

Annual report 2016

- 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)

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Foreword

It was with great dismay that we learned of the death of our PhD student Janneke de Kort (VU University Amsterdam). On May 25th 2016, Janneke passed away after being diagnosed with acute leukemia the year before. Janneke was a highly motivated student, always in the front row at courses, surrounded by lots of highlighted papers and extra books. She was a very social person too, befriending both her fellow students and her lecturers. Janneke was an exceptional student, and we will truly miss her sharp mind and sincerity.

On April 26th, 2016, shortly before his retirement, IOPS teacher Kees van Putten was awarded Knight in the Order of Oranje Nassau for his exceptional scientific merits in psychology. We cordially congratulate Kees with this honorary award.

After the introduction of the IOPS Best Poster Award in 2014, the IOPS Best Presentation Award for the best student presentation at the IOPS conferences was bound to be established. The first two PhD students to win this award were Dries Debeer (Summer 2016) and Jonas Haslbeck (Winter 2016).

Sacha Epskamp won the IOPS Best Paper Award 2016, with his paper *Generalized network psychometrics* published in *Psychometrika*.

We congratulate the seventeen students who defended their thesis successfully. With one project left unfinished, the number of IOPS students in 2016 increased to 65.

On behalf of the IOPS board,

Rob Meijer

1 Introduction

1.1 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.

1.2 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.

1.3 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.

1.3.1 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.

1.3.2 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.

1.3.3 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).

1.4 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 research proposal 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 application is then 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 (via forms which you can find on the IOPS site). Proposals accepted by NWO will only be reviewed by two PhD students and judged generally by the director. The reviewers provide feedback on both the research proposal and the educational plan. These reviews are sent to the PhD student. On basis of the reviews, the student replies to the comments by the reviewers and, if necessary, revises the proposal. Next, the revised proposal together with the replies by the student is returned to the reviewers. On the basis of their comments, the revised proposal, and the reply by the student, the reviewers formulate a recommendation to the IOPS board about whether the student should be admitted to IOPS based on the proposal 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/>

1.5 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

2 Organization

2.1 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.

2.2 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 31-12-2016)

Participating institutes			
<i>Name institute</i>	<i># students</i>	<i># prospective students</i>	<i># staff</i>
Leiden University, Faculty of Social and Behavioural Sciences			
▪ Methodology and Statistics Unit, Institute of Psychology	4	0	9
▪ Education and Child Studies, Institute of Education	0	0	0
▪ Statistical Science for the Life and Behavioral Sciences, Mathematical Institute	4	0	1
University of Amsterdam, Faculty of Social and Behavioural Sciences			
▪ Psychological Methods, Department of Psychology	10	1	10
▪ Developmental Psychology, Department of Psychology	2	0	4
▪ Work and Organizational Psychology, Department of Psychology	0	0	0
▪ Methods and Statistics, Department of Development and Education	0	1	7
University of Groningen, Faculty of Behavioural and Social Sciences			
▪ Psychometrics and Statistics, Department of Psychology	3	0	6
▪ 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)	4	1	5
Tilburg University, Tilburg School of Social and Behavioral Sciences			
▪ Methodology and Statistics	19	0	17
Utrecht University, Faculty of Social and Behavioural Sciences			
▪ Methodology and Statistics	12	1	21
KU Leuven, University of Leuven, Belgium, Faculty of Psychology and Educational Sciences			
▪ Research Group of Quantitative Psychology and Individual Differences	7	0	5
Statistics Netherlands (CBS), Den Haag	0	0	2
Psychometric Research Center (Cito), Arnhem	1	0	4
Cooperating institutes			
University of Groningen, Faculty of Behavioural and Social Sciences			
▪ Department of Education	1	0	3
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	1	0	5
Wageningen University			
▪ Research Methodology Group	0	0	1

2.3 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.

Members IOPS Board

There were no changes in the IOPS Board in 2016.

On 31 December 2016 the Board consisted of:

- Prof. R.R. (Rob) Meijer, Chair, University of Groningen
- Prof. D. (Denny) Borsboom, University of Amsterdam
- Prof. M.J. (Mark) de Rooij, Leiden University
- Dr G.J.A. (Jean-Paul) Fox, University of Twente
- Dr J.M. (Jelte) Wicherts, Tilburg University
- Prof. H.J.A. (Herbert) Hoijtink, Utrecht University
- Prof. F. (Francis) Tuerlinckx, KU Leuven, University of Leuven
- Dr A.A. (Anton) Béguin/Prof. G.K.J. (Gunter) Maris, CITO (National Institute for Educational Measurement)
- Prof. A.G. (Ton) de Waal, CBS (Statistics Netherlands)

PhD representatives

Paulette Flore (Tilburg University) was appointed first representative, after being assistant representative in 2015.

Eva Zijlmans (Tilburg University) was appointed assistant PhD student representative.

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 February 1st, 2014, the Executive Secretary of IOPS is Drs. Edith Ruisch. Finances are handled by the Financial Department (FSSC) of the University of Groningen.

Secretary: **Drs. Edith Ruisch-de Vries**
E-Mail: secretariaat.iops@rug.nl
Web: www.iops.nl
Phone: 050 36 36 367
Address: University of Groningen
 Faculty of Social and Behavioral Sciences
 Grote Kruisstraat 2/1
 9712 TS Groningen, The Netherlands

2.4 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.

2.5 Board & plenary meetings

In 2016 board meetings were held on 9 June and 15 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 2016 two plenary meetings took place, one on 9 June, and one on 15 December.

2.6 Archive

The IOPS archives the following:

- Registration of new PhD students (*aanmeld dossier*)
 - research plan, education plan and registration form
 - reviews, 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/...

3 The IOPS post graduate programme

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

3.1 Educational programme

3.1.1 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		2017, 2019...
January	Statistical Learning	LU	2	2018, 2020...	2017 only
February	What is Psychometrics?	UA	2	2016, 2018...	2017, 2019...
March	Statistical Consulting to Behavioral Scientists	UA & LU	3	2018, 2020...	2017, 2019...
April	Meta-analysis	UM	1	2016, 2018...	
	Transparency in Science	UG	1		2017, 2019...
May	Applied Bayesian Statistics	UU	2	2016, 2018...	2017, 2019...
June					
July					
August					
September	Survey Design	UU	2	2016, 2018...	2017, 2019...
October	Bayesian Item Response Modelling	UT	2	2016, 2018...	
November	Optimization & Numerical Methods	UL	2	2016, 2018...	2017, 2019...
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.

3.1.2 Courses in 2016

In 2016 six courses of the IOPS curriculum were organized:

1. **What is Psychometrics?** (mandatory)
University of Amsterdam, 9 – 11 February 2016
Coordinator: Prof. D. Borsboom
2. **Applied Bayesian Statistics** (elective)
Utrecht University, 18 - 22 April 2016

Course leader: Dr N. Schuurman

Lecturers: Prof. H. Hoijtink, Dr I. Klugkist, Dr R. Van der Schoot, Kr E. Hamaker

3. **Meta-analysis** (elective)

Maastricht University, 27 – 29 June 2016

Instructor: Dr W. Viechtbauer

4. **Survey Design** (elective)

Utrecht University, 26 – 29 September 2016

Lecturers: Dr P. Lugtig & Dr V. Toepoel

5. **Bayesian Item Response Modeling**

University of Twente, 24 – 25 November 2016

Lecturer: Prof. G.J.A. Fox

6. **Optimization & Numerical Methods in Statistics** (elective)

KU University of Leuven , 17 - 18 November 2016

Instructors: G. Molenberghs, F. Tuerlinckx, K. van Deun & T. Wilderjans

3.1.3 Number of IOPS students per course

In the table below the numbers of IOPS students that participated in IOPS courses in the period 2013 - 2016 are stated.

IOPS Course	2013	2014	2015	2016
Generalized latent variable modeling (TiU)			20	
What is psychometrics? (UvA)	10		24	20
Advising on research methods (UvA)	n.a.		14	
Applied Bayesian Statistics (UU)	n.a.	10	5	??
Optimization & Numerical Methods in Statistics,(KU L)	13	6	22	18
Meta-Analysis (UM)		5		7
Analysis of Measurement Instruments (UT)		6		
Survey Design (UU)	8			4
Bayesian Item Response Modeling				9

3.1.4 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.

3.1.5 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.

3.2 Research training programme

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

3.2.1 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.

3.2.2 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.

3.2.3 Conferences in 2016

- **31st IOPS Summer Conference**, 9 and 10 June 2016, University of Twente.
See appendix 2 for the programme.

- **26th IOPS Winter Conference**, 15 and 16 December 2016, University of Groningen
See appendix 3 for the programme.

