available and thus had to be developed and their performance evaluated. This was the topic of this dissertation.

In this dissertation, methods for estimating item-score reliability were developed and

the usability of these methods was evaluated. First, reliability methods based on test scores were used as a basis for developing methods for estimating item-score reliability. These methods were evaluated in controlled studies using simulated data. Three promising methods resulted. In a second study, these three item-score reliability methods were used to estimate the item-score reliability in several empirical-data sets. The resulting values were compared to values of item indices assessing other aspects of item quality. The relation between the three item-score reliability methods and the other item indices was investigated in a third study using simulated data. In a final study, the usability of item-score reliability for selecting or rejecting items based on their contribution to test-score reliability was investigated.
The studies in this dissertation show that item-score reliability methods provide insight into the quality of an item and help to decide whether an item should be included in the test. Also, the relationship between item-score reliability and other aspects of item quality is investigated. Our methods may contribute to the improvement of psychological and educational tests.

MARIËLLE ZONDERVAN-ZWIJNENBURG

Standing on the shoulders of giants. Formalizing and evaluating prior knowledge

4 October 2019
Utrecht University, Methods & Statistics
Supervisors: Prof. dr. H. Hoijtink, dr. A.G.J. van de Schoot
Financed by NWO Gravitation
1 July 2014 – 1 March 2019

Summary of thesis

Research makes the greatest progress when it makes use of the results and insights of others. This dissertation explores, proposes, and demonstrates several ways in which information other than the data at hand can be used in an analysis. The first part concentrates in three chapters on acquiring prior knowledge for Bayesian analyses and its impact on the posterior results. First, a procedure to elicit prior information on a correlation from psychologists is developed and evaluated. Second, a simulation study is conducted to demonstrate the impact of prior knowledge in a two-group latent growth model with unbalanced sample sizes. Prior knowledge on the smaller group has the most meaningful impact on the posterior results, especially with respect to the non-null detection rate. Third, a systematic search strategy for prior knowledge is provided and applied in an empirical example. Understandably, prior knowledge on the smaller group in the unbalanced latent growth model was also most difficult to acquire. Experts were very helpful sources in determining the applicability of various empirical studies as prior knowledge. The second part of this dissertation concerns the evaluation of prior information from previous studies: it introduces testing replication by means of the prior predictive p-value. In this manner, researchers can test whether the relevant findings from a new study significantly deviate from what we can expect given the original findings. Relevant findings are captured through an informative hypothesis, which can, for example, concern the sign of relevant parameters, the relative ordering of parameters, or a minimal meaningful (effect size) value. This method is first explained for the specific case of ANOVA studies, where the relative

ordering of the groups is often of main interest. Subsequently, it is demonstrated how the prior predictive p-value can also be used to test replication of structural equation models with the Replication R-package. Part II ends with an overview of several methods to evaluate the replication of an ANOVA, and their performance in the context of small samples. The third and final part of this dissertation uses Bayesian Research Synthesis to evaluate the updated evidence from four cohort studies for competing informative hypotheses. The hypothesis with the highest updated posterior model probability is robustly supported by all studies, irrespective of population specifics and measurement methods.

5.3 New projects

GIUSEPPE ARENA

The time is Now: Understanding Social Network Dynamics Using Relational Event Histories

Tilburg University, Methodology and Statistics
Supervisors: Prof. dr. Roger Leenders, dr. ir. Joris Mulder
Financed by ERC
1 October 2018 – 1 October 2022

Summary
How do social relations in classrooms change across different settings such as lectures and group work, and how do these relations affect the students' motivation to keep working on a task and avoid rebellious acts? How do colleagues in working projects communicate with each other, and how is this affected by physical distance and means of communication? What triggers violent interactions between gangs and what can be done to slow down violent interactions or make them stop entirely? How do emergency responders (e.g., police, fire fighters, medical personnel) share information and coordinate among each other when emergencies occur?
These are just a few pending questions researchers have been facing in the last few decades (Monge, 1991; Mitchell & James, 2001; Cronin et al., 2011; Kozlowski et al., 2013, in press; Leenders et al., 2016). The difficulty in answering such questions lies in the fact that social interaction – whether it is the interaction among teachers and students, military in the field, doctors in a surgery room, or company employees working together on breakthrough innovations – is inherently dynamic in nature. Students in classes go through various stages of trust and development, move from one performance episode to the next, and constantly adjust their internal and external interactions. Soldiers in the field need to respond to hostile attacks and constantly adapt their mode of operation to their environment and their own well-being. It is safe to say that most, if not all, interaction among individuals, teams, organizations, and even countries, is dynamic in nature. Although most social scientists acknowledge the dynamic nature of human interaction, there is virtually no social science theory that describes exactly how long it takes to develop trust, how much faster integration occurs among classrooms made
up of Western cultures as opposed to classrooms combining Western and non-Western cultures, and exactly how long a particular interaction (e.g., a student insulting the teacher) will affect future relations.
In order to truly understand network dynamics and predict future events between individuals,
groups, or countries, we need (1) empirical data that captures networks dynamics accurately and with high resolution, and (2) we need statistical models that can extract the information contained in these data to answer practical and prevalent research questions. The first requirement is fulfilled due to the increasing availability of so-called relational event history data. This relatively new source of data, which is rarely used in social science research, consists of sequences of interactions, called relational events, between a sender and a receiver at a specific point in time. In a working team, a relational event could be one team member providing another member with information. In the classroom a relational event could be the teacher hushing a student. In the case of criminal

organizations, a relational event
could be a gang member killing the member of another gang.
Due to new technical developments, sequences of these relational events can be collected relatively easily. Interaction occurs through communication technology (e.g., email) leaving digital traces about senders, receivers, and timing. Employees in companies wear sociometric badges that store the interactions between colleagues. Classrooms are being recorded on video to observe interactions between teacher and students. Police stores databases of criminal interactions between gangs. Because these data contain information about relational events in continuous time, these data can tell us how fast/slow teams operate, why and when it speeds up or slows down, how the past affects the future, and how (quickly) social order evolves.
The second requirement – the availability of statistical models to extract the treasure of information contained in relational event histories – has not yet been fulfilled. A key characteristic of relational event data is the time and order that events took place in the past. Obviously it makes a great difference whether an insult of a student towards the teacher is followed by the teacher hushing the student, or when the order of these two events is switched when predicting what will happen next. Currently available statistical models of social network interaction (such as the Exponential Random Graph Model (ERGM; Lusher et al., 2012) and the Stochastic Actor-Oriented Model (SAOM; Snijders et al., 2010) are unable to capture the time and order of events in an appropriate way. On the other hand, the recently proposed Relational Event Model (REM; Butts, 2008) yields a promising new approach for modeling the timing and ordering of events. At this stage, however, the REM is still in a very preliminary stage of development and therefore it can only be used for a limited set of research questions.
Due to the recent availability of relational event histories and the great potential of the REM,
the time is now to develop a statistical framework for building and testing dynamic theories to better understand temporal dynamic social processes. One of the several goals of this projects will be to develop a general and flexible statistical framework for modeling relational event data. The new framework will be referred to as the Bayesian relational event model (BREM) which combines the relational event model (Butts, 2008; Leenders et al., 2016) with novel Bayesian methods (Mulder, 2014a, 2016).

MINGYANG CAI

Transition models for individual causal effects

Utrecht University, Behavioural and Social Sciences
Supervisors: Prof. dr. S. van Buuren, dr. G. Vink
Financed by Utrecht University
1 August 2018 – 31 July 2022

Summary

The individual causal effect is the difference between potential outcomes under all possible treatment conditions for a single unit (Hernan & Robins, 2019). Under the potential outcomes framework, causality is associated with an intervention applied to a unit, and the individual causal effect is measured by the difference between a measured potential outcome and an unmeasured, but estimated potential outcome. The individual causal effect may vary

across different units. Therefore, if the scientificc interest is whether a unit would benefit from treatment, it is necessary to estimate the unit's individual causal effect. The individual casual effect is of great interest in many disciplines such as biomedical, public health and social sciences.
Although the individual causal effect is the essential element of the potential outcomes framework, many researchers in causal inference estimate the average causal effect instead of the individual causal effect (Splawa-Neyman, Dabrowska, & Speed, 1990). The reason is that we can only observe one of those potential outcomes for an individual which means all other outcomes are missing (Holland, 1986). Thus, it is impossible to estimate the individual causal effect from the observed data directly. Obviously, if we assume that the effect varies between individuals, it would be inappropriate to extrapolate an average causal effect in one population to an individual. A solution would be to estimate the individual's causal effect by imputing the unobserved potential outcome. Multiple imputation (Rubin, 1987) seems a promising technique for estimating potential outcomes. In multiple imputation, several imputed datasets are generated to reflect the uncertainty about the true, but unobserved value. After imputing missing values in potential outcomes, we could estimate the individual causal effect on the imputed dataset.
I will explore a new class of transition models which could describe the individual causal effect using the imputation models for unobserved potential outcomes. The transition model consists of three components: 1) imputation, 2) causal modeling and aggregation, and 3) analysis and decision-making. With this modular framework, researchers would conveniently perform causal
inference. Moreover, the result of the causal inference could be presented less ambiguously. I expect that novel transition models could be applied to both experimental and observational studies.

FELIX CLOUTH

Personalized Treatment Options Model

Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors Prof. dr. Jeroen Vermunt, prof. dr. Steffen Pauws
Financed by NWO (project: DATA2PERSON)
1 September 2018 – 1 September 2022

Summary

The aim of this project is to develop Personalized Option Profiles for patients diagnosed with cancer. With Personalized Option Profiles we mean that we will build a tool that aims to help patients choosing a treatment that maximizes the probability of a certain, personalized to that patient, outcome profile. Using the "NCR" (National Cancer Registry) and the "PROFILES" (PROFILES study, Tilburg University) data set, patients will be clustered based on their outcomes using latent class analysis. As a first step, latent classes will be constructed using indicators such as survival time, reoccurrence of the disease, and quality of life after treatment. Decisions on the number of classes in our model will be guided by statistical information criterions (i.e. AIC and BIC) but eventually will be based on theoretical considerations and medical interpretability. For this, we will aim for a close collaboration with medical decision makers (i.e. oncologists). Having identified a model with an optimal number of classes, in a second step, the patients in our data set will be assigned to the class with their highest probability (classification). These two first steps can be conducted using the specialized software Latent GOLD or R.

In a third step, predictions will be made for new patients. More precisely, based on their tumor characteristics, general health, age, sex, etc. a prediction model will be constructed that estimates which latent outcome class is most likely for this new patient. Additional, in this step we will control for the treatment effect. That is, for each relevant treatment option for that specific patient we will estimate the effect on the likelihood of belonging to one of the latent outcome classes. Doing so, we will be able to give recommendations to each new patient for their best treatment depending on their outcome preferences. This prediction step can be a range of different models, from a multinomial logistic regression to statistical learning (i.e. black box) models, and to this point we did not yet decide which exact model will be used. This last step will be performed using R. This analysis strategy also referred to as the three-step approach [1] allows for analyzing big data sets in a feasible manner and is particularly suited for our needs.
The data is available and will be provided by the Intergraal Kankercentrum Nederland (IKNL) where I have an appointment as an external researcher. Further, the prediction model will be developed in close collaboration with another PhD student who works on Natural Language Generation and will build a tool to communicate the results from this project in a personalized way.
The approach taken in this project is as follows. To begin, we will explore the different outcome variables available in the two datasets and build an outcome profiles sub-model for colon cancer [M1-M6] and a personalized option profiles model using the three-step implementation of statistical learning methods [M7-M12]. This work will result in the first paper that we aim to publish in a journal for oncology or medical statistics.
Subsequently, we generalize these clustering and prediction tools to be applicable with other cancer types [M13-M18] and to allow flexible updating when new data come in [M19-M24] (second paper). During these two stages also a first version of a R package will be created. Next, the general toolbox will be applied to and tested with prostate cancer data [M25-M30]. Based on the experiences with the implementation of the personalized decision aids in subproject 2, we will finetune our models and software implementation [M31-M36] (third paper). Finally, the models and tools will be evaluated, with both patients and doctors [M37-M42] (fourth paper). [1] https://jeroenvermunt.nl/lca_three_step.pdf

MIHAI CONSTANTIN

Tools for Aiding Empirical Research Based on Intensive Longitudinal Data

Tilburg University, Methodology and Statistics
Supervisors: Prof. dr. J.K. Vermunt, dr. A.O.J. Cramer, dr. N.K. Schuurman
Financed by Tilburg University
1 September 2018 – in progress

Summary

In the recent years, two increasingly popular topics have occupied the front lines of psychopathological research. First, is the conceptualization of mental disorders as complex systems in which symptoms interact to produce patterns that lead to the emerge of mental disorders. This view is known as the network approach, or the network theory of mental disorders (Borsboom, 2017;

Cramer et al., 2016; Cramer, Waldorp, van der Maas, & Borsboom, 2010). Another active direction in clinical research is the use of intensive longitudinal data (ILD). These data—as opposed to, for example, crosssectional or panel data—are regarded as gateway to designing personalized interventions and are usually acquired via the experience sampling methodology (ESM; Larson & Csikszentmihalyi, 2014) in which participants are asked to answer relatively simple items (e.g., "I feel cheerful") multiple times per day, at random moments, over the course of several days (Trull & Ebner-Priemer, 2009). Numerous methods
exist for modeling ESM data (Hamaker, Asparouhov, Brose, Schmiedek, & Muthén, 2018; Hamaker, Ceulemans, Grasman, & Tuerlinckx, 2015), however, a popular choice in social sciences is the first order vector autoregressive model, in short VAR (1) (Brandt & Williams, 2007). Within a VAR (1), each variable is regressed on itself and all other variables at the previous time point (i.e., also called lag 1; see Figure 1a). Recently, network psychometricians turned their attention to such methods in order to construct intra-individual networks (Bringmann, Lemmens, Huibers, Borsboom, & Tuerlinckx, 2015; Bringmann et al., 2013; Epskamp et al., 2018), in which the links between the measured variables denote temporal predictive relations (e.g., experiencing bodily discomfort at a time point predicts being nervous at the next time point; see Figure 1).
The aim of this project is to further advance the use of ILD to facilitate personalized, networkbased research. We take a pragmatic stance and tackle issues that are immediately relevant to researchers who want to design studies based on ILD data. More specifically, we focus on (1) the power requirements for sensibly using such methods, (2) evaluating and developing effect sizes that suit different research question that employ network models and ILD (3) the issue of measurement error when using noisy ILD data, and (4) the many degrees of freedom with respect to the choices researchers make when collecting and analyzing such data.

DAMIANO D'URSO

Unraveling measurement non-invariance in multilevel data in the Social Sciences

Tilburg School of Social and Behavioural Sciences, Methodology and Statistics
Supervisors: Prof. dr. J.K. Vermunt, dr. K. de Roover
Financed by NWO
1 October 2018 – 1 October 2022

Summary

Psychological researchers often measure unobservable psychological attributes (e.g., personality traits or emotions) using observable variables such as questionnaire items. However, valid comparison of the measured attributes across groups, subjects, and/or time points requires measurement invariance (MI): The same measurement model (MM) holds across the compared units. It is therefore of great importance to test for MI, also when the number of units to be compared is large and when they are clustered, that is, when dealing with multilevel data structures. The importance of the problem is highlighted by the fact that it is now becoming common practice to compare numerous groups at the same time and examples include the comparison of schools in scholastic surveys, countries in cross-cultural studies, and individuals in longitudinal studies.
On the one hand, different modelling frameworks and tools are currently available to compare groups as well as detecting violations of MI. However, for specific types of data it is yet not clear

which methodologies perform better in detecting those violations as well as in which conditions. As an example, in the case of polytomously scored items with limited and ordered categories one might use a factor analytic approach or a item response theory approach for the purpose of investigating the extent to which invariance holds and study the extent to which the compared MMs differ. However, the two approaches differ notably with regard to both the chance of detecting various types of violations of MI as well as the procedures and tools available within each framework and yet it is not clear which one should be preferred. On the other hand, these existing methods generally examine violations of MI only for comparison of small numbers of groups, are generally only confirmatory in nature, and are suited only for specific types of data or provide insufficient information on the sources of non-invariance. This is why new methods for comparing MMs across many units in multilevel data are necessary to indicate for which units MI holds (and thus valid comparisons can be made) and for which units MI is violated. The new methods for exploring MMs differences may indicate sources of non-invariance one may try to address (e.g., response styles, differential item functioning), but may also indicate substantively interesting structural differences in general, such as differences in the structure of personality or emotional experience. The goal of this project is two-fold: on the one hand, we aim at evaluating the performance of present tools in detecting violations of MI in the context of multilevel data structures; on the other hand, we aim to overcome the limitations of the present techniques by developing new models and methods that allow for fine-grained and flexible evaluation of MI.

RIA HOEKSTRA

Within, Between and Beyond: A network perspective on intra- versus inter-individual data

University of Amsterdam, Social and Behavioral Sciences
Supervisor: Prof. dr. Denny Borsboom, dr. Sacha Epskamp
Financed by NWO Research Talent Grant 406-18-532
1 January 2019 – 1 January 2023

Summary
The network perspective on psychopathology arose relatively recently as a new way of conceptualizing mental disorders. Within this perspective mental disorders are thought of as a network of symptoms which directly interact with each other. Since its conceptual debut in 2008 (Borsboom, 2008), the analysis of symptom networks has been argued to facilitate treatment of psychopathology (Borsboom & Cramer, 2013; Borsboom, 2017; Kroeze et al., 2016). In fact, clinicians have started to use network analysis to identify central symptoms in the network, which are assumed to influence many other symptoms, as sensible targets for interventions (Fried et al., 2017; Bringmann et al., 2013; Bos et al., 2017). However, such interventions target a process taking place within the individual, while currently, the majority of network structures found in the literature have been estimated by analyzing between-subjects' data-analytic techniques (for an overview see Fried et al., 2017). One of the most dramatic examples of a mismatch between inter- and intraindividual level of analysis occurs when the direction of an association at the inter-individual level is reversed at the intra-individual level. This counterintuitive feature is a special case of the well-known statistical phenomenon: Simpson's paradox (Kievit et al., 2013; Molenaar &

Campbell, 2009; Fisher & Bowell, 2016). Discrepancies like these between intra- and interindividual levels of analysis have significant implications for psychological science, and in particular for psychopathology. A treatment that appears to be effective at the interindividual level might in fact have reverse implication at the intraindividual level. Because of such discrepancies between inter- versus intra-individual structures, the practice of generalizing relations that hold at the population level to the individual level has attracted criticism from researchers arguing that within-person processes can only be discovered using within-person data (Molenaar, 2014; Barlow & Nock, 2009). Up to this date, and to our knowledge, this discussion on inter- versus intra-individual level of analysis in methodology has largely centered around factor analysis (Allport, 1962; Hamaker, Dolan & Molenaar, 2015; Borsboom, 2015, but see Hamaker, Kuiper & Grasman, 2015). Therefore, it remains a question to what extent and in what way the current findings regarding the incompatibility of inter- and intra-individual (Molenaar, Huizenga & Nesselroade, 2003) generalize to other models, such as network models.
As results of interindividual analyses in network analysis are currently used to determine interventions on an intraindividual level, it is of vital importance to establish whether, and under which conditions, inferential moves across these two levels are valid. As a result, there is a pressing need for tools that allow researchers to (1) assess to what extent heterogeneity in network structures is present, (2) determine whether intended inferences are threatened of invalidated by the presence of heterogeneity, and (3) to combine information derived from between-subjects and within-subject analyses in an optimal way. To facility this need, my PhD project focusses on developing, testing and applying a toolbox to asses heterogeneity in network analysis. This toolbox will give researchers the muchneeded equipment to determine, whether, and when they can make valid inferences from one level to the other.

DIANA KARIMOVA

Multinomial Choice Model for Relational Events Networks

Tilburg School of Social of Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. dr. R.T.A.J. Leenders, dr. ir. J.Mulder
Financed by ERC Grant
1 September 2018 – 31 August 2022

Summary
My PhD project is devoted to developing exploratory methods for better understanding temporal features of dynamic interaction processes, such as speed, lag, rhythm, pacing, and memory. In this working project, we will analyze the relational event history of 70,000 information-sharing events between colleagues through email in large organizations. The interest in the study is in how (fast) new information flows through the network, whether there is a lag between members in different teams, whether there is a specific rhythm of information sharing events, and how this changes in continuous time during the period of working projects. External information of the employees is available such as team membership (which changes over time), common working projects including

important deadlines, the time of employment, the department and location, among others. All this information can be interpreted as a covariate that influence the process of interaction. For example external covariates such as gender, department, location, hierarchical level, religion, time of employment, 'activity' of the employee to send messages, 'popularity' of the employee as receiver. Network effects are dynamic in nature: If teams have to work together to meet a certain deadline, it is likely that the effect of team membership dies out near a deadline. To explore such temporal properties of the network effects, we will use Bayesian MCMC methods to fit the model sequentially over the event history sequence. Through visualization we will learn about the dynamic nature of network drivers and temporal aspects of the dynamic interaction process. There are endless possible internal and external covariates, and interactions that can potentially drive the temporal interaction process. Therefore overfitting and false positives can be serious issues. To account for this, I will develop shrinkage priors, such as the Bayesian Lasso and horseshoe priors to shrink nonexisting effects towards zero and leave true effects unaffected.

SIMON KUCHARSKY

Inferring cognitive strategies from eye movements: A Bayesian model-based approach

University of Amsterdam, Social and Behavioural Sciences
Supervisors: Prof. dr. E.J. Wagenmakers, prof. dr. M Raijmakers, dr. I. Visser
Financed by NWO Talent Grant
1 October 2018 – 30 June 2023

Summary

Eye-tracking provides a window into human cognition. The greatest challenges of eye movement analysis are how to characterize sequences of fixations, how to find patterns in them, and how to relate these patterns to cognitive processing. Meeting these challenges is important, because finding characteristic features of how people look at various stimuli could provide invaluable information both for psychological theory and practice. This project builds on promising existing work concerning the stochastic modeling of eye-movements. We aim to resolve current challenges and provide a general modeling framework that will drive the field forward.

IJSBRAND LEERTOUWER

Understanding vulnerability to stress-related disorders from a complex dynamic systems perspective

Tilburg School of Social and Behavioral Sciences, Methodology & Statistics
Supervisors: Prof. dr. J.K. Vermunt, dr. A.O.J. Cramer
Financed by Tilburg University
15 August 2018 – 15 August 2021

Summary

The network perspective on psychopathology conceptualizes mental disorders as complex dynamic systems, in which emotions, cognitions, and behaviors directly interact with each other (Cramer, Waldorp, van der Maas & Borsboom, 2010; Borsboom & Cramer, 2013). In the case of generalized anxiety disorder for example, excessive worry may lead to insomnia and thereby fatigue, which in turn may lead to concentration problems, worry about those concentration problems, and in the end, increased insomnia. The previously described interaction pattern is an example of a so-called feedback-loop, which essentially means that an element in the network reinforces itself through other symptoms. Over time, such interactions can become self-sustaining, and according to the network perspective, this self-sustaining, stable state of the network is what constitutes a mental disorder. The crucial question is, then, what makes a network structure conducive (vulnerable) to end up in this self-sustaining state. One hypothesis regarding so-called stress-related disorders (i.e., disorders that are influenced by exogenous or endogenous stressors such as traumatizing events, challenging life circumstances, or physical illness; Kalisch, Müller & Tüscher, 2015) is that vulnerability to psychopathology implies strongly interconnected (symptom) networks (a strong connection between insomnia and fatigue implies that activating one of these symptoms rapidly induces activation of the other) that propel the network into a disordered state after a shock from the external field (i.e., the stressor in question; Cramer et al., 2016; Borsboom, 2017; Kalisch et al., in press.). Simulations have indeed demonstrated that strongly connected depression symptom networks are vulnerable in the sense that they easily and abruptly move into a disordered (depressed) state and tend to remain in this state after stress levels have decreased (Cramer et al., 2016). The important next step for this line of research is to gain a better understanding of these processes related to vulnerability in real life. However, before we can investigate these processes empirically, there are a number of challenges that will have to be met concerning when to measure, what to measure, and how to quantify what we estimate based on what we measure. Addressing these challenges will be the general goal of the proposed project.

HIDDE LEPLAA

Replication in the behavioural sciences

Utrecht University, Methodology and Statistics
Supervisor: Prof. dr. I. Klugkist, prof. dr. H. Hoijtink, dr. C. Rietbergen
Financed by Utrecht University
1 September 2017 – 31 August 2024

Summary
In this project we will further investigate the phenomenon of replication studies. First by proposing a new method to conduct a replication, using data from the Open Science Collaboration (OSC) Reproducibility Project Psychology (OSC, 2012; 2015). Using informative hypotheses (e.g. Klugkist, Laudy, & Hoijtink, 2005; Hoijtink, 2012, p. 50-51) the replicating hypotheses will be analyzed with the Bayes Factor (e.g. Kass & Raftery, 1995; Hoijtink, Mulder, Van Lissa, & Gu, 2019). In the second project, qualitative methods (e.g. Glaser, 1978; Boeije, 2010) will be used to research the view of psychologists on the phenomenon of replication.

DANIELLE MCCOOL

Using surveys and smartphone sensors to produce time use and travel statistics

Utrecht University, Methodology and Statistics
Supervisors: Prof. dr. Barry Schouten, dr. Peter Lugtig
Financed by Waarneem-Innovatie Netwerk (CBS/UU)
15 July 2018 – 15 July 2022

Summary

This project considers as its broad focus the integration of mobile device sensors with more traditional survey methods with the ultimate goal of developing methodology for alignment between modes for official statistics. There are many areas of research that are concerned withbehavior that exists in a continuous context but which have relied upon either sampling or recall methods to approximate the underlying behavior of interest. As an illustrative example, consider travel movement behavior. General patterns of travel behavior may be of interest to a governmental body, who may require aggregate statistics to make governmental infrastructure decisions. Given access to every individual's precise location, no statistical methods would be required for making statements about the number of persons using public transportation on a given week. Conceding that we have access neither to all members of the population, nor to their precise location at each moment in time, these official travel statistics are usually generated both by generalizing intelligently across samples of persons as well as samples of time. This is often accomplished by studies in diary format that require respondents to recall all trips made during a day.

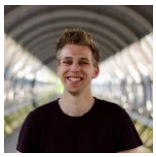
This current methodology, known as the travel diary study, has been well established over decades of studies, but comes with known compromises. Because they are based on self-recall data, they are often biased, with respondents misreporting trip characteristics or rounding times and distances for ease of calculation. Furthermore, they are cumbersome and require no small amount of data entry, which decreases participation and is also known to increase the likelihood that those who do participate will leave out smaller trips. By including sensor data in the methodology, we aim to address these problems by increasing the precision and frequency of location measurement and by extending the survey instrument to access larger swaths of the population by reducing deployment and participation costs. The reduced burden also enables us to track participants' habits over longer periods of time, which allows for more fine-grained answers to questions about travel behavior.

While sensor data seem to offer many fields much in the way of increased quantity and precision of data, there are known issues. Location data is susceptible to errors at multiple levels. Data can be missing for a range of reasons related either to personal or device characteristics. The expectation is that missing data from various sources will require differential treatment that will also impact the method of addressing the other missing data. Consider the difference, for example, between complete unit nonresponse versus incidentally leaving one's phone at home versus a device dying mid-trip. Although all three are sources of missingness, the overall effect on outcome measures is likely to be quite different, and the methodology employed to address each will vary as well. It would be impossible for us to impute the route through space taken by a person for whom no data has been collected. However, the missing spatial data for dropped measurements on either side of a tunnel could very well be imputed on the basis of known map characteristics. It may also be possible to impute longer stretches of missing data, given that a person travels a single route with some frequency. One aim of this project is to determine the limits of what we are able to do with missing

data, given the additional dimensions of space and time inherent in semi-continuous sensor data.
The first two articles arising from this project seek to evaluate experimental microdata collected in a field test of a travel diary application in November and December 2018 at Statistics Netherlands. The combination of register data for two-thousand participants invited to the study and the data generated by over six hundred respondents will be used in order to develop methodology for identifying, categorizing and reducing the impact of missing and erroneous data. Further evaluations investigating the extent to which the collected sensor data differs from the data collected in previous official surveys may also form part of this project in a separate article. In line with the overall goals of evaluating and improving the use of sensor data, a future two papers are proposed on the integration of sensor data in time use studies where the issues with the usage of geospatial data to provide more detailed information will require similar modeling and correction for nonresponse but may add new features such as utilizing location coordinates to evaluate and correct for missing annotative data.

JEROEN MULDER

Concerning Causes: Evaluation of Methods to Study Causes and Their Effects in Developmental Processess



Utrecht University, Methodology an Statistics
Supervisors: Prof. dr. Ellen Hamaker
Financed by Consortium Individual Development (CID)
1 May 2018 – 30 April 2023

Summary
On the website of the Consortium Individual Development (CID) it is stated that: “CID examines how the environment (…) and child characteristics (…) affect the development of social competence (SC) and behavioral control (BC), skills that are essential for functioning in society and for reducing risk of behavioral and emotional problems.”.
Trying to understand how diverse factors result in individual differences in developmental outcomes, implies a strong interest in the causal mechanisms that drive the developmental processes. However, from a methodological point of view, studying causality in the context of developmental processes is a challenging task. While experiments based on random assignment form a powerful tool to study causal mechanisms, most (human) developmental processes cannot readily be studied using this methodology for practical or ethical reasons. In contrast, using correlational research—such as cross-sectional and longitudinal panel studies—to study causal mechanisms, is hampered by the threat of omitted variables. Researchers are keenly aware of this problem, and therefore tend to avoid the use of strong causal language in the context of non-experimental research (Hernán, 2018); however, this does not make them less interested in it.
The aim of the current PhD project is to: a) investigate the extent to which CID research is based on a causal interest versus an interest in mere description and/or prediction; b) investigate how particular experimental designs that include mediation can be used to study causal relationships, but also what threats may exist in this context; c) investigate how diverse longitudinal models may align with research questions about the causal connection between developmental processes; and d) investigate how instrumental variables may be put to use in CID to allow for causal inference.

This project is divided into 4 parts. Subproject 1 will consist of a literature review that is concerned with the current aims and practices within social science research. A preliminary review of a random sample of 100 CID publications (published before 2019) reveals that many researchers are interested in causal inference. 18 studies employed an experimental design by including some sort of manipulation and 15 of these studies drew causal conclusions. In contrast, 49 studies used correlational data. Of these studies, however, 23 expressed an interest in causal inference in the introduction, and 18 studies recommended future research into causal effects.
Subproject 2 will focus on the use of experimental manipulations in which the interest is in determining to what extent the effect of the treatment is mediated through another variable. Due to the possibility of unmeasured confounding, a causal interpretation of the relationship between mediator and outcome is problematic. Therefore decomposing the total effect into a direct and indirect effect is problematic as well (VanderWeele, 2015; Cox, Kisbu-Sakarya, Miočević, & MacKinnon, 2013). We will propose a related design that may be able to account for this, and we will perform a simulation study to investigate how well this would work in practice.
Subproject 3 will focus on the relation between two developmental processes and how to investigate possible causal connections between them in longitudinal research. We will view this challenge through the lens of directed acyclical graphs (DAGs) and consider whether including time as a covariate can be considered from a mediation perspective.
Subproject 4 will focus on the potential of using instrumental variables (IV) in the context of CID. Within modern econometrics, IV's are most importantly used as a solution to the omitted variable bias, and are therefore promising as a solution to some of CID's methodological issues.

MARVIN NEUMANNN

Bridging the scientist-practitioner gap in judgement and prediction

University of Groningen, Psychometrics & Statistics
Supervisors: Prof. dr. R.R. Meijer, dr. A.S.M. Niessen, dr. J.N. Tendeiro
Financed by University of Groningen
1 September 2018 – 1 September 2022

Summary

My PhD project is concerned with the scientist-practitioner gap that exists in test-use and decision-making in, for example, the context of personnel selection and admission to higher education. I will focus on the important gap that exists with regard to the use of clinical vs. actuarial prediction methods. Previous research has demonstrated that, on average, actuarial prediction outperforms clinical prediction (Kuncel, Klieger, Connelly, & Ones, 2013). The superiority of actuarial prediction is not a new research topic (Meehl, 1954; Sawyer, 1966). However, implementation of actuarial prediction procedures, and evidence-based assessment in general is greatly lacking in practice. This creates a strong need for future research that helps practitioners to understand the value of evidence-based testing and decision-making. Therefore, in this PhD project, I will conduct several experiments that investigate how to best communicate the psychometric properties of assessment procedures and advantages of evidence-based assessment (actuarial prediction and standardized testing) to practitioners. Variables of interest are utility information in the form of Taylor-Russell tables (success ratio, selection ratio, base rate, predictive validity), practitioners' attitudinal measures

(confidence in prediction, satisfaction with prediction), factors associated with resistance of practitioners (e.g. autonomy, knowledge, method of communicating evidence) and actual implementation in practice. Previous studies showed that the lack of predictive validity that results from clinical prediction is often due to the inconsistency with which judges weight different information across subjects. Therefore, increasing the judgment consistency of practitioners is a main topic in this project.

People show higher intentions to use evidence-based testing and decision making (structured interviews and actuarial prediction) when these procedures offer more rather than less autonomy potential (Nolan & Highhouse, 2014). However, no research has simultaneously looked at the potential validity loss that could result if assessment and decision-making procedures offer more autonomy potential. This tradeoff between autonomy potential and validity will be further explored in my first study. Differences in predictive validity of different judgment procedures that vary in autonomy potential will be investigated, together with participants' intention to use and actual use of these judgment procedures. In several studies, I will describe and test interventions that present the psychometric properties of evidence-based assessment in a simple and understandable manner to students and practitioners in the field (such as human resource managers and admission officers). This entails the presentation of all sorts of psychometric information that is relevant in the context of selection. Furthermore, the lens model (Kuncel et al., 2013; Yu, 2018) serves as an overarching framework that allows to model, and to compare the subject's clinical judgment with a mechanical judgment based on regression analyses. This project results in guidelines and best practices that aid the implementation of evidence-based test use and assessment practices and contributes to narrowing the scientist-practitioner gap that exists in this context.

ANTON OLSSON COLLENTINE

(Data-dependent) choices and (statistical) consequences in psychology

Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. dr. Jelte Wicherts, dr. Marjan Bakker
Financed by Tilburg University
1 October 2018 – 1 October 2022

Summary

My PhD project focuses on how seemingly arbitrary decisions in the research process affect statistical outcomes, in the context of psychology. That apparently innocuous choices in the research process can be important has received increasing attention ever since Simmons, Nelson and Simonsohn (2011) demonstrated how the existence of multiple alternative analytic options can lead a researcher to find "evidence" for almost any claim. Such researchers' degrees of freedom (Wicherts et al., 2016), include amongst many possibilities choices about primary outcome, scoring of items or scales, or which statistical model to use.

Despite increasing awareness (e.g., Steegen et al., 2016; Orben & Przybylski, 2019) that what seem like innocent choices in the research process can have large consequences for final estimates, it is often unclear which choices are important. In addition, when a behavior is recognized as potentially problematic (as with reporting p¬-values as "marginally significant"), it can be unclear how

widespread the behavior is (although see John, Loewenstein, & Prelec, 2012), and hence how concerned we should be. As such, we believe further research on the prevalence and consequences of flexible (usually, data-dependent) decision-making in the research process is timely, and has the potential to contribute to increased replicability, transparency and research integrity in psychological science. The PhD project consists of several sub-projects, of which three have been designed so far. First, an examination of how often researchers in psychology report p-values between .05 and .1 as 'marginally significant' (published; Olsson-Collentine, van Assen & Hartgerink, 2019). Since researchers tend to use an (implicitly) predefined alpha level, later reporting results as marginally significant is an example of an implicit change in the decision rule. How problematic this is depends on the extent to which the decision rule has been altered. Second, an examination of the consequences of seemingly minor changes in experimental location and settings in direct replications in social and cognitive psychology (in review). We found that the consequences are typically small and hence an unlikely explanation for when there are large differences in outcome between direct replications. Third, study level choices can create uncertainty in meta-analytic outcomes that are not currently accounted for. We explore how flexible decision-making at the study-level can affect meta-analytic summaries. We expect this third sub-project to be published in 2020, and further sub-projects will be planned in the course of the PhD-project.

ANGELIKA STEFAN

Bayes Factor Design Analysis for the Efficient Collection of Informative Data

University of Amsterdam, Psychology
Supervisors: Prof. dr. E.J. Wagenmakers, PD dr. F. Schönbrodt
Financed by NWO Talent Grant
1 October 2018 – 1 October 2022

Summary
The diligent planning of research designs is a prerequisite for credibility and reproducibility of research results. However, frequentist power analysis, the current standard in design analysis, neglects important aspects of design quality and is not applicable to Bayesian research designs that have gained popularity during the last years. The goal of this project is to provide researchers with a comprehensive new framework for design analysis that allows planning the efficient collection of informative data, with the promise to obtain more informative results with fewer data points (on average). The research project will build on the concept of Bayes Factor Design Analysis (BFDA; Schönbrodt & Wagenmakers, 2017), a method to plan for compelling evidence in Bayesian designs. It can be roughly divided into five goals: (1) conceptually extend and streamline BFDA, (2) develop a Continuous BFDA, (3) apply BFDA to meta-analyses, (4) use BFDA to explore the efficiency of collapsing bounds in sequential designs, (5) make BFDA accessible to a broad audience. The resulting methods will provide practical researchers with a comprehensive new method to balance efficiency and informativeness of their experiments and thereby enhance the credibility and efficiency of their research.