3.3 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 “Methodological advice”), which are 5 EC in total. Exemption for these courses can be granted in case an equivalent course has been completed earlier.
- 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.

4 Students and their projects

4.1 Introduction

Applicants for the IOPS dissertation training must have a Master's degree in one of the following disciplines. Behavioral 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.

4.2 Admissions, deregistrations and dissertations

	2011	2012	2013	2014	2015	2016
Student admissions	15	22	18	14	21	20
Premature deregistrations	2	0	0	2	2	1
Dissertations	9	17	7	12	11	17
Projects that exceeded the project time limit on 31 December	4	3	4	5	11	8
Students on 31 December	48	53	61	60	62	65

Dissertations in 2016

1. Maria **Bolsinova** (Utrecht University) - *Simple Models & Complex Reality: Contributions to item response theory in educational measurement*
2. Laura **Bringmann** (KU University of Leuven) - *Dynamical Networks in Psychology: More than a pretty picture?*
3. Sebastiaan **De Klerk** (ECABO) - *Multi-Media Based Performance Assessment in Dutch Vocational Education*
4. Dries **Debeer** (KU University of Leuven) - *Item-position effects and missing responses in large-scale assessments: Models and applications*
5. Lisa **Doove** (KU University of Leuven) - *Tree-based methodologies for the detection of treatment-subgroup interactions and the estimation of optimal treatment regimes in randomized controlled trials*
6. Marije **Fagginger Auer** (Leiden University) - *Solving multiplication and division problems: Latent variable modeling of students' solution strategies and performance*
7. Susanna **Gerritse** (Utrecht University) - *An application of population size estimation to official statistics. Sensitivity of model assumptions and the effect of implied coverage*
8. Xin **Gu** (Utrecht University) - *Bayesian Evaluation of Informative Hypothesis*
9. Joke **Heylen** (KU University of Leuven) - *Modeling variability in time profiles: Teasing apart amplitude and shape*

10. Ruslan **Jabrayilov** (Tilburg University) - *Improving Individual Change Assessment in Clinical, Medical and Health Psychology*
11. Joran **Jongerling** (Utrecht University) - *There and back again: Studying inter-individual differences in intra-individual variability*
12. Tanja **Krone** (University of Groningen) - *Some Notes on Bayesian Time Series Analysis in Psychology*
13. Jurian **Meijering** (Wageningen University) - *Probing the Power of Apollo: Methodological Challenges and Opportunities of the Delphi Method for Developing Rankings*
14. Camelia **Minica** (VU Amsterdam) - *Family-Based Genetic Association Analysis: Methods and Applications to Addiction Phenotypes*
15. Pieter **Oosterwijk** (Tilburg University) - *Statistical properties and practical use of classical test-score reliability methods*
16. Noémi **Schuurman** (Utrecht University) - *Multilevel Autoregressive Modeling in Psychology: Snags and Solutions*
17. Inga **Schwabe** (University of Twente) - *Nature, Nurture and Item Response Theory – A Psychometric Approach to Behaviour Genetics*

New projects in 2016

1. Hilde **Augusteijn** (Tilburg University) - *Getting it right with meta-analysis: Assessing heterogeneity and moderator effects in the presence of publication bias and p-hacking*
2. Tessa **Blanken** (University of Amsterdam) - *From heterogeneous insomnia to homogeneous subtypes – and beyond: how do different subtypes of insomnia relate to (first-) onset depression?*
3. Nadja **Bodner** (KU Leuven) - *Boolean Networks*
4. Vincent **Buurman** (Leiden University) - *PCA with Optimal Scaling and Regularization*
5. Daniela **Crisan** (University of Groningen) - *Practical Implications of the Mist of Item Response Theory Models*
6. Alexandra **De Raadt** (University of Groningen) - *Properties of Cohen's kappa*
7. Jeffrey **Durieux** (Leiden University) - *Clusterwise Independent Component Analysis for multi-subject (resting-state) fMRI data*
8. Zhengguo **Gu** (Tilburg University) - *Monitoring Individual Change in Mental Health Care and Education*
9. Sofia **Gvaladze** (KU Leuven) - *Capturing time-varying multivariate dynamics through principal component analysis based methods*
10. Adela **Isvoranu** (University of Amsterdam) - *Psychosis: Towards a Dynamical Systems Approach*
11. Jolanda **Kossakowski** (University of Amsterdam) - *The PsychoGraph: Developing a Seismograph for Psychology*
12. Tim **Loossens** (KU Leuven) - *Statistical modelling of emotion dynamics*
13. Sanne **Smid** (Utrecht University) - *The use of expert data in Bayesian Latent Growth Curve Models with a distal outcome*
14. Pia **Tio** (Tilburg University) - *SPANC: Simultaneous Principal and Network Components model for integration of multi-source data*

15. Nikky **Van Buuren** (University of Twente/Cito) - *Bayesian Networks and Personalized Learning Recommendations*
16. Daan **Van Renswoude** (University of Amsterdam) - *Gaze-Patterns Tell the Tale: A Model-Based Approach to Free-Scene Viewing in Infancy*
17. Duco **Veen** (Utrecht University) - *Elicitation of expert information: Modelling latent growth models with prior expert information and evaluating predictions*
18. Lieke **Voncken** (University of Groningen) - *Norming Methods for Psychological Tests*
19. Iris **Yocarini** (Erasmus University Rotterdam) - *Psychometric evaluation of combining tests in a higher education context*
20. Beibei **Yuan** (Leiden University) - *The δ -machine: A new competitive and interpretable classifier based on dissimilarities*

Projects in progress beyond the project time limit

On December 31st 2016, 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.

1. Sacha **Epskamp** (University of Amsterdam) - *Network psychometrics*
2. Robert **Hillen** (Tilburg University) - *Latent categories versus latent dimensions*
3. Hannah **Oosterhuis** (Tilburg University) - *Improving norms for psychological and educational tests*
4. Silvia **Rietdijk** (Utrecht University) - *Time for a change: Studying individual differences in dynamics*
5. Florian **Sense** (University of Groningen) - *Bayesian inferential methods for state-trace plots*
6. Claudia **Van Borkulo** (University of Amsterdam & Medical University Center Groningen) - *A network approach to mood disorders*
7. Mathilde **Verdam** (University of Amsterdam) - *Using Structural Equation Modeling to detect measurement bias in patient-reported quality-of-life outcomes to improve their interpretation*
8. Marlies **Vervloet** (KU Leuven) - *Model construction in (multilevel) regression analysis*

Projects left unfinished

May 25th 2016, Janneke de Kort passed away after being diagnosed with acute leukemia the year before. Janneke was a PhD student at VU University Amsterdam, her project was entitled: *Do our genes pave our way? Modeling GE-covariance, GxE interaction and moderated GE-covariance in longitudinal twin-models.*

4.2 Dissertations

Maria Bolsinova

Simple Models & Complex Reality: Contributions to item response theory in educational measurement



13 May 2016

Methods & Statistics, Faculty of Social Sciences, Utrecht University

Supervisors: Prof. H. Hoijtink, Prof. G.K.M. Maris

Financed by Utrecht University

15 September 2011 - 1 September 2015

Summary of thesis

In educational measurement, data obtained using educational tests are gathered both for practical and scientific purposes, for example for individual assessment or to study the effects of educational policies. While these data often have a very complex structure, we try to capture their most important aspects with relatively simple models. The reason is that statistical models are needed to make inferences about the unobservable constructs of interest (e.g., reading ability, foreign language proficiency, and arithmetic ability) on the basis of observed test data. The dissertation presents various contributions to item response theory in educational measurement which in one way or another search for an optimal balance between simple models and complex reality. The dissertation consists of two parts: Part I presents contributions to modeling response time and accuracy and Part II presents Bayesian contributions to IRT.

Laura Bringmann

Dynamical Networks in Psychology: More than a pretty picture?



7 October 2016

Quantitative Psychology and Individual Differences, Faculty of Psychology and Educational Sciences, KU Leuven

Supervisors: Prof. F. Tuerlinckx, Prof. D. Borsboom

Financed by KU Leuven

1 October 2011 - 1 October 2015

Summary of thesis

In this thesis, we provide different perspectives on dynamical networks in psychology. The main technique used here to infer networks is the multilevel vector autoregressive (VAR) model. In a VAR model, the structure of the time-dependency within and between variables is explicitly modeled through a set of regression equations. Using a multilevel extension of a VAR model allows one to study the dynamics both within an individual as well as at group level.

The multilevel VAR model is further introduced in Chapter 2. In this study, longitudinal emotion data from individuals with residual depressive symptoms were examined. Besides visualization of the inferred networks, we also show how network structures can be further studied with network analyses, such as centrality techniques.