CHUENJAI SUKPAN

Inequality-constrained model selection (for dynamical models)

Utrecht University, Methodology and Statistics
Supervisors: Prof. dr. Ellen Hamaker, dr. Rebecca M. Kuiper
Financed by The Royal Thai Government
1 January 2019 – 31 December 2022

Summary
Researchers are often interested in theory-driven hypotheses: for example, medicine A works better than medicine B, which works better than a placebo (in an anova model: μA > μB > μPlacebo); or the number of children is a stronger predictor for happiness than income (in a regression model: βNC > βInc). These theory-driven hypotheses can be evaluated with the goric or gorica, AIC-like criteria which can examine inequality constraints as in the examples. The goric(a) selects the best model/hypotheses out of a set; hence, the name model selection criteria. The goric is suitable for normal linear models, while the gorica is for a more general class of models.
In this project, I will extend the use of the goric and gorica to a wide range of models for which the performance is then evaluated by simulations. For instance, one promising method in SEM is the dynamical model DSEM (created by Mplus in collaboration with Ellen Hamaker). This model analyzes (intensive) longitudinal data, a type of data that is used more and more because of the widespread use of electronic devices that easily collect many repeated measurements. Mplus / DSEM renders an AIC / DIC value for each analyzed model, enabling the user to compare these models. With this, the user cannot always evaluate their a priori expectations, because they are generally represented by order-restricted hypotheses. Fortunately, the gorica can be applied to DSEM, which enables users to examine their inequality-constrained hypotheses. This is, however, never done before and, moreover, the performance of the gorica in DSEM is not examined. This is among others what I will be doing (via a simulation study), which might lead to the inclusion of the gorica in DSEM.
Summary of (possible) projects:
1) Lavaan and Mplus + Simulation study of performance of goric(a).
2+3) goric(a) in dynamic models: DSEM (Mplus) and VAR(1) and ct-sem + simulations.
4) Application on real data (preferably ESM data using a continuous-time model).
5) 'My own project'.
6) Make tutorial(s) for goric and gorica R packages.
7) Make part of a goric(a) course; perhaps part of existing course

5.4 Running projects

RICHARD ARTNER

Methods for estimating and improving the replicability of psychological science

KU Leuven-University of L euven, Quantitative Psychology and Individual Differences
Supervisors: Prof. dr. F. Tuerlinckx, dr. W. Vanpaemel
Financed by KU Leuven-University of Leuven
1 October 2017 – 30 September 2023

TESSA BLANKEN

From heterogeneous insomnia to homogeneous subtypes – and beyond: how do different subtypes of insomnia relate to (first-) onset depression?

Netherlands Institute for Neuroscience, Sleep & Cognition / University of Amsterdam
Supervisors Prof. Eus van Someren & Prof. Denny Borsboom
Financed by ERC
1 October 2015 – 1 January 2020

NADJA BODNER

Boolean Networks

Quantitative Psychology & Individual Differences, Faculty of Psychology and Educational Sciences, KU Leuven-University of Leuven
Supervisors: Prof. Eva Ceulemans, Prof. Francis Tuerlinckx & Dr Guy Bosmans Financed by FWO
1 October 2016 – 1 October 2020

SEBASTIÁN CASTRO ALVAREZ

ImoRTant: developing item response theory to analyze intensive longitudinal data

University of Groningen, Psychometrics and Statistics
Supervisors: Prof. dr. R.R. Meijer, dr. L. Bringmann, dr. J. Tendeiro
Financed by University of Groningen
1 September 2018 – 31 August 2121

ALINE CLAESEN

Methods for estimating and improving the replicability of psychological science

KU Leuven-University of Leuven, Quantitative Psychology and Individual Differences
Supervisors: Prof. dr. F. Tuerlinckx, dr. W. Vanpaemel
Financed by KU Leuven-University of Leuven
1 October 2017 – 30 September 2023

ELISE CROMPVOETS

Pairwise comparisons within education

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University (in collaboration with CITO)
Supervisors: Prof.dr. K. Sijtsma & Dr. A. Béguin Financed by Tilburg University and CITO
1 September 2016-1 September 2020

NIEK C. DE SCHIPPER

Big data in the Social Sciences: Statistical methods for multi-source high- dimensional data

Netherlands Institute for Neuroscience, Sleep & Cognition / University of Amsterdam
Supervisors Prof.dr. J.K. Vermunt & Dr. K. van Deun
Financed by NWO Vidi Grant K. van Deun 2015
1 September 2016 – 1 September 2020

JEFFREY DURIEUX

Clusterwise Independent Component Analysis for multi-subject (resting-state) fMRI data

Leiden University, Methodology and Statistics Unit
Supervisors: Dr Tom F. Wilderjans & Prof. Serge A.R.B. Rombouts
Financed by NWO
1 September 2016 – 1 September 2021

ANNE ELEVELT

Smart(phone) surveys

Methodology & Statistics, Faculty of Social and Behavioral Sciences, Utrecht University
Supervisors: Prof.dr. P.G.M. van der Heijden, Dr. P.J. Lugtig, Dr. V. Toepoel
Financed by Utrecht University
1 September 2016 – 31 August 2020

ANJA FRANZISKA ERNST

Dynamic clustering: Classifying people through ecological momentary assessment

University of Groningen, Psychometrics & Statistics
Supervisors: Prof. dr. M.E. Timmerman, prof. dr. C.J. Albers
Financed by NWO
1 September 2017 – 31 August 2021

SARAHANNE FIELD

Let's learn to walk before we try to run: Towards characterizing the causes of poor reproducibility

University of Groningen, Psychometrics & Statistics
Supervisors: Prof. dr. H.A.L. Kiers, prof. dr. E.J. Wagenmakers
Financed by NWO Research Talent Grant
1 September 2017 – 30 August 2021

QIANRAO FU

Executing Replications Studies using informative Hypotheses

Utrecht University, Methodology and Statistics
Supervisor: Prof. dr. H. Hoijtink
Financed by China Scholarship Council (CSC)
1 September 2017 – 31 August 2021

ROSEMBER GUERRA URZOLA

A huge scale optimization approach to joint data modeling in the social and behavioral sciences

Tilburg School of Social of Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. dr. K. Sijtsma, dr. K. van Deun, dr. J.C. Vera Lizcano
Financed by Data Science Tilburg University
1 September 2018 – 1 September 2022

SOFIA GVALADZE

Capturing time-varying multivariate dynamics through principal component analysis based methods

Methodology of Educational Research, Faculty of Psychology and Educational Sciences, KU
Leuven-University of Leuven
Supervisors: Prof. Eva Ceulemans, Prof. Francis Tuerlinckx & Dr Peter Kuppens
Financed by
2016 – 2020

ADELA ISVORANU

Psychosis: Towards a Dynamical Systems Approach

Psychological Research Methods, Faculty of Social and Behavioural Sciences, University of Amsterdam
Supervisors: Prof. Denny Borsboom & Prof. Jim van Os
Financed by NWO
1 September 2016– 1 September 2020

XYNTHIA KAVELAARS

Making the most of clinical trials: Increasing efficiency using novel Bayesian methods for information-sharing within and between trials

Utrecht University, Methodology & Statistics
Supervisors: Prof. dr. M.C. Kaptein, dr. ir. J. Mulder
Financed by NWO Research Talent Program
1 July 2018 – 31 June 2022

KONRAD KLOTZKE

Marginal Joint-Modelling of Reponse Accuracy and Response Times

Twente University, Research Methodology, Measurement and Data Analysis
Supervisor: Prof. ir. J.P. Fox
Financed by University of Twente
1 July 2017 – 1 July 2020

LAURA KOLBE

Non-standard applications of structural equation modeling in child development and education research

University of Amsterdam, Methods and Statistics
Supervisors: Prof. dr. F.J. Oort, dr. T.D. Jorgensen, dr. S. Jak
Financed by University of Amsterdam
1 September 2017 – 1 September 2020

LETTY KOOPMAN

Scaling methods for multilevel test data

Department of Child Development and Education, Faculty of Social and Behavioural Sciences,

University of Amsterdam
Supervisors: Prof.dr. L.A. van der Ark & Dr. B.J.H. Zijlstra
Financed by NWO Research Talent Grant
1 November 2016-31 October 2020

JOOST KRUIS

Developing Process Measurement Models with Broad Applicability

Psychological Methods, Faculty of Social and Behavioural Sciences, University of Amsterdam
Supervisors Prof. Han Van der Maas, Prof. Gunter Maris & Dr Dylan Molenaar
Financed by NWO Graduate Programme 2013 (IOPS)
1 September 2015– 1 September 2020

JULES KRUIJSWIJK

On Hierarchical Structures in the Multi-Armed Bandit Problem

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University
Supervisors: Prof.dr. J.K. Vermunt & Dr. M. Kaptein
Financed by MTO
1 September 2016-31 August 2020

PAUL LODDER

Latent variable prediction models in clinical and medical psychology

Methodology & Statistics / Medical & Clinical Psychology, Tilburg School of Social and Behavioral Sciences, Tilburg University
Supervisors: Prof.dr. J. Denollet, Prof. J.M. Wicherts, Dr. W. Emons
Financed by Tilburg University
1 April 2016-1 April 2020

TIM LOOSENS

Statistical modelling of emotion dynamics

Quantitative Psychology and Individual Differences, Faculty of Psychology and Educational Sciences, KU Leuven-University of Leuven
Supervisors: Prof. Francis Tuerlinckx & Dr Stijn Verdonck
Financed by
2016 – 2020

GABY LUNANSKY

A theoretical network model of psychological resilience

University of Amsterdam, Psychology
Supervisors: Prof. dr. Denny Borsboom, dr. Claudia van Borkulo
Financed by ERC grant Denny Borsboom
1 September 2017 – 1 September 2021

ESTHER MAASSEN

Structural equation modeling as an antidote to selective outcome reporting

Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. dr. J.M. Wicherts, prof. dr. M.A.L.M. van Assen
Financed by ERC Consolidator Grant
1 September 2017 – 31 August 2021

MARLYNE MEIJERINK

Confirmatory methods for time-sensitive social processes

Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. dr. R.T.A.J. Leenders, dr. ir. J. Mulder
Financed by NWO Vidi grant J. Mulder 2017
1 September 2018 – 1 September 2022

MALILEH NAMAZKHAN

Statistical Modelling of Energy Saving Measures

University of Groningen, Psychometrics and Statistics
Supervisors: Prof. dr. E.M. Steg, prof. dr. C.J. Albers
Financed by TKi Urban Energy project ENPREGA
April 2017 – March 2021

SOOGEUN PARK

Big Data in the Social Sciences: Statistical methods for multi-source high- dimensional data

Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. dr. J.K. Vermunt, prof. dr. E. Ceulemans, dr. K. van Deun
Financed by NWO Vidi grant K. van Deun 2015
1 September 2017 – 31 August 2021

BUNGA CITRA PRATIWI

Predictive Validity of Psychological Tests from a Statistical Learning Perspective

Leiden University, Methodology and Statistics
Supervisors: Prof. dr. m. de Rooij, dr. E. Dusseldorp
Financed by Leiden University
1 September 2017 – 31 August 2021

SANNE SMID

The use of expert data in Bayesian Latent Growth Curve Models with a distal outcome

Methodology and Statistics, Faculty of Social Sciences, Utrecht University
Supervisors: Prof.H. Hoijtink & Dr R. van de Schoot
Financed by NWO
1 January 2016 – 1 January 2020

ANDREA STOEVENBELT

Psychometrics and statistics of stereotype threat

Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. dr. J.M. Wicherts, dr. P.C. Flore
Financed by NWO and Tilburg University
1 September 2017 – 31 August 2021

DEBBY TEN HOVE

A comprehensive framework for estimating and interpreting interrater reliability for dependent data

University of Amsterdam, Child Development and Education
Supervisors: Prof. dr. L.A. van der Ark, dr. T.D. Jorgensen
Financed by The Graduate School of Child Development and the Research Institute of Child Development and Education (University of Amsterdam)
1 September 2018 – 31 August 2022

PIA TIO

SPANC: Simultaneous Principal and Network Components model for integration of multi-source data

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University
Supervisors: Prof. J.K. Vermunt, Prof. D. Borsboom, Dr K. van Deun & Dr L. Waldorp
Financed by NWO-Aspasia (Van Deun)/ERC-Consolidator (Borsboom)
1 Februari 2016 – 1 February 2020

MONIKA VAHEOJA

Application of IRT equating on high-stakes testing in Applied Universities of Teacher Education. Errors and error-analysis in the consistency and stability of pass/fail decision in tests with different sample sizes

Research Methodology, Measurement and Data Analysis, University of Twente
Supervisors: Prof.dr. T.J.H.M. Eggen & Dr. N.D. Verhelst
Financed by Vereniging Hogescholen, project 10voordeleraar
1 November 2016-1 October 2020

OLMO VAN DEN AKKER

Preregistration and the "failed study"

Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. dr. J.M. Wicherts, prof. dr. M.A.L.M. van Assen, dr. M. Bakker
Financed by ERC
1 September 2017 – 31 August 2021

HANNEKE VAN DER HOEF

Cluster analysis in educational research: Best practice guidelines for finding groups

University of Groningen, Psychometrics and Statistics
Supervisors: Prof. dr. M.E. Timmerman, dr. M.J. Warrens
Financed by University of Groningen
1 September 2018 – 31 August 2022

JOHNNY VAN DOORN

Bayesian inference for ordinal data in psychology

Psychological Methods, Social and Behavioural Sciences, University of Amsterdam
Supervisors: Prof. E.J. Wagenmakers & Dr M. Marsman
Financed by NWO Graduate Programme
1 September 2015 – 1 March 2020

ERIK-JAN VAN KESTEREN

New Dimensions in Social Science: Extending Structural Equation Models to Accomodate Novel Data Sources

Methodology & Statistics, Faculty of Social Science, Utrecht University
Supervisors: Prof.dr. I. Klugkist & Dr. D.L. Oberski
Financed by NWO Talent Grant
1 September 2017-1 September 2022

WOUTER VAN LOON

Stacked Domain Learning for multi-domain data: A new ensemble method

Leiden University, Methodology and Statistics
Supervisors: Prof. dr. M.J. de Rooij, dr. M. Fokkema, dr. E.M.L. Dusseldorp, dr. B.T. Szabo
Financed by Leiden University and Leiden Centre of Data Science
15 May 2017 – 14 May 2021

DUCO VEEN

Elicitation of expert information: Modelling latent growth models with prior expert information and evaluating predictions

Methodology and Statistics, Faculty of Social Sciences, Utrecht University
Supervisors Prof. Dr. Herbert Hoijtink and Dr. Rens van de Schoot
Financed by NWO – VIDI grant Van de Schoot
1 August 2016 – 1 August 2020

MARK VERSCHOOR

A dynamical network model for energy household use

University of Groningen, Environmental Psychology
Supervisors: Prof. dr. Linda Steg, prof. dr. Casper Albers
Financed by University of Groningen
1 September 2017 – 31 August 2021

LEONIE V.D.E. VOGELSMEIER

Understanding between – and within – person differences in experience sampling measurements using mixture factor analysis

Methodology & Statistics, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Prof.dr. J.K. Vermunt & Dr. K. de Roover
Financed by NWO Research Talent Grant
1 July 2017 – 30 June 2021

LISA WIJSEN

The History of Psychometrics: Tools, Trends and Turning points

Psychological Methods, Social and Behavioural Sciences, University of Amsterdam
Supervisors: Prof. Denny Borsboom & Prof. Willem Heiser
Financed by NWO Graduate Programme
1 September 2015 – 1 March 2020

SANNE WILLEMS

Advances in Survival Analysis and Optimal Scaling Methods

Mathematical Institute, Universiteit Leiden
Supervisors: Prof.dr. Jacqueline J. Meulman, dr. Marta Fiocco
Financed by Universiteit Leiden
1 September 2014 - 1 March 2020

–

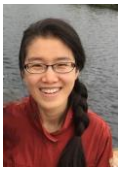
WAI WONG

Statistical challenges in Experience Sampling Research

KU Leuven-University of Leuven, Center for Contextual Psychiatry
Supervisors: Prof. dr. Inez Myin-Germeys, dr. Wolfgang Viechtbauer, prof. dr. Geert Verbeke
Financed by Center for Contextual Psychiatry
1 September 2017 – 31 August 2021

SHIYA WU

Bayesian Adaptive Survey Design



Utrecht University, Methodology & Statistics
Supervisors: Prof. dr. J.G. Schouten, dr. M. Moerbeek
Financed by Utrecht University
26 October 2017 – October 2020

SHUAI YUAN

Identifying Group Differences in Large-scale Multi-block Data

Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. dr. J.K. Vermunt, dr. K. van Deun, dr. K. de Roover
Financed by NWO Research Talent Grant
1 October 2017 – 30 September 2021

JACQUELINE N. ZADELAAR

Why speeding on your scooter is a good idea: Decision strategies in childhood and adolescence

Developmental Psychology, Faculty of Social and Behavioural Sciences, University of Amsterdam
Supervisors: Prof.dr. H.M. Huizenga, Dr. L.J. Waldorp, Dr. W.D. Weeda
Financed by NWO VICI
1 October 2016-30 September 2020

6 Staff

As described in paragraph 2.2, the IOPS staff members belong to the participating (regular staff) and cooperating (associated staff) institutes. There are two categories of staff members: junior and senior staff members. Both require acknowledgment in their field according to, among others, international publications. Junior staff members have obtained their PhD less than five years ago, and do not necessarily have (co-)responsibility of dissertation research. Senior staff members do have (co-)responsibility of dissertation research.

6.1 Professorships

- Prof. Casper **Albers** (senior) – University of Groningen

6.2 Staff changes

Junior staff members admitted to IOPS in 2019

- Dr Sacha Epskamp – University of Amsterdam
- Dr Leonie Van Grootel – Tilburg University
- Dr Muirne C.S. Paap – University of Groningen
- Dr Rink Hoekstra (senior) – University of Groningen

Junior staff members leaving IOPS in 2019

- Dr Marieke van Gerner-Haan – Utrecht University

Senior staff members leaving IOPS in 2019

Staff movements within IOPS in 2019

- Dr Rebecca Kuiper – Utrecht University: junior to senior
- Dr Peter Lugtig – Utrecht University: junior to senior
- Dr Daniel Oberski – Utrecht University: junior to senior
- Dr Gerko Vink – Utrecht University: junior to senior
- Dr Wilco Emons – From Tilburg University to CITO

Emeritus status

IOPS proudly keeps in touch with its emeritus members. No staff members entered the emeritus status in 2019.