Chapter 3 focuses on individual networks estimated with a multilevel VAR model. In this chapter, the main goal is to study connectivity of individual emotion networks and their relation to neuroticism. The results

suggest that individuals with high levels of neuroticism have a denser emotion network compared with their less neurotic peers.

In Chapter 4, we estimate the network of symptom dynamics that characterizes the Beck Depression Inventory-II (BDI-II), based on repeated administrations of the questionnaire to a group of depressed individuals who participated in a treatment study. Since the BDI-II symptoms decreased during treatment, the means changed, indicating changing dynamics. To account for this change in dynamics a linear trend was included in the multilevel VAR model. Beyond visualization, we conduct several network analyses, such as centrality and cluster analyses.

Chapter 5 lays the foundation for studying time-varying networks in psychology. Networks are likely to change over time, due to for example therapy (see Chapter 4). Up until now there has been no easy way to detect changing dynamics. With a time varying autoregressive (TV-AR) model, changes in means and temporal dynamics can be easily identified and modeled, and therefore the model has significant potential for studying changing dynamics in psychology.

Chapter 6 concerns psychological networks based on fMRI data. We use a new data driven technique, ancestral graphs (AGs), and compare it with a standard hypothesis driven method, Structural Equation Modeling (SEM). In contrast to VAR models, network analysis in both SEM and AG is based on the replication of the condition-specific trials and not on time-dependencies in time series data. As AGs can test explicitly the assumption of missing regions (nodes) in the network, it leads in general to more accurate network structures than the SEM method. Although currently mainly used in fMRI research, AGs could also be a promising solution for estimating networks in other fields of psychology, such as emotion research.

In Chapter 7, a more general theoretical perspective on psychological science is taken. Network techniques are highly interdisciplinary and analyses done in physics seem to translate to other fields, such as social or psychological science. Still, in measurement debates, physical measurement is seen as largely disconnected from psychological measurement. We argue instead that there are interesting parallels and connections between the two. In the last chapter, the discussion, a critical examination of the general topic of the thesis is presented, ultimately answering the question: Dynamical networks in psychology -- more than a pretty picture?

Sebastiaan de Klerk

Multi-Media Based Performance Assessment in Dutch Vocational Education



15 January 2016
University of Twente / Kenniscentrum ECABO, Afd. Examinering
Supervisor: Prof. T.J.H.M. Eggen
1 December 2012 - 1 December 2015

Summary of thesis

In this PhD thesis, a new method of assessment, which we have called Multimedia-based Performance Assessment (MBPA) is presented and studied in the context of Dutch vocational education. An MBPA is an assessment that incorporates multiple types of multimedia and is used to assess the skills that are usually measured through Performance-based Assessment (PBA). The goal of the research presented in this thesis was to investigate whether MBPA is a more efficient and effective way of assessing students' skills than the traditional PBA or not. Both qualitative and quantitative evidence is presented to substantiate the use of MBPA in Dutch vocational education. The qualitative research consists of literature study on the measurement structure of PBA (i.e., measurement error), and the current state of research on the use of MBPA in educational measurement (Chapters 1 to 3). Furthermore, a framework for design and development of MBPA was built and presented (Chapter 4). The quantitative research consists of two

experimental studies in which a sample of students have both performed in a PBA and two MBPA's. A validity study has been carried out to investigate to what extent the MBPA can be used to measure skills that are required to perform a specific vocation (confined space guard), and that are currently being measured through a PBA (Chapter 5). A psychometric study was used to study the possibilities of measurement of the same skills in a more complex and interactive computer-based environment. That is, this MBPA resembled more of a 'game-like' computer environment in which students had to perform multiple tasks (Chapter 6). Finally, in the Epilogue, the presented research is discussed in a wider context (Chapter 7).

Dries Debeer

Item-position effects and missing responses in large-scale assessments: Models and applications



11 October 2016

Quantitative Psychology and Individual Differences, Faculty of Psychology and Educational Sciences, KU Leuven,

Supervisor: Prof. R. Janssen

Financed by KU Leuven

1 October 2010 - 1 October 2016

Summary of thesis

Psychological and educational assessments commonly consist of multiple items that are inevitably administered in a specific item order. Hence, effects related to the sequential ordering of items (i.e., item-position effects) may arise. Typical examples of reported item-position effects are a change in the difficulty of items in aptitude tests (i.e., so-called fatigue or practice effects) and an increase in the consistency of the responses in attitude and personality questionnaires (i.e., the so-called Socratic effect). Further, the serial ordering of items also plays a role in skipping items and dropping out before the end of the assessment, both of which are observed in large-scale educational assessments.

Common psychometric models assume that only properties of the test taker and the item contribute to the item response, and that these properties are invariant with respect to the position in which the item is administered. This dissertation focuses on effects of the sequential ordering of items and how these effects can be investigated and modeled using Item Response Theory (IRT). Models are proposed, evaluated and applied to empirical data...

Full text, see <http://www.iops.nl/concluded-iops-projects/debeer-dries/>

Lisa Doove

Tree-based methodologies for the detection of treatment-subgroup interactions and the estimation of optimal treatment regimes in randomized controlled trials



30 September 2016

Faculty of Psychology and Educational Sciences, Quantitative Psychology and Individual Differences, KU Leuven

Supervisors: Prof. I. Van Mechelen, Dr E. Dusseldorp & Dr K. Van Deun

Financed by KU Leuven

1 October 2012 - 1 October 2016

Summary of thesis

For many medical and psychological problems, multiple treatment alternatives are available. An obvious question in such cases pertains to whether there is one globally best treatment alternative for the full population of clients under study, or whether the best treatment alternative varies over subgroups of clients that can be characterized in terms of pre-treatment characteristics. Formally speaking, the best treatment

alternative varying over subgroups of clients may be referred to as a qualitative treatment-subgroup interaction, that is, in the case of two treatment alternatives A and B, an interaction that implies that for some subgroups of clients treatment A outperforms treatment B, whereas for other subgroups the reverse holds true. The detection of such interactions implies a clear need for the development of so-called treatment regimes, that is, decision rules that assign to each client a treatment alternative, out of the set of available treatment alternatives, based on his/her observed characteristics. The optimal treatment regime then is the one leading to the greatest expected outcome in the population under study. For the detection of treatment-subgroup interactions and the estimation of optimal treatment regimes suitable statistical methods are needed. This is especially troublesome if the relevant subgroups of clients are unknown and are to be learned from the data. Recently, a promising class of tree-based methods has been proposed for this purpose. Unfortunately, however, this family of methods also goes with quite a few challenges. In this doctoral dissertation, we will address five of these in five consecutive chapters.

Marije Fagginger Auer

Solving multiplication and division problems: Latent variable modeling of students' solution strategies and performance



15 June 2016

Methodology and Statistics Unit, Institute of Psychology, Faculty of Social and Behavioural Sciences, Leiden University

Supervisor: Dr C.M. van Putten, Dr M. Hickendorff, Prof. W.J. Heiser & Prof. A. Béguin

Financed by NWO, PROO grant

1 September 2011 - 1 September 2015

Summary of thesis

National large-scale assessments have demonstrated a decrease in Dutch primary school students' performance on multidigit multiplication and division problems (e.g., 56×23 and $544 \div 34$) in the past two decades. This performance decrease appears to be related to changes in students' use of mathematical strategies: the use of relatively accurate strategies for which calculations are written down decreased, while the use of inaccurate mental strategies increased. This leads to the question of what factors influence students' strategy use and performance, and the role of instruction in this. This issue was investigated using two approaches: secondary analyses of large-scale assessment data using latent variable models and experiments in schools. With the large-scale assessment data, relations between teachers' reports on their instruction and students' strategy use and performance were investigated using multilevel latent class analysis (MLCA) and LASSO penalized explanatory item response theory (IRT). With experiments in schools, it was investigated whether requiring students to write down calculations actually improves their performance, whether additional instruction in writing down calculations positively affects students' strategy use and performance, and whether students' problem solving is comparable for tasks that only involve one mathematical operation (as is common in experiments) versus tasks in which multiple operations are mixed together (as is common in assessments and educational practice).

Susanna Gerritse

An application of population size estimation to official statistics. Sensitivity of model assumptions and the effect of implied coverage



8 July 2016

Methods & Statistics, Faculty of Social Sciences, Utrecht University

Supervisors: Prof. P.G.M. Van der Heijden & Prof. B.F.M. Bakker

Financed by Utrecht University / Statistics Netherlands (CBS)

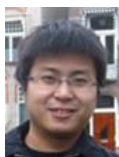
15 January 2012 - 15 January 2016

Summary of thesis

Official Statistics bureaus are periodically asked to give an estimate of their country's population, which can be defined by the number of usual residents. A person is considered a usual resident when they have lived in the Netherlands for longer than a year, or if they have the intention to reside for longer than a year. For the Dutch Census, Statistics Netherlands makes use of the Population Register (PR). However, for numerous reasons, immigrants that have taken residence in the Netherlands may not register and become undocumented immigrants. Thus, the PR alone is not sufficient to estimate the number of usual residents, and has an undercoverage considering the number of Dutch usual residents. One commonly used method to estimate population sizes is the capture-recapture methodology. First the PR is linked to two other registers. Then capture-recapture methodology using a covariate that denotes residence duration can be used to estimate the number of usual residents missed by all three registers. However, for the valid use of capture-recapture methodology, a set of assumptions has to be met. Additionally, practical issues such as missing data may occur. Such practical issue have to be resolved before one can estimate the number of Dutch usual residents via capture-recapture methodology. For that purpose there are two central questions answered in this thesis: 1) what is the effect of violated assumptions and missing data on the robustness of population size estimation via capture-recapture methodology, and 2) how can the information gained in 1) be used to achieve a trustworthy estimate of the under coverage of usual residents in the Population Register in the Netherlands? To answer the first question in this thesis, research has been conducted into the robustness of population size estimation via capture-recapture methodology when the following assumptions are violated: 1) independence of the inclusion probabilities of the registers, 2) no erroneous captures in the registers, and 3) perfect linkage of the units in the used registers. For the independence assumption, this research also investigated the robustness for independence conditional on fully and partially observed covariates. Additionally research has been conducted into the effect missing data have on the population size estimation, and most notably how different methods of handling missing data differ in their effect on the resulting population size estimate. It has been found that implied coverage of one register, given the other register is important to the extent that violated assumptions will bias the population size estimation. Implied coverage plays an important role in this thesis given that it cannot be ascertained from the data whether assumptions are violated, but implied coverage can. The results obtained in answering the first question have been used to conduct research into the undercoverage of the PR of the Netherlands. It is concluded that for reference date september 2010, the PR has an undercoverage of 0,5 to 1,1% usual residents.

Xin Gu

Bayesian Evaluation of Informative Hypothesis



3 June 2016

Methods & Statistics, Faculty of Social Sciences, Utrecht University

Supervisor: Prof. H. Hoijtink

Financed by CSC (China Scholarship Council)

5 December 2011 - 5 December 2015

Project description

Null hypothesis significance testing is by far the dominant research tool for the evaluation of empirical data collected by experiments and observational studies in areas such as the behavioral and social sciences, biology, epidemiology and medicine. This is surprising because null hypothesis significance testing has strongly been criticized (see, for example, Cohen (1994), Royall (1997) and Wagenmakers (2007)). One of the reasons is probably that researchers tend to stick to the methods they have always used. However, another reason may very well be that there are no attractive alternatives.

Bayesian evaluation of informative hypotheses provides an attractive alternative. This approach no longer requires researchers to focus on the null hypothesis. It allows them to focus on the theory or expectation they are interested in and to answer the question: "is my theory/expectation supported by the data or not". Applied researchers start to discover the existence of informative hypotheses and the first publications in

which they are used have appeared. The PhD project proposed will substantially increase the class of statistical models for which informative hypotheses can be evaluated. It will therefore contribute to the construction of a toolkit that will enable researchers to straightforwardly evaluate their theories/expectations.

Furthermore, this project will address statistical issues related to the evaluation of informative hypotheses that are in need of further research: how to evaluate informative hypotheses formulated using equality constraints; and, how to move beyond the multivariate normal linear model. It will therefore also contribute to the further development of statistical theory.

Joke Heylen

Modeling variability in time profiles: Teasing apart amplitude and shape



17 March 2016

Methodology of Educational Research, Fac. of Psychology & Educational Sciences, KU Leuven

Supervisors: Dr E. Ceulemans & Prof. I. Van Mechelen

Financed by KU Leuven

1 October 2011 - 1 October 2015

Project description

Nowadays, many research questions imply studying time-resolved data. For example, the time dynamics of emotions is a hot topic; hence, one recently has started gathering data on the intensity of different emotion components (e.g., appraisals, physiological features, subjective experience) at several time points during an emotion episode. Given these data, it is important to capture the different shapes that the time profiles may take and how these shapes depend on episodes' characteristics, person traits, and on the type of emotion component under examination. The latter implies two major methodological challenges.

First, we need to find out which method is best suited to gain insight into these shapes. Two classic strategies are functional component analysis (based on dimension reduction) and clustering approaches (implying categorical reduction of the time profiles). Since both strategies have some drawbacks, we intend to develop extensions that combine the attractive features of both.

Second, a proper solution to the problem of time alignment is required, which pertains to differences in shift and to stretching or contracting of the time axis. Although some functional models have been developed to deal with alignment issues (e.g., shifted and warped factor analysis), these methods have to be extended to deal with the inherent multilevel structure of the data under study.

Therefore, the goal of this project is to build new clustering and dimension reduction models for multilevel time-resolved emotion data that allow for shifting and/or warping, and to develop algorithms and model selection procedures for fitting these models to empirical data.

Ruslan Jabrayilov

Improving Individual Change Assessment in Clinical, Medical and Health Psychology



4 April 2016

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Dr W.H.M. Emons, Prof. K. Sijtsma & Dr F.B. Tekle

Financed by NWO, Open Competition grant

1 December 2011 - 1 December 2016

Project description

In clinical therapy and medical treatment, psychological effects of treatment at the individual level are

assessed using psychological tests and questionnaires. The difference between the scores before and after a treatment is interpreted as the result of treatment, and forms the basis for deciding whether the patient can be declared cured or needs psychological counseling. Current methods for individual-change assessment rest on classical test theory and suffer from important flaws. This project investigates item response theory methods that fix these problems, and provides recommendations on the psychometric requirements of tests for assessing statistical and clinically significant changes in individual patients.

Joran Jongerling

There and back again: Studying inter-individual differences in intra-individual variability



9 December 2016

Methods & Statistics, Faculty of Social Sciences, Utrecht University

Supervisors: Prof. H. Hoijtink & Dr E. Hamaker

Financed by Utrecht University

1 September 2009 - 1 April 2015

Project description

If one realizes how the meaning of the autoregressive and cross-lagged regression parameters changes once the model is combined with the LGC model, a natural next step is to include these parameters as random rather than common effects. Doing so would allow individuals to differ with respect to their inertia, and it would allow the influence of one variable on the other to be different across people. However, there are a number of problems associated with including autoregressive and cross-lagged regression parameters as random effects in the model. The current PhD project is focused on developing a random effects extension of the bivariate ALT model and tackling some important problems associated with this extension. This random effects extension of the bivariate ALT model will provide us with a much richer picture of psychological processes as they unfold over time. Moreover, it will allow us to investigate moderation effects in these longitudinal models. For instance, if we have observed the affect of two spouses (bivariate longitudinal data), we may find that the effect of one spouse on the other, represented by the cross-lagged regression, depends on personality characteristics such as Agreeableness and Neuroticism, but also on relationship quality. This would imply that the influence of one partner on the other is moderated by personality and relationship features.

Tanja Krone

Some Notes on Bayesian Time Series Analysis in Psychology



22 September 2016

Psychometrie & Statistiek, Fac. BSS, University of Groningen

Supervisors: Prof. R.R. Meijer & Dr M.E. Timmerman

Financed by NWO, Research Talent grant

1 July 2012 - 1 March 2016

Project description

The use of research designs with intensive measurements across time for individual subjects is becoming increasingly popular in psychological research. Such designs are necessary to achieve insight into the extremely complex phenomena of human behaviour like emotions (Scherer, 2009) and psychopathology (Frank et al., 2005). This complexity finds expression in behaviour fluctuating across time. Since those fluctuations depend on contextual and interindividual differences, understanding the underlying dynamics is extremely challenging. With this challenge, statistical time series analysis can be of great help. In general, the analysis of time series data serves either or both of the two main purposes:

- (i) to study the time series itself to gain insight into the processes underlying the data;
- (ii) to forecast, that is, to use observed data to predict unobserved future data.

When studying the time series, random noise is separated from systematic patterns in the data (e.g., Box et al., 1994). The systematic component is usually modelled, for example, by splitting into seasonal and trend components. This is relevant, for example, to identify whether a patient suffering from winter depression shows less symptoms of depression after a therapy, apart from the usual seasonal fluctuations. The main goal of forecasting models is to predict unobserved outcomes on the basis of observed history. Examples include statements on the density of traffic and on the necessary time for a patient to receive treatment before successful recovery.