	1 Januari 2019	31 December 2019
Junior staff members	44	43
Senior staff members	72	73
Honorary emeritus members	20	19

6.3 Staff members

Leiden University

Institute of Psychology, Methodology and Statistics Unit

- Prof. Mark **De Rooij** (senior): rooijm@fsw.leidenuniv.nl
- Dr Elise **Dusseldorp** (senior): elise.dusseldorp@fsw.leidenuniv.nl
- Dr Marjolein **Fokkema** (junior): m.fokkema@fsw.leidenuniv.nl
- Prof. Henk **Kelderman** (senior): h.kelderman@fsw.leidenuniv.nl
- Dr Joost **Van Ginkel** (junior): jginkel@fsw.leidenuniv.nl
- Dr Mathilde **Verdam** (junior): m.g.e.verdam@fse.leidenuniv.nl
- Dr Wouter **Weeda** (junior): w.d.weeda@fsw.leidenuniv.nl
- Dr. Tom **Wilderjans** (senior): t.f.wilderjans@fsw.leidenuniv.nl

Institute of Education and Child Studies

- Dr Marian **Hickendorff** (junior): hickendorff@fsw.leidenuniv.nl

Mathematical Institute

- Prof. Jacqueline **Meulman** (senior): jmeulman@math.leidenuniv.nl

University of Amsterdam

Department of Psychology - Methodology

- Prof. Denny **Borsboom** (senior): d.borsboom@uva.nl
- Dr Sacha **Epskamp** (junior): s.epskamp@uva.nl
- Dr Julia **Haaf** (junior): j.haaf@gmx.net
- Dr Abe **Hofman** (junior): a.d.hofman@uva.nl
- Dr Raoul **Grasman** (senior): r.p.p.p.grasman@uva.nl
- Dr Maarten **Marsman** (junior): m.marsman@uva.nl
- Dr Dylan **Molenaar** (junior): d.molenaar@uva.nl
- Prof. Han **Van der Maas** (senior): h.l.j.vandermaas@uva.nl
- Prof. Eric-Jan **Wagenmakers** (senior): e.m.wagenmakers@uva.nl
- Dr Lourens **Waldorp** (senior): l.j.waldorp@uva.nl
- Dr Robert **Zwitser** (junior): r.j.zwitser@uva.nl

Department of Psychology - Developmental Psychology

- Prof. Hilde **Huizenga** (senior): h.m.huizenga@uva.nl
- Dr Brenda **Jansen** (senior): b.r.j.jansen@uva.nl
- Extra-ordinary Prof. Maartje **Raijmakers** (senior): m.e.j.raijmakers@uva.nl
- Dr Ingmar **Visser** (senior): i.visser@uva.nl

Department of Psychology - Work and Organizational Psychology

-

Department of Child Development and Education - Methods and Statistics

- Dr Judith **Conijn** (junior): j.m.conijn@uva.nl
- Dr Suzanne **Jak** (junior): s.jak@uva.nl
- Dr Terrence **Jorgensen** (junior): T.D.Jorgensen@uva.nl
- Prof. Frans **Oort** (senior): f.j.oort@uva.nl
- Dr Niels **Smits** (senior): n.smits@uva.nl
- Prof. Andries **Van der Ark** (senior): L.A.vanderArk@uva.nl
- Dr Bonne **Zijlstra** (junior): b.j.h.zijlstra@uva.nl

University of Groningen

Department of Psychology

- Prof. Casper **Albers** (senior): c.j.albers@rug.nl
- Dr Laura **Bringmann** (junior): l.f.bringmann@rug.nl
- Prof. Henk **Kiers** (senior): h.a.l.kiers@rug.nl
- Prof. Rob **Meijer** (senior): r.r.meijer@rug.nl
- Dr Susan **Niessen** (junior): a.s.m.niessen@rug.nl
- Dr Jorge **Tendeiro** (senior): j.n.tendeiro@rug.nl
- Prof. Marieke **Timmerman** (senior): m.e.timmerman@rug.nl
- Dr Don **Van Ravenzwaaij** (senior): d.van.ravenzwaaij@rug.nl

Department of Sociology

- Dr Mark **Huisman** (senior): j.m.e.huisman@rug.nl
- Dr Marijtje **Van Duijn** (senior): m.a.j.van.duijn@rug.nl

University of Twente

Department of Educational Measurement and Data Analysis

- Prof. Theo **Eggen** (senior): t.j.h.m.eggen@utwente.nl
- Dr Jean-Paul **Fox** (senior): g.j.a.fox@utwente.nl
- Dr Stéphanie **Van den Berg** (senior): stephanie.vandenberg@utwente.nl
- Dr Bernard **Veldkamp** (senior): b.p.veldkamp@utwente.nl

Tilburg University

Department of Methodology and Statistics

- Dr Marjan **Bakker** (junior): m.bakker_1@tilburguniversity.edu
- Dr Angelique **Cramer** (senior): a.o.j.cramer@tilburguniversity.edu
- Dr Kim **De Roover** (junior): k.deroover@tilburguniversity.edu
- Dr Paulette **Flore** (junior): p.c.flore@tilburguniversity.edu

- Dr John **Gelissen** (senior): j.p.t.m.gelissen@tilburguniversity.edu
- Dr Maurits **Kaptein** (junior): m.c.kaptein@tilburguniversity.edu
- Dr Kyle M. **Lang** (junior): k.m.lang@tilburguniversity.edu
- Dr Guy **Moors** (senior): guy.moors@tilburguniversity.edu
- Dr Joris **Mulder** (junior): j.mulder3@tilburguniversity.edu
- Dr Erwin **Nagelkerke** (junior): e.nagelkerke@tilburguniversity.edu
- Dr Michèle **Nuijten** (junior): m.b.nuijten@uvt.nl
- Dr Noémi **Schuurman** (junior): n.k.schuurman@tilburguniversity.edu
- Prof. Klaas **Sijtsma** (senior): k.sijtsma@tilburguniversity.edu
- Dr Inga **Schwabe** (junior): i.schwabe@tilburguniversity.edu
- Dr Jesper **Tijmstra** (junior): j.tijmstra@tilburguniversity.edu
- Dr Robbie **Van Aert** (junior): R.C.M.vanAert@tilburguniversity.edu
- Dr Marcel **Van Assen** (senior): m.a.l.m.vanassen@tilburguniversity.edu
- Dr Mattis **Van den Bergh** (junior): m.vdnbergh@tilburguniversity.edu
- Dr Katrijn **Van Deun** (senior): k.vandeun@tilburguniversity.edu
- Dr Leonie **Van Grootel** (junior): leonie@vangrootel.net
- Prof. Jeroen **Vermunt** (senior): j.k.vermunt@tilburguniversity.edu
- Dr Jelte **Wicherts** (senior): j.m.wicherts@tilburguniversity.edu

Utrecht University

Methodology & Statistics Department

- Dr Emmeke **Aarts** (junior): e.aarts@uu.nl
- Dr Lakshmi **Balachandran Nair** (junior): l.balachandrannair@uu.nl
- Dr Maarten **Cruyff** (senior): m.cruyff@uu.nl
- Prof. Edith **De Leeuw** (senior): e.d.deleeuw@uu.nl
- Dr Ellen **Hamaker** (senior): e.l.hamaker@uu.nl
- Dr David **Hessen** (senior): d.j.hessen@uu.nl
- Prof. Herbert **Hoijtink** (senior): h.hoijtink@uu.nl
- Prof. Irene **Klugkist** (senior): i.klugkist@uu.nl
- Dr Rebecca **Kuiper** (senior): r.m.kuiper@uu.nl
- Dr Peter **Lugtig** (senior): p.lugtig@uu.nl
- Dr Mirjam **Moerbeek** (senior): m.moerbeek@uu.nl
- Dr Daniel **Oberski** (senior): d.l.oberski@uu.nl
- Dr Bella **Struminskaya** (junior): b.struminskaya@uu.nl
- Dr Vera **Toepoel** (senior): v.toepoel@uu.nl
- Prof. Stef **Van Buuren** (senior): s.vanbuuren@uu.nl
- Prof. Peter **Van der Heijden** (senior): p.g.m.vanderheijden@uu.nl
- Dr Rens **Van de Schoot** (senior): a.g.j.vandeschoot@uu.nl
- Dr Gerko **Vink** (senior): g.vink@uu.nl

KU Leuven-University of Leuven

Faculty of Psychology and Educational Sciences

- Prof. Eva **Ceulemans** (senior): eva.ceulemans@ppw.kuleuven.be
- Prof. Francis **Tuerlinckx** (senior): francis.tuerlinckx@ppw.kuleuven.be
- Prof. Iven **Van Mechelen** (senior): iven.vanmechelen@ppw.kuleuven.be
- Prof. Wolf **Vanpaemel** (senior): wolf.vanpaemel@ppw.kuleuven.be

Statistics Netherlands (CBS)

- Prof. Ton **de Waal** (senior): t.dewaal@cbs.nl
- Prof. Barry **Schouten** (senior): jg.schouten@cbs.nl

Psychometric Research Center (Cito), Arnhem

- Dr Timo **Bechger** (senior), timo.bechger@cito.nl
- Dr Anton **Béguin** (senior), anton.beguin@cito.nl
- Dr Bas **Hemker** (senior), bas.hemker@cito.nl
- Dr Iris **Smits** (junior): iris.smits@cito.nl
- Dr Wilco **Emons** (senior): w.h.m.emons@tilburguniversity.edu

6.4 Associated staff members

- Prof. Lidia **Arends** (senior), Psychology Institute, Erasmus University Rotterdam: arends@fsw.eur.nl
- Dr Samantha **Bouwmeester** (senior), Psychology Institute, Erasmus University Rotterdam: bouwmeester@fsw.eur.nl
- Dr Math **Candel** (senior), Methodology and Statistics, Maastricht University: math.candel@maastrichtuniversity.nl
- Prof. Conor **Dolan** (senior), Faculty of Psychology and Education, Dept. Biological, VU University Amsterdam: c.v.dolan@vu.nl
- Prof. Patrick **Groenen** (senior), Faculty of Economics, Erasmus University Rotterdam: groenen@ese.eur.nl
- Dr Rink **Hoekstra** (senior), Educational Science, Learning and Instruction, Faculty of Behavioural and Social Science, University of Groningen: r.hoekstra@rug.nl
- Dr Shahab **Jolani** (junior), Methodology and Statistics, Maastricht University: shahab.jolani@maastrichtuniversity.nl
- Dr Yfke **Ongena** (junior): Centre for Information and Communication Research, Faculty of Arts, University of Groningen: y.p.ongena@rug.nl
- Dr Muirne **Paap** (junior), Youth care, in particular (young) children in care, Faculty of Behavioural and Social Scienses, University of Groningen: m.c.s.paap@rug.nl
- Dr Marike **Polak** (junior), Psychology Institute, Erasmus University Rotterdam: polak@fsw.eur.nl
- Dr Wendy **Post** (senior), Special Needs Education and Youth Care, Faculty of Behavioural and Social Sciences, University of Groningen: w.j.post@rug.nl
- Dr Jan **Schepers** (junior), Methodology and Statistics, Maastricht University: jan.schepers@maastrichtuniversity.nl

- Dr Frans **Tan** (senior), Methodology and Statistics, Maastricht University: frans.tan@maastrichtuniversity.nl
- Dr Hilde **Tobi** (senior), Biometris, Wageningen University: hilde.tobi@wur.nl
- Prof. Gerard **Van Breukelen** (senior), Methodology and Statistics, Maastricht University: gerard.vbreukelen@maastrichtuniversity.nl
- Dr Sophie **Van der Sluis** (junior), VU University Amsterdam: sophie.van.der.sluis@cncr.vu.nl
- Dr Wolfgang **Viechtbauer** (senior), Psychiatry & Neuropsychology, Maastricht University: wolfgang.viechtbauer@maastrichtuniversity.nl
- Dr Matthijs **Warrens** (junior): m.j.warrens@rug.nl, Dept. of Education, University of Groningen
- Dr Kate **Xu** (junior), Department of Psychology, Education & Child Studies, Erasmus University Rotterdam: man.kate.xu@fsw.eur.nl

6.5 Honorary emeritus members

- Prof. Martijn **Berger**, martijn.berger@maastrichtuniversity.nl
- Prof. Jelke **Bethlehem**, jelkeb@xs4all.nl
- Prof. Paul **De Boeck**, deboeck.2@osu.edu
- Prof. Wil **Dijkstra,** w.dijkstra@fsw.vu.nl
- Prof. Paul **Eilers**, p.eilers@erasmusmc.nl
- Prof. Cees **Glas**, c.a.w.glas@utwente.nl
- Prof. Jacques **Hagenaars,** jacques.a.hagenaars@tilburguniversity.edu
- Prof. Willem **Heiser,** heiser@fsw.leidenuniv.nl
- Prof. Joop **Hox**, j.hox@uu.nl
- Prof. Pieter **Kroonenberg,** kroonenb@fsw.leidenuniv.nl
- Prof. Gideon **Mellenbergh,** g.j.mellenbergh@uva.nl
- Prof. Robert **Mokken,** mokken@science.uva.nl
- Prof. Ab **Mooijaart,** mooijaart@fsw.leidenuniv.nl
- Prof. Willem **Saris**, w.saris@telefonica.net
- Prof. Tom **Snijders,** t.a.b.snijders@rug.nl
- Prof. Jos **Ten Berge,** j.m.f.ten.berge@rug.nl
- Prof. Wim **Van der Linden,** wim_vanderlinden@ctb.com
- Prof. Hans **Van der Zouwen,** j.van.der.zouwen@fsw.vu.nl
- Dr Norman **Verhelst,** norman.verhelst@gmail.com

7 Scientific awards and grants

7.1 Awards and grantS honored to IOPS staff members

7.1.1 Scientific awards

- Laksmi **Balachandran Nair**: ECRM Teaching Research Methods Excellence Award, first prize, 2019
- Maria **Bolsinova**: Psychometric Society Prize of the Psychometric Society, 2 July 2019
- Maria **Bolsinova**: NCME dissertation award of the Natial Council on Measurement in Education, 7 July 2019
- Sacha **Epskamp**: Complex Systems Society Junior scientific awards, 2019
- Ellen **Hamaker**: ERC Consolidator Grant, 2019
- Herbert **Hoijtink**: fellow at NIAS-KNAW, 2019
- Dylan **Molenaar**: Early career award of the Psychometric Society, 2019
- Daniel **Oberski**: NWO-Vidi award, 2019
- Francis **Tuerlinckx** was president of the Psychometric Society, 2018-2019
- Rens **van de Schoot**: KNVI – Victorine van Schaickfonds Initiative Award, 14 November 2019
- Caspar **van Lissa**: NWO-Veni award, 2019

7.1.2 NWO Grants

NWO Veni, Vidi, Vici grants These are part of the NWO Innovational Research Incentives Scheme [*Vernieuwingsimpuls*]				
Borsboom, D. (2019), University of Amsterdam	Network Construction Methodology	Vici		€1500.000
Bringmann, L., University of Groningen	Changing networks: New models to detect changes in psychiatric disorders	Veni	Jan 2020 – Jan 2024	€250.000
De Roover, K. (2017), Tilburg University	Lack of measurement invariance in multilevel data: A cluster-based solution for making valid attribute comparisons	Veni	2017-2020	€250.000
Hickendorff, M. Leiden university	Children's adaptive strategy use in mathematics education: Individual differences and instructional factors	Veni	2019-2022	€250.000

Hickendorff, M. Consortium Kohnstamm Instituut, Cito, KPC groep, Universiteit Leiden	Peil.rekenen-wiskunde	NRO-beurs	2018-2021	€309.000
Huizenga, H. (2013), University of Amsterdam	Why speeding on your scooter is a good idea: decision strategies in childhood and adolescence	Vici	1 Sept 2013 – 31 Aug 2019	€1.500.000
Jak, S. (2017), University of Amsterdam	One size fits all? New methods to account for heterogeneity in meta-analytic structural equation modeling	Veni	Jan 2017 – Jun 2021	€250.000
Jorgensen, T. (2018), University of Amsterdam	Evolving models for dynamic network data to represent and test complex theories	Veni	1 Feb 2019 – 31 Jan 2023	€250.000
Kuiper, R.M. (2016), Utrecht University	Studying time-lagged effects using ESM-data: Statistics lag behind, it is time to go continuously	Veni	December 2016 December 2020	€250.000
Klugkist, I. (2013), Utrecht University	A Different Angle: New Tools for Circular Data	Vidi	Nov. 2013 – 30 Jan. 2019	€800.00
Molenaar, D. (2015), University of Amsterdam	Within-subjects Approaches to the Analysis of Responses and Response Times to Psychometric Tests	Veni	1 Oct. 2015 – 1 Oct. 2019	€250.000
Mulder, J. (2017), Tilburg University	Statistical Modeling of Dynamic Social Networks Using Relational Event Histories	Vidi	2018-2022	€800.000
Oberski, D.L. (2019), Utrecht University	Advancing social science with valid measures derived from incidental data	Vidi	24 Dec. 2019 – 24 Dec. 2024	€800.00
Ravenzwaaij, D. van, University of Groningen	Back to Bayesics: Solving the Reproducibility Crisis in Biomedicine	Vidi	Nov. 2018 – Nov. 2023	€800.000
Schoot, A.G.J. van de (2016), Utrecht University	Experts, their prior knowledge, and the issue of limited data	Vidi	1 Jan. 2016 – 1 Jan. 2021	€800.00
Van Deun, K. (2016), Tilburg University	Big Data in the Social SciencesL Statistical methods for multi-source high-dimensional data	Vidi	2016 - 2021	€800.000
Wagenmakers, E.J. (2017), University of Amsterdam	Monitoring evidential flow	Vici	September 2017 – September 2022	€1.500.000

NWO Aspasia grants With the Aspasia grants, NWO stimulates the promotion of female researchers in higher ranking.		
Van Deun, K. (2016), Tilburg University	Big Data in the Social Sciences: Statistical methods for multi-source high-dimensional data	€200.000

NWO Research Talent grants

NWO Research Talent is a responsive mode funding scheme, which offers talented and ambitious young researchers a platform to pursue a scientific career and carry out high-quality PhD research.

Assen, M. van (2015), Tilburg University	Getting it right with meta-analysis: Assessing heterogeneity and moderator effects in the presence of publication bias and p-hacking	PhD student Hilde Augusteijn	1 Sept. 2015 – 1 Sept. 2020	€210.000
Borsboom, D. & J. Van Os (2016), UvA Amsterdam	Psychosis: Towards a Dynamical Systems Approach	PhD student Adela **Isvoranu**	1 Sept. 2016 - 1 Sept. 2020	
Hamaker, E. & Van der Heijden, P. (2015), Utrecht Un.	Not straightforward: Mediation and networks in continuous time	PhD student Oísin **Ryan**	1 Sept. 2015 - 1 Sept. 2019	€219.170
Hoijtink, H. (2015), Utrecht Un.	How to hedge our bets in educational testing: combining test results with teacher expertise	PhD student Kimberly **Lek**	1 Sept. 2015 - 1 Sept. 2019	€219.170
Kaptein, M.C., J. **Mulder** (2018), Tilburg University	Making the most of clinical trials: Increasing efficiency using novel Bayesian methods for information sharing within and between trials	PhD student Xynthia **Kavelaars**	2018 – 2022	€
Kucharsky, Simon	Inferring Cognitive Strategies from Eye-movement Sequences: A Bayesian Model-based Approach		1 Dec. 2018 – 30 Nov. 2022	€228,413
Snijders, T.A.B., Wittek, R. & **Van Duijn, M**. (2015), Un. of Groningen	The co-evolution of well-being and the kinship network after parental divorce.	PhD student De Bel, V.	1 Sep 2015 - 1 Sep 2019	€219.170
Stefan, Angelika	Bayes Factor Design Analysis for the Efficient Collection of Informative Data		1 Nov. 2018 – 30 Oct. 2022	€232,563
Timmerman, M.E., **Albers**, C.J. (2017) Un. Of Groningen	*Dynamic clustering: Classifying people through ecological momentary assessment*	PhD student A.F. Ernst		
Van der Ark, L.A. & B.J.H. Zijlstra (2016) UvA Amsterdam	Scaling methods for multilevel test data	PhD student Letty **Koopman**	1 Nov. 2016 – 1 Nov. 2020	€168.735
Vermunt, J.K. **Mulder, J**. (2015), Tilburg University	Advancing structural equation modeling with unbiased Bayesian methods	PhD student Sara **van Erp**	1 Sept. 2015 – 1 Sept. 2019	€210.000