Although the merits of the principles underlying time series analysis have been shown convincingly in psychology (e.g., Lodewyckx et al., 2011), the models used so far suffer from important limitations. As will be discussed below, the number of dependent variables and their nature to include in the analysis is limited. Furthermore, the models are static, rather than dynamic in nature. Those limitations imply that important dynamics will be kept hidden. Resolving those limitations would be extremely helpful, since understanding the dynamics offers a key to influencing, which is of utmost importance in diagnosis and planning psychological interventions. Furthermore, forecasting can be very useful, for example in forensic psychiatry (e.g., to predict aberrant behaviour), or in youth care (e.g., early tracing of anomalies in development). To resolve the limitations of the time series models used so far, we will extend the linear multiregression dynamic model (LMDM; Queen et al., 1993, 2007, 2008, 2009) to more general Bayesian dynamic models (BDMs). The LMDM, which has been successfully applied to traffic forecasting, has a number of favourable properties that make the model eminently suitable for psychological time series. We will develop some necessary theoretical extensions, and apply the variant developed to empirical examples from typical psychological time series research. To examine the value of the BDMs in relationship to currently popular time series models, we will perform a comparative study based on simulated and empirical data.

Jurian Meijering

Probing the Power of Apollo: Methodological Challenges and Opportunities of the Delphi Method for Developing Rankings



13 December 2016

Research Methodology Group, Wageningen University

Supervisors: Prof. Adri Van den Brink, Prof. Kristine Kern, & Dr Hilde Tobi

Financed by Wageningen School of Social Sciences

1 September 2011 – 1 September 2016

Summary of thesis

The Delphi method is a structured data-collection process aimed at facilitating experts to achieve a certain level of agreement on a complex problem. In several subsequent rounds experts give their opinion on the problem of interest, usually by means of a standardized questionnaire. After each round experts receive controlled opinion feedback in the form of a summary of the findings. Based on this feedback experts are allowed to reconsider their opinion in the next round.

Although the Delphi method seems to provide opportunities for developing rankings, research into its application to the development of rankings seems to be non-existent. Furthermore, the Delphi method has several unresolved methodological issues, in particular regarding the measurement of agreement and the provision of controlled opinion feedback. Therefore, the general objective of this PhD project was to find out what the methodological challenges and opportunities are of the Delphi method for developing rankings.

To achieve this objective, four studies were conducted. In the first study, simulations were performed to find out how various agreement indices behave within and across the rounds of a Delphi study. In the second study, the Delphi method was applied to develop a ranking of research domains in landscape architecture.

An experiment within the study investigated the effect of two types of controlled opinion feedback on the drop-out rate, experts' degree of opinion change, and the level of agreement among experts. The third study investigated the methodological characteristics of six urban sustainability rankings, which resulted in a recommendation to define and operationalize the concept 'urban sustainability' using the Delphi method. Therefore, in the fourth and final study the Delphi method was applied to find out which components experts find most relevant for defining and measuring urban sustainability. An experiment within this study provided insight into the effect of feeding back experts' initial ratings on the degree of opinion change and the level of agreement.

Overall, this PhD project showed how the Delphi method may be used to: (1) obtain a ranking of objects on a ranking attribute and (2) obtain a definition and operationalization of a complex ranking attribute. It was also shown that these applications of the Delphi method do not come without challenges. First, selection criteria and search strategies need to be developed by which sufficient numbers of different types of experts may be found. Second, for the first Delphi questionnaire a parsimonious list of items (e.g. ranking objects or components of a ranking attribute) needs to be drawn up that largely covers the potentially great diversity of existing items. Third, careful considerations need to be made about which types of information (i.e. summary statistics, rationales, experts' own initial ratings) to feed back to experts after every round as this may influence various Delphi outcome measures. Fourth, the choice for a particular consensus, agreement, or association index needs to be carefully made and justified as it determines the level of agreement among experts that is obtained. Finally, project showed that by means of a simulation study and two real-world Delphi experiments new knowledge about the functioning of the Delphi method could be acquired. More of these studies are needed to establish evidence-based guidelines and to uncover the full potential of the Delphi method for developing rankings.

Camelia Minica

Family-Based Genetic Association Analysis: Methods and Applications to Addiction Phenotypes



18 February 2016

VU University Amsterdam, Department of Biological Psychology, Faculty of Psychology and Education, Room 2b-03

Supervisors: Prof. D.I. Boomsma, Prof. C.V. Dolan & Dr J. Vink

Financed by VU University Amsterdam

1 January 2012 - 1 January 2016

Summary of thesis

Multivariate data may confer power advantages in GWAS, yet multivariate data require modeling choices.

Chapter II compared the efficiency (in terms of power) of several analytic strategies to detect a genetic variant in multivariate phenotypic data. Twin data were simulated to fit exactly the following five models: 1) single common genetic factor, 2) a correlated genetic common factors model, 3) a latent regression model, 4) a hybrid simplex (AE) – factor (C) model, and 5) a stationary double simplex (AE) model. The effect of the genetic variant on all or a subset of the phenotypes was mediated by the common genetic factor(s). In twin 1 data the following analytic strategies were considered: a) univariate tests in which each phenotype was regressed on the genetic variant (single phenotype ANOVA); b) univariate tests based on sum scores (ANOVA); c) exploratory factor analysis (EFA); c) multivariate tests based on MANOVA. Power calculations were based on the non-centrality parameter (NCP). Results demonstrated that: a) the sum scores ANOVA and the exploratory factor analysis were the most powerful strategies when the genetic effect was general, i.e., propagated in all phenotypic indicators, while MANOVA was the least powerful in this circumstance; b) MANOVA and EFA were particularly powerful when the genetic variant was propagated in a subset of phenotypes, and their power increased with increasing phenotypic correlations; c) the NCPs of MANOVA and EFA were equal across all scenarios indicating that the differences in power between the two strategies arisen from the differences in degrees of freedom.

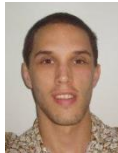
Family-based genotype imputation was proposed as a means of increasing power in GWAS, as it allows for the inclusion into association analysis of individuals with observed phenotypes but missing genotypes.

Chapter III considered...

Full text, see <http://www.iops.nl/concluded-iops-projects/minica-camelia/>

Pieter Oosterwijk

Statistical properties and practical use of classical test-score reliability methods



1 July 2016

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Prof. K. Sijtsma & Prof. L.A. van der Ark

Financed by Tilburg University

1 September 2011 - 1 September 2015

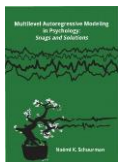
Project description

The goals of this project are twofold. First, investigate whether three methods from nonparametric item response theory for test-score reliability estimation are closer to the true reliability than other estimates, including Cronbach's alpha and the greatest lower bound (GLB). Second, to propose a test information function in the context of nonparametric item response theory that expresses reliability as a function of the scale, this recognizing that measurement accuracy can vary across the scale of an attribute. Some explanation of these goals is the following. Well-known reliability methods such as Cronbach's alpha, the Guttman indices, and the GLB are known to be negatively biased relative to the reliability of the test score. Sijtsma and Molenaar found indications that for tests consisting of dichotomous items Mokken's two reliability methods and their own reliability method were nearly unbiased with respect to reliability, and certainly much closer than Cronbach's alpha and other methods. This project aims at providing more evidence for the small bias or perhaps the absence of bias for these three reliability methods and intends to generalize results to tests consisting of polytomous items.

The other aim of this project is to propose and investigate a test information function that allows for reliability assessment at different locations on the scale. The reliability coefficient is just one number, and is used for computing a standard measurement error and a confidence interval for each tested case, if it is however feasible that for different location on a scale reliability of measurement also varies. A test information function would be a welcome addition to nonparametric item response theory, because it would further enhance the applicability of this flexible class of models for scale construction. Ramsay has provided some first attempts, which serve as point of departure in this project.

Noémi Schuurman

Multilevel Autoregressive Modeling in Psychology: Snags and Solutions



27 June 2016

Methods & Statistics, Utrecht University

Supervisors: Prof. H. Hoijtink & Dr E. Hamaker

Financed by NWO Vidi grant Dr. Ellen Hamaker

1 September 2012 - 1 September 2015

Summary of thesis

Psychological processes are of interest in all areas of psychology, and all such processes occur within individuals over time. Some examples of psychological processes are the regulation of daily mood, the effect of job motivation on job performance and vice versa, or social interactions between a parent and child. In order to study these processes it is necessary to take many repeated measures for each individual.

Multilevel autoregressive models are statistical models than can be used to analyze this kind of data – data that consist of many repeated measures, for many individuals.

The approach of autoregressive models is summarized well with the saying “The best predictor of future behavior is past behavior”: In autoregressive models, current observations are used to predict future observations. By extending the autoregressive model to a multilevel autoregressive model, it becomes possible to model the repeated measures for many individuals at the same time, while also modeling the differences between the processes of each individual.

Multilevel autoregressive models are increasing in popularity within psychology, however, the methods for analyzing psychological data with these models are still being developed. The aim for this dissertation was to further investigate, explicate, and if possible remedy certain difficulties in fitting and interpreting multilevel autoregressive models in the context of psychological science. Specifically, in Chapter 1 it is discussed why it is important to collect many repeated measures for studying psychological processes, and why it is important to model these processes on an individual level, as well as the similarities and differences between the individuals’ processes. In Chapter 2 a difficulty with specifying an Inverse-Wishart prior distribution for the covariance matrix of the random parameters is explored, in the context of fitting the multilevel autoregressive model in a Bayesian framework. In Chapter 3 it is discussed how to standardize the model parameters, such that we can make meaningful comparisons of the strength of the cross-lagged effects in a multivariate model. In Chapters 4 and 5 the consequences of ignoring measurement errors for the estimation of the model parameters are investigated for respectively a single-subject autoregressive model and the multilevel autoregressive model, as well as how to account for measurement errors in these models. The final chapter of this dissertation contains a summary of the work presented in the previous chapters, and a discussion of some limitations of the multilevel autoregressive modeling approach.

Inga Schwabe

Nature, Nurture and Item Response Theory – A Psychometric Approach to Behaviour Genetics



24 March 2016

Department of Research Methodology, Measurement and Data Analysis, Faculty of Behavioural Sciences, University of Twente

Supervisors: Prof. C.A.W Glas, Dr S.M. Van den Berg, Dr A.A. Beguin & Prof. D.I. Boomsma

Financed by NWO, PROO grant

1 January 2013 - 1 January 2016

Summary of thesis

My dissertation discusses a number of psychometric issues that require special attention in the analysis of genetically-informative data, such as data on twins. These include heterogeneous measurement error, scaling and scale transformations, and harmonization of phenotypes. It is shown how ignoring these issues can result in spurious findings of genotype by environment interactions. Multilevel item response theory models are proposed that can help solve these problems.

4.3 New projects

Hilde Augusteijn - *Getting it right with meta-analysis: Assessing heterogeneity and moderator effects in the presence of publication bias and p-hacking*



MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University
Supervisors: Prof. M.A.L.M. Van Assen, Prof. K. Sijtsma & Prof. J.M. Wicherts
Financed by NWO
1 September 2015 – 1 September 2019

Summary

It is well-known that publication bias and p-hacking, which are omnipresent in psychology and other sciences, lead to overestimated effect sizes in meta-analyses. Unknown is how and when they affect heterogeneity and moderator effects in meta-analysis. Because these outcomes of meta-analyses are used for making decisions, both in science and practice, methods are needed that can deal with publication bias and p-hacking. The proposed research (i) assesses consequences of publication bias and p-hacking for heterogeneity and moderator effects, and (ii) improves meta-analytic methods enabling researchers to obtain accurate estimates of overall effect size, heterogeneity, and moderator effects in their applications.

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

Summary

Insomnia is a very common health problem that affects between 6 and 33% of the population – depending on classification criteria. Past research has shown that it is remarkable difficult to pinpoint consistent characteristics and mechanisms of insomnia. A possibility for this inconsistency is that insomnia is not a uniform disorder with a singly underlying mechanism, but rather a heterogeneous disorder consisting of multiple subtypes. Given the high prevalence rates of insomnia, it is plausible that insomnia may represent a final set of seemingly similar complaints caused by different underlying mechanisms, pathways and vulnerabilities.

The aim to define different subtypes of insomnia has a long history and has led to the construction of different subtypes of insomnia, of which psychophysiological, paradoxical and idiopathic insomnia are the most common. Most of these proposed subtypes of insomnia are based on *sleep* characteristics, like sleep complaints or sleep duration. It has been insufficiently explored whether clear subtypes could emerge when sleep characteristics are complemented by *non-sleep* characteristics. Such consideration has proven to be valuable in other disorders. For example, a systematic review on subtypes of depression suggests that optimal discrimination may not be accomplished by merely focusing on the familiar defining symptoms of depression.

In the current project we consider the possibility that insomnia comes in different subtypes of pathophysiology that are reflected in traits and other stable characteristics, and not necessarily also in

specificity of sleep complaints. To evaluate this possibility, we have assessed non-sleep characteristics of insomnia with respect to life history, disease and personality traits through the online Sleep Registry platform (www.sleepregistry.nl) - an online survey database with a large number of questionnaires. The first aim of the current project is to apply bottom-up, data-driven techniques to the Sleep Registry data to derive relevant, homogeneous subtypes of insomnia defined by non-sleep characteristics.

Next to the high prevalence rates of insomnia, suffering from insomnia increases the risk of developing a depression. Estimations are that 13% of people suffering of insomnia today, will suffer from depression one year later. In addition, the prevalence of depression has been increasing over the past years and the prognosis is that depression will be the prominent cause of the global burden of disease in 2030. Therefore, it is of importance to identify subgroups that are at high risk for developing a depression. Insomnia is one of the strongest risk factors for depression that may be best modifiable. Thus, the second aim of this project is to assess how different subtypes of insomnia relate to the onset of depression.

In sum, the current project aims to apply bottom-up, data-driven techniques to derive relevant subtypes of insomnia defined by *non*-sleep characteristics. This understanding of subtypes hopefully leads to more accurate classification of people suffering from insomnia with the ultimate goal to provide better, and more precise treatment. In addition, knowledge of relevant, homogeneous subtypes might offer more insights in who is at risk for depression, enabling intervention of insomnia and thereby hopefully the prevention of depression.

Nadja Bodner - *Boolean Networks*



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

Summary

Dyadic interaction processes are considered to be the engines of child development, attachment, and psychopathology (Bowlby, 1969/1982). Indeed, attachment theory states that subjects form secure attachment relations if their support-seeking behavior is adequately and sensitively acted upon by significant others. Whereas the latter can be readily observed for infants and their mothers (e.g., Beebe et al., 2010), it is much harder for older children and adults (Dwyer, 2005), given that attachment-related behavior becomes more sophisticated and diverse, but less explicit with increasing age (Mayseless, 2005). Which behavior is considered support-seeking, sensitive or adequate, is intrinsically tied to the sequential dynamics of the interaction. Hence, studying the content and structure of such second-to-second behavior chains seems to be crucial to advance theory and, in the long run, diagnostic processes and interventions (Bosmans & Kerns, 2015). The same holds for the study of affective interactions and many other key concepts in the behavioral sciences.

The obvious complexity of the data (i.e., a multitude of behaviors tracked across time), asks for tailor-made data-analytic models, which capture the temporal dependencies and interrelations among all of these behaviors in easy-to-interpret rules. The aim of this project is to propose a modeling framework, based on the key principles of Boolean networks (Kauffman, 1969), that meets this need, and to develop accompanying software for both researchers and practitioners.

Vincent Buurman - *PCA with Optimal Scaling and Regularization*



Mathematical Institute, Statistical Science for the Life and Behavioral Sciences
Leiden University
Supervisor: Prof. J. Meulman
Financed by Leiden University / IBM SPSS
22 January 2016 – 22 January 2020

Summary

Principal Components Analysis (PCA) has many purposes; a.o., it is used for dimension reduction, visualization, scale construction and noise reduction. Depending on the application, one of these goals is the focus of the analysis and thus drives the considerations involved. One of these considerations is the dimensionality of the solution that one should choose. Application of PCA in social sciences is limited as in this field the data that are collected are often strictly not one of a real numbers. Demographic data, for example, are often categorical, that is data without a natural ordering or distance between categories. The oft used Likert scales are ranking scores, that is scores with a natural ordering, but not necessarily equal distance between subsequent values. Homogeneity Analysis also known as Multiple Correspondence Analysis (MCA)) allows dimension reduction of these types of data. The extension of PCA into PCA with Optimal Scaling will be called OS-PCA. OS-PCA allows us to analyse categorical data in a PCA fashion. Categorical data are optimally scaled (transformed) such that the lower dimensional representation given by the OS-PCA analysis contains as much information of the correlational structure of the transformed data as possible. The transformations also allow us to look at nonlinear relationships between the variables, or the variables and the principal components.

PCA has been extended to high dimensional data settings by introducing the concept of regularization. In high dimensional data settings, the risk of overfitting a model to the data is increased. These methods are based on analogies to ridge and the lasso penalties in regression. As in regression, these penalties require tuning. We study two different ways to extend OS-PCA. Since OS-PCA includes transformations of the variables, the risk of overfitting, compared to linear PCA, is increased. The first way is to look at regularization of the transformations. The second is to look at regularization of the component loadings.