Vermunt, J.K., K. **de Roover** (2017), Tilburg University	Understanding between- and within-person differences in experience sampling measurements using mixture factor analysis	PhD student Leonie **Vogelsmeier**	2017 – 2021	€224.000
Vermunt, J.K., K. **van Deun** (2017), Tilburg University	Identifying Group Differences in Large-Scale Multi-block Data	PhD student Shuai **Yuan**	2017 – 2021	€224.201
Wagenmakers, E.J. (2017), University of Amsterdam	Blinded Analysis as a Cure for the Crisis of Confidence	PhD student Alexandra **Sarafoglou**	2017-2021	€224.201
Wilderjans, T.F. & Rombouts, S.A.R.B. (2016) Leiden University	Clusterwise Independent Component Analysis for multi-subject (resting state) fMRI data	PhD student Jeffrey **Durieux**	1 Sept. 2016 – 1 Sept. 2021	€219.474
Other NWO grants				
Hamaker, E.L., Utrecht University	How to study causes and their effects in developmental processes	NOW Gravitation CID	2019 – 2024	€236.000
Hoijtink, H.	Individual development: Why some children thrive and others don't	PI in NOW Gravity Grant	2012-2022	€540.000
Marsman, M. (2017), University of Amsterdam	The psychometrics of learning	NWO Innovational Research Incentives Scheme Veni	2017 -	€250.000
Van Schaik, J.E. & **Raijmakers, M.E.J**. (2016).	The Element of Surprise: Variability as the trigger of science conceptualization and transfer in kindergartners	NRO-Postdocs in Education Research	2016-2019	€147.240
Veenstra, R., Dijkstra, J.K., Vollebergh, W., Harakeh, Z., **Van Duijn, M.,** & Steglich,C. (2013)	Social networks processes and social development of children and adolescents	NWO-PROO	2013 -	€717.326
Wicherts, J.M., P. Flore (2017), Tilburg University	Registered Replication Report Stereotype threat	Replicate Grant	2018 – 2019	

7.1.3 International grants

International grants				
Borsboom, D. (2015) UvA	ERC Consolidator grant for the project "Psychosystems: Consolidating Network Approached to Psychopathology"	European Research Council (ERC)	2016-2020	€2.000.000
De Waal, T. (2018), CBS	EU-grant: imputation under known totals	European Commission	2018-2019	€50.000
De Waal, T. (2018), CBS	Third Specific Grant Agreement of the "ESSnet on quality of multisource statistics": "Quality Guidelines for Multisource Statistics"	European Commission	2018-2019	€36.400
Fu, Q., Utrecht University	Executing Replications Studies using informative Hypotheses	China Scholarship Council (CSC)	2017 – 2021	€220.000
Mulder, J. (2017), Tilburg University	The Time is Now: Understandig Social Network Dynamics Using Relational Event Histories	ERC starting grant	2018 – 2023	€1.500.000
Schouten, B. (2018), CBS-UU	Eurostat multi-beneficiary grant for project @HBS, App-assisted data collection of household expenditure	European Commission	2018-2019	
Sukpan, C., Utrecht University	Inequality-constrained model selection (for dynamical models)	The Royal Thai Government	2019 – 2022	€220.000
Wagenmakers, E.J. (2017), University of Amsterdam	A unified framework for the assessment and application of cognitive modeling	European Research Council (ERC)	December 2017 – December 2022	€2.500.000
Wagenmakers, E.J., University of Amsterdam		MCSA-IF-EF		€176.000
Wicherts, J.M. (2016), Tilburg University	IMPROVE: Innovative Methods for Psychology: Reproducible, Open, Valid, and Efficient	European Research Council (ERC)	2017 – 2022	€2.000.000
Wu, S., Utrecht University	Bayesian Adaptive Survey Design	China Scholarship Council (CSC)	2017 – 2020	€220.000

Grants awarded to KU Leuven-University of Leuven				
Ceulemans, E., **Bosmans**, G.. & **Tuerlinckx**, F. (2015)	De studie van dyadische interactiepatronen: Een Booleaanse netwerkbenadering	Fund Scientific Research (FWO), Flanders, Belgium	1 Jan 2016 – 31 Dec 2019	€219.367
Tuerlinckx, F., **Ceulemans**, E., **Kuppens**, P., **Van Mechelen**, I., & **Vanpaemel**, W. (2013)	Formal models of the affective system: Dynamics, exogenous inputs and relation to subjective well-being.	GOA grant. Special Research Fund, KU Leuven-University of Leuven	1 Jan 2015 – 31 Dec 2019	€1.250.000
Verdonck, S., **Tuerlinkx**, F. (2016)	Postdoc grant	Fund Scientific Research (FWO), Flanders, Belgium	1 Oct 2016-30 Sep 2019	3 years of postdoc salary
Tuerlinckx, F., **Kuppens**, P. (2019)	DynAMo: Een computationeel model voor affectieve dynamiek	Fund Scientific Research (FWO), Flanders, Belgium	1 Jan 2019 – 31 Dec 2021	€281.845
Van Mechelen, I., Verbeke, G. (2019)	Optimale behandelingsregimes: Opsporen van écht optimale regimes, valide inferenties en toepassing op ADHD en depressie	Fund Scientific Research (FWO), Flanders, Belgium	1 Jan 2019 – 31 Dec 2021	€328.762, 14
Tuerlinckx, F., **Van Mechelen**, I., **Kuppens**, P., **Ceulemans**, E. & **Vanpaemel**, W.	Ontsporing van het affectieve system: Meting, vroegtijdige detectie en onderliggende mechanismen	Special Research Fund, KU Leuven	1 Oct 2019 – 30 Sep 2023	€1.422.400
Tuerlinckx, F., **Van Mechelen**, I., **Kuppens**, P., **Ceulemans**, E. & **Vanpaemel**, W.	Ontsporing van het affectieve system: Meting, vroegtijdige detectie en onderliggende mechanismen excellentielabel	Special Research Fund, KU Leuven	1 Oct 2019 – 30 Sep 2023	€142.240
Tuerlinckx, F. (co-promotor) (2019)	Higher Education Learning Platform for Quantitative Thinking	Erasmus+	1 Sep 2019 – 31 Aug 2022	€30.186,64
Ceulemans, E. (2019)	Hoe beïnvloed context affectieve dynamiek: een gemodereerde tijdreeksbenadering	Fund Scientif Research (FWO), Flanders, Belgium	1 Jan 2019 – 31 Dec 2021	€297.526
Lebel, E., **Vanpaemel**, W. (2018)	Transparency instruments to Quantify the method transparency, analytic robustness and replicability of empirical research - TransparencyMeters	European Commission. Research Executive Agency	1 Sep 2018 – 31 Aug 2020	€160.800

Other Grants				
Bringmann, L., Stulp, G., University of Groningen	Understanding the effect of social environment on mental wellbeing	Interdisciplinary PhD position Young Academy Groningen	2020	€120.000
Bringmann, L., Stadel, M., Stulp, G., **Van Duin**, M.	Capturing a Patient's Context	PhD Fund, Behavioral & Social Sciences, University of Groningen	2020 -	€133.000
Bringmann, L., Kreienkamp, J., Epstude, K., De Jonge, P.	Cultural Adaptation in Real Life: A Dynamic Approach to Psychological Needs in Intercultural Contact	PhD Fund, Behavioral & Social Sciences, University of Groningen	2018 -	€133.000
Bringmann, L., **Castro Alvarez**, S., **Tendeiro**, J.N., **Meijer**, R.R.	ImpoRTant: Developing item response theory to analyze intensive longitudinal data	PhD Fund, Behavioral & Social Sciences, University of Groningen	2018 -	€133.000
De Rooij, M.	Stacked Domain Learning for multi-domain data: a new ensemble method	Leiden Data Science Research Program (PhD student Wouter van Loon)	2017-2021	€100.000
Meijer, J., Imandt, M., Snoek, M., Van Blankenstein, F.M. & **Van der Ark**, L.A. (2015)	Voorspellende waarde, effecten en onderliggende mechanismen van selectieprocedures in de lerarenopleidingen	Research fund granted by Nationaal Regieorgaan Onderwijsonderzoek (NRO)	1 Feb 2016 31 Jan 2020	€598.200
Meijer, R.R., den Hartogh, J.R., Frencken, W., van Yperen, N.	De voetbalselectie: herkenning en selectie van potentie	Koninklijk Nederlandse Voetbal Bond	1 Sep 2017 – 31 Aug 2021	€80.000
Sachisthal, M., Peetsma, T., Van der Maas, L.J. & Raijmakers, M.E.J.	ASAP Science – Motivation in Science Video Watching: The Role of Individual Differences and Video Characteristics.	PhD grant awarded by the Yield Research Priority Area, University of Amsterdam	2016-2020	€200.000
Sijtsma, K., **Vera Lizcano**, J.C., **Van Deun**, K.	A huge scale optimization approach to joint data modeling in the social and behavioral sciences	Data science grant (Tilburg University) PhD student Rosember **Guerra**	2018-2022	
Van Renswoude, D., **Raijmakers**, M. & **Visser**, I.	Gaze-Patterns Tell the Tale: A Model-Based Approach to Free-Scene Viewing in Infancy	PhD Project granted by the research priority area Yield and the Psychology Research Institute from the University of Amsterdam	2016-2020	€200.000

Van der Heijden, P. & **Cruyff,** M. (Utrecht Un.)	Event history analysis for population size estimation of elusive populations	Grant for International PhD project, funded by the faculty of Social and Behavioural Sciences	1 Sept. 2015 1 Sept. 2019	€200.000
Van der Heijden, P. (Utrecht Un.)	Applied Data Science	PhD-traject A. Bagheri	15 dec 2017-16 dec 2021	€100.000 van ITS Universiteit Utrecht en €50.000 van UMCU en €50.000 van M&S Utrecht
Van der Heijden, P., Utrecht University	Applied Data Science	Funded by University of Utrecht, Faculty of Social Sciences	April 2018 – April 2022	€1.400.000
Visser, I., Colonnesi, C., Rodeburg, R., Van Oostrom, K. & Möller, E.	Infant Early Self-regulation, Attention and Joint-Attention Difficulties as Predictors of Later Self-Regulation Problems	PhD project granted by the research priority area Yield from the University of Amsterdam	2018-2022	215 KE
Warrens, M., Un. of Groningen	PPO Kortlopend Onderwijsonderzoek fase 1	Nationaal Regieorgaan Onderwijsonderzoek (NRO)		€20.000

7.2 Awards and grants honored to IOPS PhD students

7.2.1 Scientific awards

In 2019, the following IOPS PhD students were honored with a scientific award:

- Robbie **Van Aert**: IOPS Best Paper Award, 2019
- Sanne **Willems**: IOPS Posteraward, summer 2019
- Martin **Schnuerch**: IOPS Presentationaward, summer 2019
- Felix **Clouth**: IOPS Posteraward, winter 2019
- Adela **Isvoranu**: IOPS Presentationaward, winter 2019
- Merijn **Mestdagh**: Dissertation award of the Psychometric Society 2019 for Merijn Mestdagh (PhD student) under supervision of Francis Tuerlinckx and Stijn Verdonck
- Abe **Hofman**: Dissertation award of the Abbas Foundation 2019
- Lieke **Voncken**: Test- en diagnostiekprijs van de Nederlandse vereniging voor Neuropsychologie, 2019

Punter, A. (2019). IEA Bruce H. Choppin Memorial Award on dissertation: Improving the modelling of response variation in international large-scale assessments.

7.2.2 Grants

8 Research output

8.1 Scientific publication

8.1.1 Dissertations by IOPS PhD students

Boeschoten, L. (2019). *Consistent Estimates for Categorical Data Based on a Mix of Administrative Data Sources and Surveys*: Tilburg University.

Cremers, J. (2019). *One Direction? Modelling Circular Data in the Social Sciences using the Embedding Approach* Utrecht: Utrecht University.

Haslbeck, J. M. B., Borsboom, D., & Waldorp, L. J. (2019). Moderated Network Models. *Multivariate Behavioral Research*.

Mulder, K. T. (2019). *Bayesian Circular Statistics: von Mises-based solutions for practical problems* Utrecht University.

Savi, O. A. (2019). *Towards an idiographic education*.

Van Bork, R. (2019). *Interpreting psychometric models*. https://doi.org/10.31237/OSF.IO/X6A7S.

Zwijnenburg, M. A. J. (2019). *Standing on the Shoulders of Giants: Formalizing and Evaluating Prior Knowledge* Utrecht: Utrecht University.

8.1.2 Other dissertations under supervision of IOPS staff members

8.1.3 Refereed article in a journal

Abacioglu, C. S., Isvoranu, A-M., Verkuyten, M., Thijs, J., & Epskamp, S. (2019). Exploring multicultural classroom dynamics: A network analysis. Journal of School Psychology, 74, 90-105. https://doi.org/10.31234/osf.io/ck2p5, https://doi.org/10.1016/j.jsp.2019.02.003.

Abidi, L., Oenema, A., Verhaak, P., Tan, F. E. S. & van de Mheen, D. The introduction of the practice nurse mental health in general practices in the Netherlands: effects on number of diagnoses of chronic and acute alcohol abuse. 2 Apr 2019, In: BMC Family Practice. 20, 9 p., 48.

Agelink van Rentergem, J. A., de Vent, N. R., Huizenga, H. M., Murre, J. M. J., & Schmand, B. A. (2019). Predicting Progression to Parkinson's Disease Dementia Using Multivariate Normative Comparisons. Journal of the International Neuropsychological Society, 25(7), 678-687. https://doi.org/10.1017/S1355617719000298.

Alcohol Use Among Out of School Youth in South Africa. Health Psychology Bulletin, 3, 48–57.

Assink, M., van der Put, C. E., Meeuwsen, M. W. C. M., de Jong, N. M., Oort, F. J., Stams, G. J. J. M., & Hoeve, M. (2019). Risk factors for child sexual abuse victimization: A meta-analytic review. Psychological Bulletin, 145(5), 459-489. https://doi.org/10.1037/bul0000188.

Ataky, A., Dewitte, M., Kok, G., & Schepers, J. (2019). The role of sexual desire, sexual satisfaction and

Augusteijn, H. E. M., van Aert, R. C. M., & van Assen, M. A. L. M. (2019). The effect of publication bias on the Q test and assessment of heterogeneity. Psychological Methods, 24(1), 116-134. https://doi.org/10.1037/met0000197.

Aust, F., Haaf, J. M., & Stahl, C. (2019). A Memory-Based Judgment Account of Expectancy-Liking Dissociations in Evaluative Conditioning. Journal of Experimental Psychology Learning Memory and Cognition, 45(3), 417-439. https://doi.org/10.1037/xlm0000600.

Baan, J., Gaikhorst, L., van 't Noordende, J. E., & Volman, M. L. L. (2019). The involvement in inquiry-based working of teachers of research-intensive versus practically oriented teacher education programmes. Teaching and Teacher Education, 84, 74-82. https://doi.org/10.1016/j.tate.2019.05.001.

Bagheri, A. (2019). Integrating word status for joint detection of sentiment and aspect in reviews. Journal of Information Science, 45(6), 736-755. DOI: 10.1177/0165551518811458.

Bagheri, A., Oberski, D. L., van der Heijden, P. G. M., Sammani, A., & Asselbergs, F. W. (2019). ETM: Enrichment by Topic Modeling for Automated Clinical Short Text Classification. Manuscript submitted for publication.

Bais, F., Schouten, B., Lugtig, P., Toepoel, V., Arends-Tòth, J., Douhou, S., ... Vis, C. (2019). Can Survey Item Characteristics Relevant to Measurement Error Be Coded Reliably? A Case Study on 11 Dutch General Population Surveys. Sociological Methods and Research, 48(2), 263-295. DOI: 10.1177/0049124117729692

Barbalat, G., van den Bergh, D., & Kossakowski, J. J. (2019). Outcome measurement in mental health services:

Bayarri, M. J., Berger, J. O., Jang, W., Ray, S., Pericchi, L. R., & Visser, I. (2019). Prior-based Bayesian information criterion. Statistical Theory and Related Fields, 3(1), 2-13. https://doi.org/10.1080/24754269.2019.1582126.

Benítez, I., Adams, B. G., & He, J. (2019). An integrated approach to bias in a longitudinal survey in the United Kingdom: Assessing construct, method, and item bias in the General Health Questionnaire (GHQ-12). Assessment, 26(7), 1194-1206. https://doi.org/10.1177/1073191117739979.

Berger, J. O., Jang, W., Ray, S., Pericchi, L., & Visser, I. (2019). Rejoinder by James Berger, Woncheol Jang, Surajit Ray, Luis R. Pericchi and Ingmar Visser. Statistical Theory and Related Fields, 3(1), 37-39. https://doi.org/10.1080/24754269.2019.1611147.

Bexkens, A., Huizenga, H. M., Neville, D. A., Collot d'Escury, A. L., Bredman, J. C., Wagemaker, E., & Van der Molen, M. W. (2019). Peer-Influence on Risk-Taking in Male Adolescents with Mild to Borderline Intellectual Disabilities and/or Behavior Disorders. Journal of Abnormal Child Psychology, 47(3), 543-555. https://doi.org/10.1007/s10802-018-0448-0.

Bianchi, A., Shlomo, N., Schouten, B., Da Silva, D. & Skinner, C. (2019), Indicators for Representative Response Based on Population Totals, Survey Methodology Journa, 45 (2), 217 – 247.

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Billen, E., Garofalo, C., Vermunt, J., & Bogaerts, S. (2019). Trajectories of self-control in a forensic psychiatric sample stability and association with psychopathology, criminal history, and recidivism. Criminal Justice and Behavior, 46(9), 1255-1275. https://doi.org/10.1177/0093854819856051.

Black, M. M., Bromley, K., Cavallera, V. A., Cuartas, J., Dua, T., Eekhout, I., ... Weber, A. (2019). The Global

Scale for Early Development (GSED). Early Childhood Matters, 14, 80-84.
Blanch-Hartigan, D., van Eden, M., Verdam, M. G. E., Han, P. K. J., Smets, E. M. A., & Hillen, M. A. (2019). Effects of communication about uncertainty and oncologist gender on the physician-patient relationship. Patient Education and Counceling. DOI: 10.1016/j.pec.2019.05.002
Blanken, T. F., Benjamins, J. S., Borsboom, D., Vermunt, J. K., Paquola, C., Ramautar, J., Dekker, K., Stoffers, D., Wassing, R., Wei, Y., & Van Someren, E. J. W. (2019). Insomnia disorder subtypes derived from life history and traits of affect and personality. The Lancet Psychiatry, 6(2), 151-163. https://doi.org/10.1016/S2215-0366(18)30464-4.
Blanken, T. F., Benjamins, J. S., Borsboom, D., Vermunt, J. K., Paquola, C., Ramautar, J., ... Van Someren, E. J. W. (2019). Insomnia disorder subtypes derived from life history and traits of affect and personality. The Lancet Psychiatry, 6(2), 151-163. https://doi.org/10.1016/S2215-0366(18)30464-4.
Blanken, T. F., Borsboom, D., Penninx, B. W., & Van Someren, E. J. (2019). Network outcome analysis identifies difficulty initiating sleep as a primary target for prevention of depression: a 6-year prospective study. Sleep. https://doi.org/10.1093/sleep/zsz288.
Blanken, T. F., Van Der Zweerde, T., Van Straten, A., Van Someren, E. J. W., Borsboom, D., & Lancee, J. (2019). Introducing Network Intervention Analysis to Investigate Sequential, Symptom-Specific Treatment Effects: A Demonstration in Co-Occurring Insomnia and Depression. Psychotherapy and Psychosomatics, 88(1), 52-54. https://doi.org/10.1159/000495045.
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Bonapersona, V., Kentrop, J., Van Lissa, C. J., van der Veen, R., Joëls, M., & Sarabdjitsingh, R. A. (2019). The behavioral phenotype of early life adversity: A 3-level meta-analysis of rodent studies. Neuroscience and Biobehavioral Reviews, 102, 299-307. DOI: 10.1016/j.neubiorev.2019.04.021.
Borsboom, D., & Marsman, M. (2019). Latente variabelen en netwerken. Verschillende benaderingen van psychometrische data. Nieuw Archief voor Wiskunde, 20(3), 183-189.
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Borsboom, D., Cramer, A. O. J., & Kalis, A. (2019). Reductionism in retreat. Behavioral and Brain Sciences, 42, [e32]. https://doi.org/10.1017/S0140525X18002091.
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classification. Human Brain Mapping, 40, 2711 – 2722
Bovendeerd, B., De Jong, K., Colijn, S., De Groot, E., Hafkenscheid, A., Moerbeek, M., & De Keijser, J. (2019). Systematic client feedback to brief therapy in basic mental healthcare: Study protocol for a four-centre clinical trial. BMJ Open, 9(5), [e025701]. DOI: 10.1136/bmjopen-2018-025701.
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van Ommering, C. J. , de Klerk, S. , & Veldkamp, B. P. (2019). Getting to grips with exam fraud: a qualitative study towards developing an evidence based educational data forensics protocol. In S. Draaijer, D. Joosten-ten Brinke, & E. Ras (Eds.), Technology Enhanced Assessment : 21st International Conference, TEA 2018, Revised Selected Papers (pp. 199-218). (Communications in Computer and Information Science; Vol. 1014). Springer Verlag. https://doi.org/10.1007/978-3-030-25264-9_13

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Wijga, M. , Endedijk, M. , & Veldkamp, B. P. (2019). Social Regulation at the Workplace: Different Modes of Regulation and Variation in Quality. Paper presented at 18th Biennial European Association for Research on Learning and Instruction Conference, EARLI 2019, Aachen, Germany.

Witlox, L., Schagen, S. B., De Ruiter, M. B., Geerlings, M. I., Peeters, P. H. M., Koevoets, E. W., ... Monninkhof, E. M. (2019). Effect of physical exercise on cognitive function and brain measures after chemotherapy in patients with breast cancer (PAM study): Protocol of a randomised controlled trial. BMJ open, 9(6), [e028117]. https://doi.org/10.1136/bmjopen-2018-028117

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8.2.2 Report

Conijn, J., & van der Ploeg, S. (2019). *Wat is het effect van de duur tussen het moment van een oorspronkelijke toets en het moment van herkansing van die toets op het resultaat van de herkansing?* Den Haag: NRO.

Brinkman, L., & Oberski, D. L. (2019). *Open Science in Bachelor education: 25 easy-to-implement teaching formats for Open Science*.

Endedijk, H. M., Breeman, L. D., van Lissa, C. J., den Boer, L., & Mainhard, M. T. (2019). *De onzichtbare rol van de docent inzichtelijk gemaak: Lesgeven in het Passend Onderwijs: Hoe leerkracht-leerling relaties de sociale positie van leerlingen in de klas mee bepalen. NRO eindrapportage*. Onderwijskunde UU.

Lugtig, P. J., & Smith, P. A. (2019). *The choice between a panel and cohort study design*. Southampton: University of Southampton/ESRC.

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Theunissen, M., de Wolff, M., Vugteveen, J., Timmerman, M., & de Bildt, A. (2019). *Handleiding voor het gebruik van de Strengths and Difficulties Questionnaire bij adolescenten (12-17 jaar) binnen de Jeugdgezondheidszorg: Vragenlijst voor het signaleren van psychosociale problemen*. Leiden: TNO.

Van De Vijver, F. J. R., Davidov, E., Avvisati, F., Eid, M., van de Schoot, R., Fox, J. P., ... le Donné, N. (2019). *Invariance analyses in large-scale studies*. (OECD Education Working Papers). OECD. DOI: 10.1787/19939019

8.3 Popular publications

De Leeuw, E. D. (2019). The Future of Data Collection. *ClouToday*.

8.4 Other results

Toepoel, V. (2019). *Adapting surveys to the modern world: comparing a research messenger design to a regular responsive design for online surveys*.

Toepoel, V. (2019). *Smartphones: from survey design to sensor data*.

8.4.1 Editorial activities

Albers, C.J. Journal of Data Science, Statistics, and Visualisation (Editaorial Board Member) 2019 →
Borsboom, D. Measurement Science Review (Journal) (Editor) 2008 → 2019
Borsboom, D. Educational Measurement: Issues and Practice (Journal) (Editor) 2009 → 2019
Borsboom, D. Frontiers in Psychology (Journal) (Editor) 2010 → 2019
Borsboom, D. European Journal of Personality (Journal) (Editor) 2013 → 2019
Borsboom, D. Psychological Medicine (Journal) (Editor) 2017 → 2019
Borsboom, D. Clinical Psychological Science (Journal) (Editor) 2018 → 2019
Borsboom, D. Journal of Abnormal Psychology (Journal) (Editor) 2018 → 2019
Bringman, L. Journal of Personality and Social Psychology: Personality Processes and Individual Differences (Editorial Board Member) 2019 →
Epskamp, E. European Journal of Personality (Journal) (Editor) 2018→ 2019
Epskamp, E. European Journal of Psychological Assessment (Journal) (Editor) 2018 → 2019
Fokkema, M. European Journal of Psychological Assessment. (Associate editor) 2015 -> 2019.
Grasman, R. Journal of Open Psychology Data (Journal) (Reviewer) 2013 → 2030
Kiers, H. Journal of Classification (Editorial Board Member) 2019 →
Kiers, H. Psychometrika (Associate Editor) 2019 →
Kwok, O-M., Cheung, MW-L., Jak, S., Ryu, E., & Wu, JJ-Y. (Eds.) (2019). *Recent advancements in Structural Equation Modeling (SEM): From both methodological and application perspectives*. (Frontiers Research Topics). Lausanne: Frontiers Media. https://doi.org/10.3389/978-2-88945-743-4
Lavrakas, P. J., Traugott, M., Kennedy, C., Holbrook, A., de Leeuw, E. D., & West, B. T. (Eds.) (2019). *Experimental Methods in Survey Research: Techniques that Combine Random Sampling with Random Assignment*. (1 ed.) (Wiley series in survey methodology). New York: Wiley.
Marsman, M. Psychometrika (Journal) (Editor) 2019 → 2023
Meijer, R.R. Assessment (Editorial Board Member) 2019→
Meijer, R.R. Journal of Personality Assessment (Editor statistical developments section) 2019 →
Meijer, R.R. International Journal of Testing (Editoral Board Member) 2019 →
Molenaar, D. Frontiers in Psychology (Journal) (Reviewer) 2016 →
Niessen, S. International Journal of Testing (Editorial Board Member) 2019 →
Niessen, S. Personnel Assessment and Decisions (Editorial Board Member) 2019 →
Timmerman, M.E. Journal of Data Science, Statistics, and Visualistaion (Editorial Board Member) 2019 →
Visser, I. British Journal of Mathematical & Statistical Psychology (Editor) 2013 → 2019
Wagenmakers, E-J. Advances in Methods and Practices in Psychological Science (Journal) (Editor) 2017 → 2019
Wagenmakers, E-J. Computational Brain & Behavior (Journal) (Editor) 2017 → 2019

8.4.2 Software and test manuals

Aarts, E. (Author). (2019). mHMMbayes: Multilevel Hidden Markov Models Using Bayesian Estimation. Software, Retrieved from https://cran.r-project.org/web/packages/mHMMbayes

Fokkema, M. & Christoffersen, B. (2019). pre: Prediction Rule Ensembles (version 0.7). https://cran.r-project.org/web/packages/pre/

Fokkema, M. & Zeileis, A. (2019). glmertree: Generalized Linear Mixed Model Trees (version 0.2). https://cran.r-project.org/web/packages/glmertree/

Hoijtink, H. J. A. (Author), van Lissa, C. J. (Author), Gu, X. (Author), & Mulder, J. (Author). (2019). bain0.2.2. Software, Retrieved from https://informative-hypotheses.sites.uu.nl/software/bain/

Klaassen, F. (Author). (2019). BayesianPower: Sample Size and Power for Comparing Inequality Constrained Hypotheses. Software, Retrieved from http://cran.r-project.org/web/packages/BayesianPower/

Smid, S. C. (Author), & Winter, S. D. (Author). (2019). Shiny App: Impact of Default Priors. Software, Retrieved from https://osf.io/m6byv/

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

8.4.3 (Paper) presentation

Albers, C.J. (2019). *Masterclass Data Visualisation.*

Albers, C.J. (2019). *Member of panel on 'Biased Intelligence'.*

Albers, C.J. (2019). *De statistiek van inclusiviteit.*

Albers, C.J. (2019). *Intensive Longitudinal Data Analysis in Practice - Possibilities and Limitations.*

Albers, C.J. (2019). *Time to get personal? The impact of researchers' choices in clinical person-centered analyses.*

Albers, C.J. (2019). *KWG Wintersymposium.*

Bergkamp, T. (2019). *Presentatie 'Frank Bakker dag' VSPN: Performance Prediction and Talent Selection in Team Sports.*

Bringmann, L. (2019). *De nieuwe netwerkbenadering van depressie*

Bringmann, L. (2019). *Personalized feedback: The movie.*

Bringmann, L. (2019). *The (un)necessity of complex statistics in an N=1 world.*

Bringmann, L. (2019). *Young Investigator Keynote Speaker: Network models in psychology – More than a pretty picture?*

Calor, S. M., Dekker, R., van Drie, J. P., Zijlstra, B. J. H., & Volman, M. L. L. (2019). *Effects of a Scaffolding Model for small groups in mathematics*. Paper presented at CERME11- The Eleventh Congress of the European Society for Research in Mathematics Education, Utrecht, Netherlands.

Castro Alvarez, S. (2019). *Using Latent State-Trait Theory to Analyze Intensive Longitudinal Data.*

De Jonge, H., Jak, S., & Kan, K. J. (2019). *Dealing with Artificially Dichotomized Variables in Meta-Analytic Structural Equation Modeling*. Paper presented at 84th annual International Meeting of the Psychometric Society, Santiago, Chile.

De Jonge, H., Jak, S., & Kan, K. J. (2019). *Dealing with Artificially Dichotomized Variables in Meta-Analytic Structural Equation Modeling*. Paper presented at Research Synthesis 2019 , Dubrovnik , Croatia.

Egberink, I. (2019). *COTAN jubileumsymposium: beslissen door mens of machine?*

Eltanamly, H., Leijten, P. H. O., Jak, S., & Overbeek, G. J. (2019). *A meta-analysis and a qualitative-synthesis of how war-exposure affects parenting and child adjustment*. Poster session presented at Biennial Meeting of the Society for Research in Child Development (SRCD) 2019, Baltimore, United States.

Ernst, A.F., C.J. Albers, B. Jeronimus, M.E Timmerman (2019). *Symposium on Classification Methods in the Social and Behavioral Sciences.*

Fischer, K., van den Akker, A. L., Larsen, H., Jorgensen, T. D., & Overbeek, G. J. (2019). *Dopamine functioning and child externalizing behavior: A longitudinal analysis of polygenic susceptibility to parenting*. 14. Poster session presented at 19th Biennial ISRCAP Scientific Meeting , Los Angeles, United States.

Fokkema, M. (2019) Recursive partitioning of clustered and longitudinal data with GLMM trees. Paper presented at the joint International Conference on Computational and Financial Econometrics and the ERCIM WG on Computational and Methodological Statistics, London, United Kingdom.

Fokkema, M. & Jorink, M. (2019). Recursive partitioning of longitudinal and growth-curve models. Paper presented at the 16th Conference of the International Federation of Classification Societies, Thessaloniki, Greece.

Fokkema, M. (2019). Prediction rule ensembles: Balancing accuracy and interpretability in statistical prediction. Spotlight presentation at the International Meeting of the Psychometric Society, Santiago de Chile, Chile.

Fokkema, M. (2019). Decision tree methods for psychological assessment. Workshop taught at the 15th European Conference on Psychological Assessment, Brussels, Belgium.

Fokkema, M. & Jorink, M. (2019). Fitting decision trees to multilevel and longitudinal data. Paper presented at the 15th European Conference on Psychological Assessment, Brussels, Belgium.

Fokkema, M. & Jorink, M. (2019). Recursive Partitioning of Growth Curve Models with LMM Trees. Paper presentated at Psychoco International Work International Workshop on Psychometric Computing, Charles University & Czech Academy of Sciences, Prague, Czech Republic.

Hensums, M., Overbeek, G. J., & Jorgensen, T. D. (2019). *Not One Sexual Double Standard but Two: Attitudes About Appropriate Sexual Behavior in Dutch Adolescents*. Paper presented at SRCD Biennial Meeting, Baltimore, United States.

Hensums, M., Overbeek, G. J., & Jorgensen, T. D. (2019). *Not One Sexual Double Standard but Two: Attitudes About Appropriate Sexual Behavior in Dutch Adolescents*. Paper presented at 16th conference of the European Association for Research on Adolescence (EARA) 2018, Ghent, Belgium.

Huber-Mollema, Y., Rodenburg, R., Oort, F. J., & Lindhout, D. (2019). Development after prenatal antiepileptic drug exposure: Nature, nurture, or both? *Birth defects research*, *111*(9), 501.

Jeronimus, B., A.F. Ernst, C.J. Albers, M.E. Timmerman. (2019). *Emotions 2019: 7th International conference onemotions, well-being, and health.*

Kiers, H., R. Hoekstra, J. Tendeiro, D. Van Ravenzwaaij (2019). *Implications of teaching Bayesian statistics to undergraduate psychology students.*

Kreienkamp, J., M. Agostini, K. Epstude, L. Bringmann, P. De Jonge (2019). *The Motivational Basis of Intergroup Contact – Two Extensive Longitudinal Studies.*

Kreienkamp, J., M. Agostini, K. Epstude, L. Bringmann, P. De Jonge (2019). *Goals and Needs in Intercultural Contacts: A Longitudinal Investigation.*

Meijer, R.R., Niessen, S. (2019). *COTAN jubileumsymposium: beslissen door mens of machine?*

Neumann, M. (2019). *Clinical- vs. mechanical decision-making in personnel selection - evidence-based assessment in practice.*

Niessen, S. (2019). *Klinische versus actuariele predictie: een experiment.*

Niessen, S. (2019). *Evaluatie van het selectieproces voor de Rio-opleiding.*

Nikolic, M., Brummelman, E., Kan, K. J., & Colonnesi, C. (2019). *Parental mentalization and warmth as predictors of children's self-conscious emotions and prosocial behaviours*. Paper presented at VNOP-CAS Research Days days, Utrecht, Netherlands.

Nikolic, M., Van der Storm, L., Colonnesi, C., Brummelman, E., Kan, K. J., & Bögels, S. M. (2019). *Socio-Cognitive Abilities, Self-Consciousness, and Social Anxiety: Developmental and Psychobiological Perspective*. Paper presented at International Convention of Psychological Science (2019), Paris, France.

Tendeiro, J. (2019). *Bayesian statistics as a therapy for frequentist problems.*

Tendeiro, J. (2019). *My current views over the Bayes factor.*

Tendeiro, J. (2019). *From frequentist problems towards Bayesian solutions.*

Timmerman, M.E. (2019). *Mixture modelling of multivariate and / or longitudinal data: Arriving at insightful representations.*

Van der Hoef, H. (2019). *Selecting the number of clusters: Current practice and challenges.*

Van der Hoef, H. (2019). *On the use and reporting of cluster analysis in educational research: A systematic review.*

Van Dijk, M., S. Niessen, M. Span, R. Cox, V. Heininga, S. Van Lien (2019). *Weekend van de Wetenschap 2019.*

Van Ravenzwaaij, D. (2019). *BCN Symposium. Bayesian Hypothesis Testing: The One-Hour Version.*

Van Ravenzwaaij, D. (2019). *Evidence for the Absence of an Effect: TOST, ROPE, and Interval BFs. Paper presented at the annual meeting of the Mathematical Psychology Society, Montreal, Canada.*

Van Ravenzwaaij, D. (2019). *Strength of Evidence in the Recommendation of Medications. Paper presented at the annual meeting of the International Society for Clinical Biostatistics, Leuven, Belgium.*

Verhoeven, M., Volman, M. L. L., & Zijlstra, B. J. H. (2019). *Leeridentiteitsontwikkeling binnen en buiten school*. Paper presented at Onderwijs Research Dagen (ORD) 2019, Heerlen, Netherlands.

Verhoeven, M., Volman, M. L. L., & Zijlstra, B. J. H. (2019). *Leeridentiteitsontwikkeling binnen en buiten school*. Paper presented at ResearchEd 2019, Nieuwegein, Netherlands.

Verhoeven, M., Volman, M. L. L., & Zijlstra, B. J. H. (2019). *Wat voor een leerling ben ik? Leeridentiteitsontwikkeling op school*. Poster session presented at Onderwijs Research Dagen (ORD) 2019, Heerlen, Netherlands.

8.4.4 In press

Calders, F., Bijttebier, P., Bosmans, G., Ceulemans, E., Colpin, H., Goossens, L., Van den Noortgate, W., Verschueren, K., & Van Leeuwen, K. (in press). Investigating the interplay between parenting dimensions and styles, and the association with adolescent outcomes. *European child & adolescent psychiatry*. https://doi.org/10.1007/s00787-019-01349-x

Dejonckheere, E.*, Mestdagh, M.*, Kuppens, P., & Tuerlinckx, F. (in press). Reply to: Context matters for affective chronometry. *Nature Human Behaviour*.

Fokkema, M. (2020). Fitting prediction rule ensembles with R package pre. Journal of Statistical Software.

Fokkema, M. & Strobl, C. (2020). Fitting prediction rule ensembles to psychological research data: An introduction and tutorial. Psychological Methods 25(5), 636–652. http://doi.org/10.1037/met0000256

Fokkema, M., Edbrooke-Childs, J. & Wolpert, M. (accepted). Generalized linear mixed-model (GLMM) trees: A flexible decision-tree method for multilevel and longitudinal data. Psychotherapy Research.

Gvaladze, S., De Roover, K., Tuerlinckx, F., & Ceulemans, E. (in press). Detecting outlying variables in multigroup data: A comparison of different loading similarity coefficients. *Journal of Chemometrics*. https://doi.org/10.1002/cem.3233

Hanna, F., Oostdam, R. J., Severiens, S., & Zijlstra, B. J. H. (Accepted/In press). Assessing the professional identity of primary student teachers: Design and validation of the Teacher Identity Measurement Scale. *Journal of Educational Measurement*.

LeBel, E. P., Vanpaemel, W., Cheung, I., & Campbell, L. (in press). A brief guide to evaluate replications. *Meta-Psychology*.

Sels, L., Cabrieto, J., Butler, E., Reis, H., Ceulemans, E., & Kuppens, P. (in press). The occurrence and correlates of emotional interdependence in romantic relationships. *Journal of Personality and Social Psychology*. https://doi.org/10.1037/pspi0000212

Van den Bergh, D., Tuerlinckx, F., & Verdonck, S. (in press). DstarM: an R package for analyzing two-choice reaction time data with the D*M method. *Behavior Research Methods*.

van Loon, W., Fokkema, M., Szabo, B., de Rooij, M. (2020). Stacked penalized logistic regression for selecting views in multi-view learning. Information Fusion.

Van Mechelen, I., & Vach, W. (in press). Cluster analyses of a target data set from the IFCS Cluster Benchmark Data Repository: Introduction to the special issue. *Archives of Data Science, Series B*.