Daniela Crisan - *Practical Implications of the Mist of Item Response Theory Models*



Psychometrics and Statistics, Faculty of Behavioural and Social Sciences
University of Groningen
Supervisors: Prof. Rob Meijer & Dr Jorge Tendeiro
Financed by University of Groningen
1 September 2015 – 1 September 2019

Summary

In education, psychology, and health research item response theory (IRT) is increasingly used to construct tests and to evaluate the psychometric quality of existing tests. Due to the increasing availability of easy-to-use software, not only test developmental companies, but also researchers use IRT for the development and evaluation of tests and questionnaires. Before an IRT model can be applied, researchers should report fit measures to show that the models they use describe the data fairly well so that, for example, estimated theta levels can be trusted. However, IRT models and their underlying assumptions represent ideals about data that do not exist in practice. As Funder (1997) discussed in a more general context: "There are only two kinds of data: Terrible data that are ambiguous, potentially misleading, incomplete, and imprecise. The second kind is No Data". Because IRT models never fit the data, a researcher who applies these models is left in uncertainty which model to choose and whether model choice

makes a significant difference for practical decisions that are based on the application of these models. Additional parameters can be added to the model resulting in more complex models that may have a better fit, but require more complex parameter estimation, and these parameters may be less stable under replications. For practical decisions should a researcher prefer the more complex models or does the worse fit of simple models have minor influence on the practical decisions that are being made in practice?

What researchers and practitioners badly need is evidence about the stability of the main conclusions of empirical educational research in which IRT models are being used (Molenaar, 1997). Some of the research problems that this project tries to address may be summarized as follows:

- Is there a difference in the main conclusions derived from an instrument (e.g., a test or a questionnaire) with or without bad items in the test?
- Is there a difference in the main conclusions derived from an instrument with or without misfitting item score patterns?
- If there are differences: How large and how consequential are they?

In this project we will investigate the practical significance of misfit of IRT models, that is, "the extent to which the decisions made from test scores are robust against the misfit of the IRT models" (Sinharay & Haberman, 2014). The main aim of this project is to investigate through both simulated data and empirical data, whether the main conclusions in empirical research hold under different IRT models and under different violations of IRT models.

Alexandra De Raadt - *Properties of Cohen's kappa*



Educational Sciences, Faculty of Behavioural and Social Sciences, University of Groningen
Supervisors: Prof. R.J. Bosker & Dr M. Warrens
Financed by University of Groningen
1 October 2015 – 1 October 2019

Summary

This PhD consists of four projects: kappa coefficients to handle missing data, effect of deleting a bad category, dependence on the number of categories and reporting category kappas instead of an overall value.

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



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

Summary

Our brain is a network of functionally connected brain regions. Functional network integrity may disrupt in the cascade of events leading to dementia before anatomical or cognitive changes become apparent. Increasing sensitivity to identify network alterations therefore may enhance the early detection of dementia.

To this end we propose Clusterwise Independent Component Analysis (CICA), a technique for multi-subject fMRI data that clusters subjects based on within-cluster similarities and between-cluster differences in

functional networks. As such, networks sensitive to early changes may be discovered in a data-driven way. Additionally, we will also study how anatomical MRI information can be incorporated into the technique.

To facilitate applied researchers to use our novel CICA method, a user-friendly R package will be developed. And since applied researchers may not be very familiar with R, we will also create a web application (by making use of R shiny apps) to make the CICA software easy accessible.

Zhengguo Gu - *Monitoring Individual Change in Mental Health Care and Education*



MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University
Supervisors: Prof. K. Sijtsma & Dr W. Emons
Financed by Tilburg University
1 September 2015 – 1 September 2019

Summary

Routine outcome measurement (ROM) is increasingly used to monitor individuals on psychological (e.g., psychological well-being) and cognitive attributes (e.g., language proficiency), and is aimed primarily at providing data for making decisions about individuals, for example, with respect to the development of pathological conditions (therapy adaptation) and skills and abilities (remedial teaching). ROM also is important in medical (Alzheimer monitoring) and health (quality of life improvement) decision-making.

ROM is highly important but unfortunately still suffers from lack of psychometric foundation. This project aims at developing innovative psychometric approaches to individual change assessment, thereby improving the quality and usability of ROM.

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

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

Summary

Nowadays improvements in technology allow to collect multivariate time-series on multiple response channels. Understanding the multivariate dynamics present in these data and how they change across time is not easy in case the number of variables grows larger. In this case, dynamic dimension reduction based methods may be a great help for capturing the major features of the data. These methods may pinpoint how variables covary and influence one another across time, and how these dynamics are affected by interventions or important events. When studying multiple individuals, multiset extensions of these methods could shed light on which of these dynamical aspects are shared by different individuals and what makes them unique. The aim of this project is to develop such methods, based on principal component analysis, and to compare their performance to existing techniques. The new methods will be applied to empirical data and disseminated to substantive researchers by, amongst others, building easy-to-use software.

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

Summary

Schizophrenia is among the most heterogeneous and least understood mental disorders (van Os, Kenis, & Rutten, 2010). Despite a century of intense research, underlying causes are still unclear and treatment success is limited (Buckley, 2007). This project argues that the lack of scientific progress in the field may be partly due to a suboptimal psychometric conceptualization of schizophrenia, and proposes a new framework to study the spectrum of psychotic disorders, based on a network approach (Borsboom & Cramer, 2013). Four subprojects are advanced, from the investigation of risk factors to prediction, screening, and validation of results at the intra-individual level.

Jolanda Kossakowski - *The PsychoGraph: Developing a Seismograph for Psychology*



Psychological Research Methods, Faculty of Social and Behavioural Sciences, University of Amsterdam
Supervisors: Prof. Han L.J. Van der Maas & Dr Lourens J. Waldorp
Financed by UvA & Yield
1 October 2015 – 1 October 2019

Summary

What if we can predict the onset of psychopathologies, like a seismograph predicting upcoming earthquakes? The purpose of this project is to develop a system that assesses the risk of the onset of MDE and gives guidelines to prevent it. The proposed project is founded on three pillars. The first subproject involves estimating dynamic networks in combination with a stochastic process on that network. The focus of the second subproject is to determine those essential parts of a network's dynamics for phase transitions: we look for network parameters that drive an entire network's behaviour. Lastly, subproject 3 focuses on developing a method that lets us *control* individual nodes and edges in the network, with control meaning that we can drive a network into a desired state within finite time.

Tim Loossens - *Statistical modelling of emotion dynamics*

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

Summary

This research project aims to acquire a thorough understanding of the dynamics driving emotions. To accomplish this, a stochastic non-linear dynamical model is proposed, based on Ising-type networks that

help relate basic neurophysiological principles to complex behaviour. In particular, the model aims to describe a person's non-linear emotional response to the most important affective features of a stimulus, such as pleasantness and unpleasantness.

The research consists of three important steps: studying the mathematical properties of the model, developing a methodology for statistical inference, and programming a user-friendly software which will allow researchers to fit the model to their data. In a first instance, the mathematical tools have to be developed to analyse the model and its properties. This should provide insight in the equilibrium and the non-equilibrium dynamics of the system, allowing a deeper understanding of the response mechanism of a person's emotional regulatory network. Moreover, this analysis should help simplify the computations required for statistical inference. Creating a methodology for statistical inference is important in order to be able to test model against noisy real-life data. The statistical inference methodology should also deal with a number of other challenges, such as individual differences. Finally, in order for researchers to use the model, a user-friendly and performant software has to be developed.

The model will be tested on a number of prototypical data sets which have been collected in the lab as well as in daily life. They include both healthy individuals and persons with an emotional disorder. The model should be able capture certain characteristic features related to the emotional well-being of individuals and their response to stimuli. Furthermore, structural differences between the emotional regulatory networks of healthy individuals and individuals with a disorder are expected.

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

Summary

My research focuses on the use of informative priors in latent growth curve models, with a small sample size. In social sciences, researchers often experience difficulties collecting enough data and obtaining statistical power, due to small or hard to access target groups or prohibitive costs, resulting in a limited data set. The use of Bayesian statistics with informative priors increases the amount of statistical power. Background knowledge from previous publications can then be translated into the statistical prior distributions. However, for limited data sets, this might not be available, as such data remains usually unpublished. We can overcome these obstacles by using background knowledge from experts, such as researchers, clinicians, and experts-by-experience. The background knowledge from these experts can then be used to construct the statistical prior distribution which can then be updated with the data.

The overall objective of my PhD-project is to study the use of expert data in latent growth curve models, and to develop guidelines for researchers who suffer from limited data. I am using simulation studies to investigate how much expert data is needed to compensate for the small sample size, which parameters in the model need informative priors, and how informative these priors should be. I will also investigate how expert data can be translated into statistical distributions, and what the effect is of disagreeing experts. Furthermore, a systematic review will be conducted to give an overview of papers in which simulation studies are used to investigate the performance of Bayesian estimation, when the sample size is small.