8.4.5 Miscellaneous

Bagheri, A., Oberski, D. L., Sammani, A., van der Heijden, P. G. M., & Asselbergs, F. W. (2019). *SALTClass: classifying clinical short notes using background knowledge from unlabeled data*. DOI: 10.1101/801944

Bais, F., Schouten, J. G., & Toepoel, V. (2019). *Is undesirable answer behaviour consistent?* The Hague: CBS.

Cremers, J., Pennings, H. J. M., Mainhard, T., & Klugkist, I. (2019). Circular Modelling of Circumplex Measurements for Interpersonal Behavior. *Assessment*. DOI: 10.1177/1073191119858407

Egberts, M. R., Engelhard, I., van de Schoot, R., Bakker, A., Geenen, R., van der Heijden, P., & Van Loey, N. E. E. (2019). Mothers' emotions after paediatric burn injury: longitudinal associations with posttraumatic stress- and depressive symptoms. *European Journal of Psychotraumatology*, *10*(Supplement 1), F7.2. [1613836]. DOI: 10.1080/20008198.2019.1613836

Hagenaars, M. A., Kuiling, P., & Klaassen, F. (2019). The role of tonic immobility and behavioural control in intrusion development. *European Journal of Psychotraumatology*, *10*(sup1), 19-19. [1613834]. DOI: 10.1080/20008198.2019.1613834

Hamaker, E. L., & Ryan, O. (2019). A squared standard error is not a measure of individual differences. *Proceedings of the National Academy of Sciences*, *116*(14), 6544-6545. DOI: 10.1073/pnas.1818033116

Račinskij, V., Smith, P. A., & van der Heijden, P. G. M. (2019). *Linkage Free Dual System Estimation*.

The SW-CRT Review Group (2019). Quality of stepped-wedge trial reporting can be reliably assessed using an updated CONSORT: crowd-sourcing systematic review. *Journal of Clinical Epidemiology*, *107*. DOI: 10.1016/j.jclinepi.2018.11.017

Zult, D., de Wolf, P. . P., Bakker, B., & van der Heijden, P. G. M. (2019). *A general framework for multiple-recapture estimation that incorporates linkage error correction*. (pp. 1-32). The Hague: CBS.

8.4.6 Meeting abstract

Kort, S., Brusse-Keizer, M., Schouwink, H. , Citgez, E., de Jongh, F., Gerritsen, J. W. , & van der Palen, J. (2019). Combining exhaled-breath analysis data with clinical parameters to improve the diagnosis of lung cancer. European respiratory journal, 54(Suppl. 63). https://doi.org/10.1183/13993003.congress-2019.PA3030

Kruik-Kolloffel, W. J. W. , Van der Palen, J. , Doggen, C. J. M., Kruik, H. J., Heintjes, E. M., Movig, K. L. L., & Linssen, G. C. M. (2019). Association between heart failure medication at discharge and heart failure readmission. European Journal of Heart Failure, 21(S1), 174-174. https://doi.org/10.1002/ejhf.1488

Meelissen, M. R. M., & Gubbels J. (2019). Nederland in PISA. NRO-congres voor onderwijs en onderzoek, Utrecht, October 30, 2019.

Meelissen, M. R. M., Hamhuis, E. R., & Glas, C.A.W. (2019). Performance differences between TIMSS's paper-pencil test and tablet test of Dutch grade 4 students: Results from the eTIMSS Equivalence study. 8th IEA International Research Conference, Copenhagen, Denmark, 26-28 June 2019.

Heitink, M.C. (2019). Onderwijs In Zicht (2019). Inzicht in didactische ICT bekwaamheid van docenten [Insights in teachers' technological pedagogical skills]. Invited talk.

8.4.7 Comment/Letter to editor

Ter Huurne, K. K., Movig, K., Van Der Valk, P. , Van Der Palen, J., & Brusse-Keizer, M. (2019). Herkenning en begrip essentieel voor therapietrouw bij COPD. Pharmaceutisch weekblad, 154(22-23), 20-21.

9 Finances

9.1 Financial statement 2019

Receipts

The participating institutes of Leiden University, University of Amsterdam, VU University of Amsterdam, University of Groningen, University of Twente, Tilburg University, Utrecht University, KU University of Leuven, Statistics Netherlands (CBS), and Cito Arnhem contributed financially according to the number of their PhD students that participated in IOPS on 1 July 2019. The participation fee for 2019 was € 700 per PhD student. Associated institutes with PhD students in the IOPS Graduate School, participated on the same terms.
Apart from the above mentioned annual contributions, no other funds are available for the IOPS Interuniversitary Graduate School.

This resulted in a credit balance for the year 2019 of € 4.582,08

9.2 Summary of receipts and expenditures in 2019

Receipts		**Expenditures**		
		Salaries IOPS office		
		Secretary, 0,4 fte	24.238,82	
Contribution participating institutions	44.100,00	Salary director 0,1fte	18.031,11	
		Other personel costs	119,75	
		Subtotal		42.389,68
		Printed matter	2,58	
		Website	252,88	
		Travel	1.061,97	
		Representation costs	974,97	
		IOPS 2019 congres	2.000,00	
		Winterconferentie	2.000,00	
Subtotal Receipts	44.100,00	Subtotal		6.292,40
Negative financial outcome 2019	4.582,08			
Total receipts	48.682,08	**Total expenditures**		48.682,08

9.3 Balance sheet 2019

IOPS Own Funds 2019			
Debet	**Euro**	**Credit**	**Euro**
Own Funds 31-12-2019	53.90	Own Funds 01-01-2019	58.483,92
		Results 2016	-4.582,08
Total Debet	53.901,84	Total Credit	53.901,84

10 Appendix 1: Contact details of IOPS institutes

10.1.1 Participating Institutes

Leiden University Faculty of Social and Behavioural Sciences	
Methodology and Statistics Unit Institute of Psychology	P.O. Box 9555, 2300 RB Leiden Secretary: Jacqueline Hartman 071 527 3761 secr.psy.ms@fsw.leidenuniv.nl
Unit Educational Sciences Institute of Education and child Studies	P.O. Box 9555, 2300 RB Leiden Secretary: Esther Peelen 071 527 3434 peelene@fsw.leidenuniv.nl
Statistical Science for the Life and Behavioral Sciences Mathematical Institute	P.O. Box 9512, 2300 RA Leiden Secretary: Martine Goderie-Vliegenthart m.l.goderie@math.leidenuniv.nl +31 71 527 7047
University of Amsterdam Faculty of Social and Behavioural Sciences	
Psychological Methods Department of Psychology	Nieuwe Achtergracht 129-B, Postbus 15906, 1001 NK Amsterdam Secretary: Lilian Heijmans 020 525 6870 mlsecretariaat-fmg@uva.nl
Developmental Psychology Department of Psychology	Postbus 15916, 1001 NK Amsterdam Secretary: Ellen Buijn 020 525 6830 e.buijn@uva.nl
Work and Organizational Psychology Department of Psychology	Nieuwe Achtergracht 129 B, Amsterdam Postbus 15919, 1001 NK Amsterdam Secretary: Joke Vermeulen 020 525 6860 j.h.vermeulen@uva.nl
Methods and Statistics Department of Development and Education	Nieuwe Achtergracht 127, Amsterdam Postbus 15906, 1001 NK Amsterdam Secretary: Mariëlle de Reuver 020 525 6050 j.m.dereuver@uva.nl
University of Groningen Faculty of Behavioural and Social Sciences	

Psychometrics and Statistics Department of Psychology	Grote Kruisstraat 2/1, 9712 TS Groningen Secretary: Hanny Baan 050 363 63 66 j.m.baan@rug.nl
Theoretical Sociology Department of Sociology	Grote Kruisstraat 2/1, 9712 TS Groningen Secretary: Saskia Simon 050 363 6469 s.simon@rug.nl
University of Twente Faculty Behavioural, Management and Social Science (BMS)	
Department of Research Methodology, Measurement and Data Analysis (OMD)	P.O. Box 217, 7500 AE Enschede Secretary: Lorette Bosch Birgit.Olthof@utwente.nl
Tilburg University Tilburg School of Social and Behavioral Sciences	
Methodology and Statistics	P.O. Box 90153, 5000 LE Tilburg Secretary: Anne-Marie van der Heijden 013 466 3687 a.m.j.heijden@uvt.nl
Utrecht University Faculty of Social and Behavioural Sciences	
Methodology and Statistics	P.O. Box 80.140, 3508 TC Utrecht Secretary: Chantal Molnar-van Velde 030 253 4438 c.molnar@uu.nl
KU Leuven-University of Leuven, Belgium Faculty of Psychology and Educational Sciences	
Research Group of Quantitative Psychology and Individual Differences	Tiensestraat 102 box 3713, B-3000 Leuven, Belgium Secretary:
Statistics Netherlands (CBS), Den Haag	
	P.O. Box 24500, 2490 AH Den Haag Secretary: 070 337 3800
Psychometric Research Center (Cito), Arnhem	
	P.O. Box 1034, 6801 MG Arnhem Secretary: Ghita Bakker Ghita.Bakker@cito.nl

10.1.2 Cooperating institutes

University of Groningen Faculty of Behavioural and Social Sciences	
Department of Education	Grote Rozenstraat 38, 9712 TJ Groningen Secretary: M.J. Kroeze-Veen 050 363 6540 M.J. Kroeze-Veen@rug.nl
VU University Amsterdam Faculty of Psychology and Education	
Department of Clinical Psychology	Van der Boechorststraat 1, 1081 BT Amsteram Secretary: Sherida Slijmgaard 020 598 8951, s.r.slijmgaard@vu.nl
Department of Biological Psychology	Van der Boechorststraat 1, 1081 BT Amsteram Secretary: Stephanie van de Wouw 020-598 8792 s.b.vande.wouw@vu.nl
Maastricht University Faculty of Health, Medicine and Life Sciences & Faculty of Psychology & Neuroscience	
Department of Methodology and Statistics	P.O. Box 616, 6200 MD Maastricht Secretary: Edith van Eijsden 043 388 2395 e.vaneijsden@maastrichtuniversity.nl
Erasmus University Rotterdam	
Department of Econometrics	P.O. Box 1738, 3000 DR Rotterdam Secretary: Research Office 010 408 1370 / 1377 researchoffice@ese.eur.nl
Department of Psychology, Education & Child Studies	P.O. Box 1738, 3000 DR Rotterdam Secretariat D-PECS 010 408 8789 / 8799 sec-dpecs@fsw.eur.nl
Wageningen University	
Biometrics	P.O. Box 8130, 6700 EW, Wageningen Secretary: Dinie Verbeek and Hanneke Ommeren 0317 48 5702 biometris@wur.nl

11 Appendix 2: IOPS Summer Conference 2019

34th IOPS/SMiP Summer Conference, 13-14 June 2019

Conference host:	Utrecht University
Locations:	De Zalen van Zeven, Boothstraat 7, 3512 BT Utrecht Utrecht Centrum voor de Kunsten, Domplein 4, 3512 JC Utrecht
Hotels:	https://www.visit-utrecht.com/plan-your-trip/hotels

Program Thursday June 13th (De Kerkzaal, De Zalen van Zeven: https://dezalenvanzeven.nl/vergaderen-utrecht/#top)

09.30 – 10.00 **Receipt with coffee and tea**

10.00 – 10.15 **Official Opening**

10.15 – 10.45 **Presentation Duco Veen** *Utrecht University*
On Elicitation of Prior Information for Latent Change Analysis

10.45 – 11.15 **Presentation Sanne Smid** *Utrecht University*
The Impact of Default Priors in Bayesian SEM with Small Samples

11.15 – 11.30 **Break**

11.30 – 12.00 **Presentation Jonas Haslbeck** *University of Amsterdam*
Moderated Network Models

12.00 – 12.30 **Presentation Jolanda Kossakowski** *University of Amsterdam*
The Race for Causality: A Comparison of Different Techniques for Causal Inference Graphs and an Application to Obsessive-Compulsive Disorder

12.30 – 13.30 **Lunch**

13.30 – 14.00 **Presentation Franziska Bott** *University of Mannheim, Germany*
The Influence of Information Sampling on the Pseudocontingency Effect

14.00 – 14.30 **Presentation Raphael Hartmann** *University of Freiburg, Germany*
Response Time Extended Multinomial Processing Tree (RT-MPT) Models in R

14.30 – 15.00 **Presentation Tessa Blanken** *VU Amsterdam*

Insomnia heterogeneity and its link to depression: Insights from an observational, prospective, and intervention study

15.00 – 15.30 **Presentation Niels Kukken** *University of Tübingen, Germany*
Are there two independent evaluative conditioning effects in relational paradigms? Dissociating the effects of CS-US pairings and their meaning

15.30 – 16.00 **Break**

16.00 – 17.00 **Invited presentation by COTAN**
Sixty years of assessing the quality of psychological tests in the Netherlands: then, now, and in the future

17.00 – 18.30 **Poster Session**

Xynthia Kavelaars *University of Tilburg* – Making the most of clinical trials: Increasing efficiency using novel Bayesian methods for information sharing within and between trials

Andrea Stoevenbelt *University of Tilburg* - The Application of the Analysis of Covariance in Stereotype Threat Research: Implications of the SAT Covariate and Prominent Moderators.

Mark Verschoor *University of Groningen* - Relationships between family member's values, energy-saving identity, personal norms to save energy, and energy behaviors

Sanne Willems *Leiden University* - Variability in the interpretation of Dutch probability phrases – a risk for miscommunication

Maike Czink *SMiP* - A closer look at the temporal aspects of recovery

Susanne Frick *SMiP* - Comparing information in the multidimensional forced-choice and the true-false format

Kilian Hasselhorn *SMiP* **-** Reactivity effects in ambulatory assessment
Effects of participant burden on intraindividual variability

Luisa Horsten *SMiP* **-** The Dark Core of Personality: Dissociating D from Honesty-Humility

David Izydorczyk *SMiP* - Measuring Rule- and Exemplar-based Processes in Judgment

Lea Johannsen *SMiP* **-** Modelling Sequential Dependencies in Reaction Time Data: Extending the Diffusion Decision Model

Stefan Radev *SMiP* **-** Taming the Intractable: Deep Learning for Universal Parameter Estimation

Fabiola Reiber *SMiP* **-** Modeling Non-compliance in the Randomized Response Technique using Unrelated Questions

Nikoletta Symeonidou *SMiP* **-** Emotional source memory: (Why) Are emotional

sources remembered better?

Thomas Verliefde *SMiP* **-** Do Acquaintances Elicit Ambivalent Priming Effects?

Monika Wiegelmann *SMiP* **-** Chronotype and work: A longitudinal perspective

Gloria Grommisch *SMiP* **-** Modeling Individual Differences in Emotion Regulation Repertoire in Daily Life with Multilevel Latent Profile Analysis

18.30 **Conference dinner**
Best Paper of 2018 Award

Program Friday June 14th (Torenzaal, Utrecht Centrum voor de Kunsten: https://uck.nl/#)

09.00 – 09.30 **Presentation Maarten Kampert** *Leiden University*
Improved Strategies for Distance Based Clustering of Objects on Subsets of Attributes in High-Dimensional Data

09.30 – 10.00 **Presentation Lieke Voncken** *University of Groningen*
Continuous test norming with GAMLSS

10.00 – 10.15 **Break**

10.15 – 10.45 **Presentation Martin Schnuerch** *University of Mannheim, Germany*
Sequential Hypothesis Tests for Multinomial Processing Tree Models

10.45 – 11.15 **Presentation Mischa von Krause** *University of Heidelberg, Germany*
Using the diffusion model to assess dark personality

11.15 – 11.45 **Presentation Daan van Renswoude** *University of Amsterdam*
Modeling infant eye-movements over real-world scenes

11.45 – 12.45 **Lunch**

12.45 – 13.15 **Presentation Beibei Yuan** *Leiden University*
The δ-machine: Classification based on distances towards prototypes

13.15 – 13.45 **Presentation Anne Voormann** *University of Freiburg, Germany*
Investigating mechanisms underlying paired-word recognition using continuous and discrete-state models

13.45 – 14.45 **Board Meeting with SMiP representatives**
Lokaal 115, UCK

14.15 – 14.45 **PhD Meeting**
Torenzaal, UCK

14.45 – 15.00 **Joint Meeting of Board and PhD's**
IOPS Best Presentation and Poster Award
Torenzaal, UCK

Thursday June 13th

10.15 – 10.45
On Elicitation of Prior Information for Latent Change Analysis
Duco Veen *Utrecht University*

Informative priors can be used in SEM to supplement limited data, obtain more confident parameter estimates, or, simply enable estimation of the model. Expert elicitation, currently limited to simple models, provides a solution to obtain informative priors. We developed a novel approach to elicited expert knowledge for Latent Change Analysis.

Student discussant: Jonas Haslbeck
Staf discussant: Joost van Ginkel

10.45 – 11.15
The Impact of Default Priors in Bayesian SEM with Small Samples
Sanne Smid *Utrecht University*

When Bayesian estimation is used to analyze Structural Equation Models (SEMs), prior distributions need to be specified for all parameters in the model. Many existing software programs offer diffuse default prior distributions, which makes it easier for users to implement a Bayesian approach. However, diffuse default priors can heavily impact the results when samples are small. Hence, diffuse default priors can unintentionally behave as very informative priors when samples are small, and therefore lead to untrustworthy results. In this talk, we discuss the risks associated with the use of default priors in Bayesian SEM when samples are small.

Student discussant: Qianrao Fu
Staf discussant: Marjan Bakker

11.30 – 12.00
Moderated Network Models
Jonas Haslbeck *University of Amsterdam*

Pairwise network models such as the Gaussian Graphical Model (GGM) are a powerful and intuitive way to analyze dependencies in multivariate data. A key assumption of the GGM is that each pairwise interaction is independent of the values of all other variables. However, in psychological research this is often implausible. In this paper, we extend the GGM by allowing each pairwise interaction between two variables to be moderated by (a subset of) all other variables in the model, and thereby introduce a Moderated Network Model (MNM). We show how to construct MNMs and propose an L1-regularized nodewise regression approach to estimate it. We provide performance results in a simulation study and show that MNMs outperform the split-sample based methods Network Comparison Test (NCT) and Fused Graphical Lasso (FGL) in detecting moderation effects. We discuss applications of MNMs in the field of psychopathology and give a brief overview of how to estimate MNMs with the R-package mgm.

Student discussant: Andrea Stoevenbelt
Staf discussant: Henk Kelderman

12.00 – 12.30

The Race for Causality: A Comparison of Different Techniques for Causal Inference Graphs and an Application to Obsessive-Compulsive Disorder
Jolanda Kossakowski *University of Amsterdam*

The quest for causality is one that people have been striving for for decades. We are not only interested in how something may lead to something else, we also want to know why something happens. Establishing a causal relation between two variables can help us in answering that big question of why something happens. Most measures that are used to estimate causal relations between variables use what is called observational data. These are (empirical) data in which no perturbations have taken place. Although one can use observational data to estimate causal relations, this alone is not enough to properly estimate these relationships between variables. We also need to perturb one or more variables and observe its effect in order to establish causal relations between variables. This means that we also need so-called experimental data to estimate causal relations. These are (empirical) data where some perturbation (intervention) has taken place. In this study, we show how well different algorithms perform when it comes to estimating causal relations. Results show that the invariant causal prediction algorithm and the hidden invariant causal prediction algorithm are very accurate in their estimation of causal relations in data without and with hidden variables. We show the use of these algorithms by applying them to a dataset of patients diagnosed with obsessive-compulsive disorder (OCD). The resulting causal graph reveals multiple cycles between aspects of OCD that may play a role in the maintenance of the disorder. Even though more research has to be conducted to improve the algorithms, we believe that this approach may expose OCD in a new way.

Student discussant:
Staf discussant: Rens van de Schoot

13.30 – 14.00
The Influence of Information Sampling on the Pseudocontingency Effect
Franziska Bott *University of Mannheim, Germany*

In a trivariate decision scenario with two contexts, two options, and two outcomes, successful decision makers should base their choices on the options' probabilities to result in a positive outcome. Yet, research on pseudocontingencies shows that choices may rather be based on skewed base rates of options and outcomes co-varying across contexts (e.g., Fiedler, Freytag, & Meiser, 2009). Pseudocontingencies may even override existing contingencies. While previous research has focused on investigating the effect by presenting predetermined learning trials, this project investigates the role of self-determined information sampling in pseudocontingency inference.
In a series of experiments, we compared predetermined learning to learning from information sampling. When participants were free to decide for each learning trial which context to observe, neither learning trials nor subsequent choice behavior differed in comparison to predetermined learning. However, when sampling information by context and option during learning, an asymmetry between positive contexts with predominantly gains and negative contexts with predominantly losses resulted. Within negative contexts both options were sampled equally often resulting in no preference for any option in a subsequent choice phase. Contrarily, within positive contexts skewed base rates of options are sampled. Moreover, participants preferred the frequently sampled option within positive contexts in line with pseudocontingency research. Still, in the majority of cases, the frequently sampled and chosen option corresponded to the objectively superior option. Therefore, we also compared the influence of the relative sampling frequency and the sampled winning probability of an option within a context on its choice probability in the decision phase.

Student discussant: Sanne Smid
Staf discussant: Ton de Waal

14.00 – 14.30

Response Time Extended Multinomial Processing Tree (RT-MPT) Models in R
Raphael Hartmann *University of Freiburg, Germany*

Since Donders' "method of subtraction" (Donders, 1868) estimating cognitive process completion times has been an active research area. The model class by Klauer and Kellen (2018) called Response Time extended Multinomial Processing Tree (RT-MPT) makes it possible to estimate process completion times for every assumed process of a given MPT model. It also overcomes some disadvantages of traditional MPT models. For example, it can be used in many situations in which an MPT model is not identified, incorporating response times makes the probability estimates for MPT models more accurate, and variants of an MPT model can be tested against each other. So far, the only available source code for modeling RT-MPTs was written in C++. In order to make RT-MPT usable for psychology, we developed the R package "rtmpt" with which it is possible to fit RT-MPT models easily. The package can be used with two established MPT syntaxes and is free and open source. Additionally, it has a number of useful and new features such as suppressing specific process times, holding process probabilities constant, and changing some prior parameters. The package leads to comparable parameter estimates as the original C++ program by Klauer and Kellen (2018). Furthermore, we show that the Bayesian algorithm of the program is valid.

Student discussant: Duco Veen
Staf discussant: Jean-Paul Fox

14.30 – 15.00
Insomnia heterogeneity and its link to depression: Insights from an observational, prospective, and intervention study
Tessa Blanken *VU Amsterdam*

Background. Insomnia is the second-most prevalent disorder and a primary risk factor for depression. It has proven difficult, however, to pinpoint consistent characteristics of insomnia, suggesting unrecognized heterogeneity. In addition, considerable overlap in the symptoms of insomnia and depression raises questions on their empirically identified relationships: could the increased risk and their co-occurrence largely reflect this symptom overlap? In a series of studies we aimed to unravel insomnia heterogeneity and disentangle the relationship between insomnia and depression.

Methods. First, in an observational study, we performed latent class analysis on N=2224 participants with insomnia for a data-driven identification of subtypes. Second, in a 6-year prospective study in N=768 participants free from lifetime depression, we investigated primary risk factors for depression onset. Third, in an intervention study in N=104 participants with co-occurring insomnia and depression symptoms we investigated sequential and specific treatment effects of cognitive behavioural therapy for insomnia (CBTI). In these final two studies we employed and introduced extensions of network analysis to account for the symptom overlap.

Results. First**,** we identified five insomnia subtypes that were distinguished by their multivariate profile of life history, affect and personality and that, crucially, differed in their risk of comorbid and lifetime depression. Second, we identified difficulty initiating sleep to directly predict first-onset depression, even after accounting for all other baseline depression symptoms. Third, we demonstrated that CBTI most strongly and most directly affected specific sleep complaints.

Discussion. The identification of subtypes of insomnia allows to select patients with the highest risk of depression—crucial for the prevention of depression, for which insomnia was shown to be an independent and primary risk factor. When prevention fails, it was moreover shown that depression symptoms can be alleviated through successful treatment of insomnia. Insomnia is thus a key determinant in the prevention and treatment of depression, providing multiple ways to combat the global burden of disease.

Student discussant: Sanne Willems
Staf discussant: Mark de Rooij

15.00 – 15.30
Are there two independent evaluative conditioning effects in relational paradigms? Dissociating the effects of CS-US pairings and their meaning
Niels Kukken *University of Tübingen, Germany*

Recent research into evaluative conditioning (EC) shows that information about the relationship between the conditioned and unconditioned stimuli can exert strong effects on the size and direction of the EC effect. Additionally, the co-occurrence of these stimuli seems to exert an orthogonal effect on evaluations. This finding has been interpreted as support for two independent types of EC effects. However, previous research devoted to this question relied on aggregated evaluative measures, allowing for alternative interpretations. In four experiments, we developed and validated a multinomial processing tree model that distinguishes effects of the pairings from effects of the meaning of the pairings. Our findings suggest that two independent EC effects contribute to overall evaluative change in a relational EC paradigm. The model that we developed offers a helpful method for future research in that it allows for an assessment of the effects of manipulations on processes rather than overall performance on an evaluative measure.

Student discussant: Alexandra de Raadt
Staf discussant: Dave Hessen

Friday June 14th

09.00 – 09.30
Improved Strategies for Distance Based Clustering of Objects on Subsets of Attributes in High-Dimensional Data
Maarten Kampert *Leiden University*

The focus in this talk is on clustering of objects in high-dimensional data, given the restriction that the objects do not cluster on all the attributes, not even on a single subset of attributes, but often on different subsets of attributes in the data. With the objective to reveal such a clustering structure, Friedman and Meulman (2004) proposed a framework and a specific algorithm, called COSA. In this talk we will discuss various improvements to the original COSA algorithm. The first improvement targets the optimization strategy for the tuning parameters in COSA. Further, a reformulation of the COSA criterion brings down the number of tuning parameters from two to one, enables incorporation of pre-specified initial weights for the attribute distances and allows for a solution that consists of zero-valued attribute weights. The third improvement consists of a new definition of the COSA distances that yields a better separation between objects from different clusters. We will compare the `old' and the improved COSA with other state of the art methods. The comparison is based on simulated and real omics data sets.

Student discussant: Beibei Yuan
Staf discussant: Marcel van Assen

09.30 – 10.00
Continuous test norming with GAMLSS
Lieke Voncken *University of Groningen*

Psychological tests are widely used to assess individuals in clinical and educational contexts. The test scores are often interpreted relative to the scores of a reference population, for instance the Dutch

population of the same age as the testee involved. Those so-called norm-referenced scores were traditionally derived from sample scores in subgroups of age, but nowadays they are derived from test scores considering a continuous function of age.
We recommend to create those continuous test norms with the generalized additive models for location, scale, and shape (GAMLSS) framework, as it allows for a wide range of distribution types and function types. In this way, the median, variation, skewness, and/or kurtosis of the raw score distribution can be modelled as functions of the predictor(s).
The flexibility of the GAMLSS framework allows for accurate norm estimation, but it also presents some challenges. First, a model needs to be selected for every distributional parameter. Second, the flexibility comes with a larger sampling variability. My PhD project involved the development of an automated model selection procedure, a method for expressing the uncertainty due to sampling variability around the normed scores, and a method for making norm estimation more efficient by including prior information. In this talk, a summary of the methods proposed and their performances will be presented.

Student discussant: Fayette Klaassen
Staf discussant: Anton Béguin

10.15 – 10.45
Sequential Hypothesis Tests for Multinomial Processing Tree Models
Martin Schnuerch *University of Mannheim, Germany*

In a seminal article, Riefer and Batchelder (1988) proposed Multinomial Processing Tree (MPT) models to measure latent psychological attributes based on categorical behavioral data. Since then, MPT models have become a powerful and frequently used instrument in various branches of cognitive psychology and social cognition research. Aside from estimation of parameters that represent psychological processes or states underlying responses to cognitive tasks, MPT models also allow for statistical tests on these parameters. So far, such tests have largely relied on Null Hypothesis Significance Testing, mostly ignoring statistical power. We show that proper control of Type 1 and Type 2 error probabilities often requires very large sample sizes in the classical Neyman-Pearson framework. We propose Sequential Probability Ratio Tests (SPRT) as an efficient alternative. Unlike Neyman-Pearson tests, sequential tests continuously monitor the data and terminate when a predefined criterion is met. As a consequence, SPRT typically require only about half of the Neyman-Pearson sample size without compromising error probability control. We illustrate the SPRT approach to statistical inference in MPT models with an example and discuss benefits as well as limitations of the proposed approach.

Student discussant: Shiya Wu
Staf discussant: Elise Dusseldorp

10.45 – 11.15
Using the diffusion model to assess dark personality
Mischa von Krause *University of Heidelberg, Germany*

In recent years, there has been an increase of interest in so so-called dark personality traits, ie. traits that manifest in socially undesirable or even downright malevolent behavior. Such traits were typically assessed using self-report questionnaires, with the most popular instruments trying to assess the Dark Triad of psychopathy, narcissism and Machiavellism. While these instruments have been fundamental in advancing the study of dark personality, they share the problems inherent in all self-report measures, for example the reliance on conscious introspection and easy fakeability. These issues seem especially important given the fact that the traits assessed are by their very definition socially undesirable. We introduce a new instrument based on simple binary decisions under time pressure -

does this adjective describe me well? Ratcliff's diffusion model is employed in order to achieve - in the model parameter drift rate - a more pure measure of speed of information uptake in these decisions than simple RTs. The difference in drift rates for "dark" and "light" adjectives is used as an estimate of dark personality. We present initial data that points towards concurrent, incremental and predictive validity of the measures obtained.

Student discussant: Kimberley Lek
Staf discussant: Denny Borsboom

11.15 – 11.45
Modeling infant eye-movements over real-world scenes
Daan van Renswoude *University of Amsterdam*

What factors drive infants' gaze behavior over complex real-world scenes? In adults, scene viewing is characterized as an interplay between low-level perceptual salience (e.g., contrast, color and orientation of pixels) and higher order top-down information such as meaningful objects. This interplay between exogenous and endogenous factors develops in infancy and scene viewing is a suitable paradigm to quantify *how* infants' visual attention develops. In this talk I will present general characteristics of data from scene viewing studies conducted with both infants and adults. In order to explain these general characteristics we developed a simple eye-movement model that can mimic some of the general behaviors observed in the data.

Student discussant:
Staf discussant: Arndt Bröder

12.45 – 13.15
The δ-machine: Classification based on distances towards prototypes
Beibei Yuan *Leiden University*

We introduce the δ-machine, a statistical learning tool for classification based on (dis)similarities between profiles of the observations to profiles of a representation set. In this presentation, we discuss the properties of the δ-machine, investigate the definition of the representation set, and derive variable importance measures and partial dependence plots for the machine. Three choices for constructing the representation set are discussed: the complete training set, a set selected by the clustering algorithm Partitioning Around Medoids (PAM), and a set selected by the *K*-means clustering. After computing the pairwise dissimilarities, these dissimilarities take the role as predictors in penalized logistic regression to build classification rules. This procedure leads to linear classification boundaries in the dissimilarity space, but non-linear classification boundaries in the original predictor space. Moreover, we applied two tailored dissimilarity functions to extend the δ-machine to handle mixed type of predictor variables, the adjusted Euclidean dissimilarity function (AEDF) and the adjusted Gower dissimilarity function (AGDF).
We will apply the δ-machine on two empirical data sets, the Mroz data and the Statlog data. For the Mroz data, we will show the non-linear boundaries in the original predictor space which were derived from the δ-machine. For the Statlog data, we compare the δ-machine with five other classification methods. The results showed that the δ-machine was one of the best methods. Moreover, we will show how the performance of the δ-machine changes by applying different types of the representation set. The obtained results showed that when the δ-machine applied the PAM, the results show a good balance between accuracy and interpretability.

Student discussant: Daan van Renswoude
Staf discussant: Daniel Heck

13.15 – 13.45

Investigating mechanisms underlying paired-word recognition using continuous and discrete-state models

Anne Voormann *University of Freiburg, Germany*

In a paired-word recognition task, individuals study single words but have to categorize in a recognition test two randomly paired words regarding position and number of studied words. Past research has shown that performance decreases in a paired-word recognition task compared to a single-word recognition task. However, the source of the performance difference remains uncertain. In the first study, we investigated this research question using two different model classes: discrete-state models and a version of general recognition theory (GRT), a multidimensional signal detection theory. We tested 80 participants in a recognition task, presenting both trials with single words and trials with paired words in the recognition test. Behaviourally, we replicated the previous findings and found that both model classes allocate an overall performance difference between single and paired words to processes of detection and discrimination based on memory evidence. More importantly, the words in paired-word trials are not evaluated independently and the two model classes allocate the dependencies in recognition decisions to different sources. While GRT attributes the dependencies to a spilling-over of memory evidence, the discrete-state model can fully account for them within guessing processes. Overall, model comparisons favour the discrete-state model. A validation study examining whether the findings also transfer to situations where only paired-words are considered will also be presented.

Student discussant:
Staf discussant:

12 Appendix 3: IOPS Winter Conference 2019

29th IOPS Winter Conference, 12-13 December 2019

Conference host: Leiden University

Location: Zaal 1A20, Pieter de la Court, Wassenaarseweg 52, 2333 AK, Leiden. (https://www.universiteitleiden.nl/en/locations/pieter-de-la-court)

Hotels:

https://www.booking.com/city/nl/leiden.nl.html?aid=303947;label=leiden-nvwkVo_NK2sKfoHkh4X60QS111932257159:pl:ta:p135:p2%E2%82%AC52:ac:ap1t1:neg:fi:tikwd-276959020:lp1010722:li:dec:dm;ws=&gclid=Cj0KCQjwiILsBRCGARIsAHKQWLMCvUYsiouXvgbGGEwcOYiN0PjK8EkQ5gE-YeYmkQXGjWHVNe0BdIgaAskAEALw_wcB

Prior to the conference – Thursday December 12th

10.30 – 12.00 **IOPS Board meeting** (room 5A19)
11.30 – 12.00 **IOPS PhD student meeting** (room OA28 (filmzaal)
12.00 – 13.00 R**egistration and Lunch (FSW Café, ground floor)**

Program Thursday December 12th (Room 1A20)

13.00 – 13.05 **Official opening** by Mark de Rooij *Professor of Methodology and Statistics of Psychological Research, Leiden University*

13.05 – 13.30 **Presentation Hilde Augusteijn** *University of Tilburg*
Posterior Probabilities in Meta-Analysis: An Intuitive Approach of Dealing with Publication Bias

13.30 – 13.55 **Presentation Daniela Crisan** *University of Groningen*
Usefulness versus Complexity: Practical Implications of IRT Model Selection

13.55 – 14.20 **Presentation Sanne Willems** *Leiden University*
Optimal Scaling transformations to model non-linear relations in GLMs for categorical and ordinal data

14.20 – 14.45 **Presentation Jacqueline Zadelaar** *University of Amsterdam*
Are Individual Differences Quantitative or Qualitative? An Integrated Behavioral and fMRI MIMIC Approach

14.45 – 15.15 **Break**

15.15 – 15.40 **Presentation Jonas Haslbeck & Oisín Ryan** *University of Amsterdam & Utrecht University*
Recovering Bistable Systems from Psychological Time Series

15.40 – 16.05 **Presentation Richard Artner** *KU Leuven-University of Leuven*
Statistical inference via all-subset regression

16.05 – 16.50 **Keynote speaker Elise Dusseldorp** *Leiden University*
Machine learning in psychology – two examples

Machine learning in psychology:two examples
Machine learning involves a large variety of algorithmic methods such as classification and regression trees (CART; Breiman et al., 1984) and random forests (Breiman, 2001). One might think that these methods are invented far away from the social sciences. However, already in 1963 two sociologists proposed Automatic Interaction Detection, a method that is regarded as the predecessor of CART.
In this presentation, we focus on two methods, Qualitative Interaction Trees (QUINT; Dusseldorp et al., 2014) and meta-CART (Li et al., 2017), that use the CART algorithm in a modified form to tackle problems in treatment efficacy research. Both methods aim at explaining the variance in a treatment effect, so-called treatment effect heterogeneity. The underlying idea is that the effect of a treatment may depend on person characteristics (e.g., age). QUINT uses randomized controlled trial data to detect homogeneous subgroups of patients with regard to their treatment outcome. That way, QUINT makes it more easy to tailor a treatment to the patients that most profit from it. Meta-CART is used in meta-analyses to detect homogeneous subgroups of studies with regard to their combined treatment effect size. It facilitates in, for example, detecting the most effective treatment ingredients. An inconvenience of these methods is that due to their algorithmic nature the estimated treatment effects in the subgroups (i.e., the leaves of the tree) are overly optimistic. We show some new advances to overcome this inconvenience using illustrations with psychological data.

16.50 – 17.10 **Plenary meeting IOPS staff and students**

17.10 – 18.15 **Poster session & Drinks**

Giuseppe Arena *University of Tilburg* - Modeling memory decay in social network analysis: a Bayesian approach

Felix Clouth *University of Tilburg* **-** Quality of life profiles of colon cancer survivors: A three-step latent class analysis

Simon Kucharsky *University of Amsterdam*- Model based real-time testing of habituation

Marlyne Meijerink *University of Tilburg* – The study of social interactions over time: A relational event modeling approach

Anton Olsson Collentine *University of Tilburg* – False certainty in meta-analysis: Theoretical vagueness in psychology leads to hidden uncertainty in meta-analytic summaries

Chuenjai Sukpan *Utrecht University* – How to evaluate *causal dominance* in lagged effect models

Shiya Wu *Utrecht University* -Expert Prior Elicitation in Bayesian Adaptive Survey Design.

Jacqueline Zadelaar *University of Amsterdam* – Development of Decision Making based on Internal and External Judgement: A Hierarchical Bayesian Approach

19.00 **Conference dinner**

Program Friday December 13th

09.30 – 10.00 **Registration / Coffee**

10.00 – 10.45 **Presentation IOPS Best Paper Award Winner Robbie van Aert**

10.45 – 11.05 **Break**

11.05 – 11.30 **Presentation Shuai Yuan** *University of Tilburg* – A novel variable selection method in K-means clustering based on Sparse Principal Component Analysis

11.30 – 11.55 **Presentation Adela Isvoranu** *University of Amsterdam* – Network Models of Psychosis

11.55 – 12.20 **IOPS Best Poster/Presentation Award Ceremony**

12.20 – 12.45 **Closing** by Mark de Rooij

12.45 **Take away lunch** (FSW Café, ground floor)