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

Summary

From a data analytic perspective, multi-source data contains several obstacles. A general problem with a high number of variables is how to extract relevant information that is hidden within a bulk of irrelevant variables. Assuming that only a small subset of variables is actually of interest, sparse modelling shrinks the contribution of many variables (some to zero) to minimise the residual sum of squares. However, given its multi-source nature it is possible that groups of variables inherently have different characteristics, for example in their signal-to-noise ratio. Ignoring this information leads to more shrinkage of variables from data sources with particular characteristics even though they may be important in the substantive interpretation of the true model structure. Additionally substantive interpretation requires a data analytic model that is based on a data-generating theory. No statistical methods are currently available that can handle all these issues simultaneously.

We propose that the combined efforts of component and network analysis can deal with these obstacles, for the weaknesses of one are the strengths of the other and vice versa. By incorporating the best of both analytic models, we add a new tool to the statistical toolbox of big data researchers.

Nikky Van Buuren - Bayesian Networks and Personalized Learning Recommendations



CITO & University of Twente (Research Center for Examinations and Certification (RCEC))
Supervisors Prof. Theo Eggen, Prof. Jean-Paul Fox & Dr J. Hendrik Straat
Financed by CITO & University of Twente
1 November 2015 – 1 November 2019

Summary

Although Bayesian Networks have already been applied in the field of education, their promising properties for personalized learning have not been thoroughly researched yet. The method is mainly promising because of its flexibility in handling different types of data, and it has the power to make complex forms of learning and assessments more accessible. Aspects under investigation in this research are first of all the evaluation of structures and parameters of Bayesian Networks for personalized learning. Then extending both network and psychometrical research with a new method in which marginal models are used to come to Bayesian networks. Finally, achievements of recommender systems in a personalized learning environment are investigated. The final dissertation will ideally lead to a systematical toolbox of building, evaluating and learning Bayesian Networks for a personalized learning environment.

Daan Van Renswoude - *Gaze-Patterns Tell the Tale: A Model-Based Approach to Free-Scene Viewing in Infancy*



Developmental Psychology, Social and Behavioural Sciences, University of Amsterdam
Supervisors: Prof. M. Raijmakers, Dr I. Visser & Dr L. Waldorp
Financed by YIELD
1 September 2015 – 1 September 2019

Summary

To learn about the structure and properties of the world, infants must select useful information from their environments[18] and use that information to identify objects, categories and, later on, more abstract concepts[28]. Allocating attention towards objects instead of perceptual saliency is therefore a crucial step in human development, as object-based attention indicates the availability of some conceptual knowledge to recognize objects as such. Attention allocation of infants (4-24-month-olds) in complex real-world scenes is studied in two well controlled experimental studies and one large (N=300) free-scene viewing study in which multiple baby labs (UvA, UCLA, Radboud) are involved.

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

Summary

The PhD project has a strong focus on the methodology how to elicit expert information. In specific methods will be developed to elicit beliefs and translate these into probability distributions concerning parameters in a latent growth curve model with distal (long term) outcome. Small sample sizes may make it impossible to estimate the latent growth curve models with distal outcomes in a classical statistical framework. By using the elicited information from experts as prior information in a Bayesian framework, researchers might be able to test their theories and fit their model. The methodology that will be developed will be used in empirical examples to solve the respective data problems and to demonstrate the use of the methodology. Further we will investigate methods for the evaluation of elicited beliefs in the light of new data.

Lieke Voncken - *Norming Methods for Psychological Test*



Psychometrics and Statistics, Faculty of Behavioural and Social Sciences, University of Groningen
Supervisors: Prof. Marieke E. Timmerman & Dr Casper J. Albers
Financed by University of Groningen
1 September 2015 – 1 September 2019

Summary

At present, norms for intelligence and developmental (IDe) tests are estimated using so-called continuous norming, rather than norming per subgroup. Continuous norming is generally believed to be more efficient than the traditional norming per subgroup (e.g., Zachary & Gorsuch, 1985; Zhu & Chen, 2011). The core idea of continuous norming is to build a statistical model that relates the relevant characteristics (as age) to the distribution of test scores. Various statistical (continuous) norming methods exist, but the quality of the procedures has been hardly examined, and the procedures have not been mutually compared. In addition, there are no well-founded procedures to compute a minimally required sample size for a norm group, only rules-of-thumb are available. The aims of this project are (1) to identify the optimally suitable and most efficient continuous norming methods for IDe tests, and (2) to develop methodology to optimize the sampling design for this approach. We distinguish four subprojects. The first two aim at identifying and disseminating the best approach to continuous norming, the third aims at optimizing the sampling design, and the final subproject implements the findings of the previous subprojects in a software package (R).

Iris Yocarini - *Psychometric evaluation of combining tests in a higher education context*



Institute of Psychology, Faculty of Social Sciences, Erasmus University Rotterdam
Supervisors: Prof. L. Arends, Dr S. Bouwmeester & Dr G. Smeets
Financed by Erasmus University Rotterdam
1 April 2015 – 1 April 2019

Summary

In the academic year of 2011- 2012 a new compensatory testing system was introduced in the first year of the psychology bachelor at the Erasmus University Rotterdam (EUR). Herein students are allowed to compensate, within certain boundaries, a low test score of one course with a high test score on another course. This is contrasted to the conjunctive testing system in which students need to pass each individual course. Additionally, an important decision is made at the end of the first bachelor year in which students either pass or fail the requirements to continue their bachelor studies. In the new compensatory testing system, this decision is not based on each individual course but rather on the average grades of several courses. As a consequence, the average grade serves as a decision making tool in which the stakes are high. In this research project the decision accuracy of this decision is evaluated using a realistic compensatory and conjunctive decision rule. To do so, simulations are performed to model student's test scores as well as student's observed test scores at the EUR.

Beibei Yuan - *The δ -machine: A new competitive and interpretable classifier based on dissimilarities*



Methodology and Statistics, Institute of Psychology, Faculty of Social and Behavioural Sciences, Leiden University
Supervisors: Prof. M. de Rooij & Prof. W.J. Heiser
Financed by NWO Graduate Programme 2013 (IOPS)
1 October 2015 – 1 October 2019

Summary

We propose a new basis for classification. The standard approach is to base classification on the basis of a set of features. In our approach we first compute dissimilarities from the set of features and base our classification on these dissimilarities. This leads to nonlinear classification boundaries in the original feature space. In contrast with machine learning tools, this procedure provides interpretable results in terms of distances to exemplars, whereas others are often seen as black boxes. We study various dissimilarity

measures, both binary and multiclass classification problems, variable importance measures, marginal dependence relationships, and extensions to high dimensional problems.

4.4 Running projects



Joost Agelink van Rentergem Zandvliet

Advanced Neuropsychological Diagnostics Infrastructure (ANDI)

Brain & Cognition / Psychology, Fac. Social and Beh. Sc., University of Amsterdam

Supervisors: Prof. Ben Schmand, Prof. Hilde Huizenga, Prof. Jaap Murre

Financed by NWO/MaGW

1 September 2013 – 1 September 2017

Yasin Altinisik

Research replication through the evaluation of prior knowledge in the form of informative hypotheses and sparse big data models

Methodology and Statistics, Faculty of Social Sciences, Utrecht University

Supervisors Prof. H. Hoijtink, Prof. T. Oldenhinkel, Dr R. Kuiper & Dr R. Klein Entink

Financed by NWO

20 February 2014 – 20 March 2018

Frank Bais

Respondent profiles and questionnaire profiles in mixed-mode surveys

Methodology and Statistics, Faculty of Social Sciences, Utrecht University

Supervisors: Prof. J.J. Hox, Dr J.G. Schouten & Dr V. Toepoel

Financed by Utrecht University

1 January 2014 – 1 January 2018



Nitin Bhushan

PhD Network dynamics of households' energy consumption after interventions

Psychometrie & Statistiek, Fac. BSS, University of Groningen

Supervisors: Prof. E.M. Steg, Dr C.J. Albers & Prof. R.R. Meijer

Financed by NWO and University of Groningen

1 September 2015 – 1 September 2018



Laura Boeschoten

Consistent Estimates for Categorical Data based on a Mix of Administrative Data Sources and Surveys

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Prof. A.G. De Waal, Prof. J.K. Vermunt & Dr D.L. Oberski

Financed by Tilburg University

1 March 2015 – 1 March 2019



Florian Böing-Messing

Testing order-constrained hypotheses on variance components

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Prof. J.K. Vermunt & Dr J. Mulder

Financed by Tilburg University

1 September 2012 - 1 September 2017



Kirsten Bulteel

Dynamic network models for dyadic data

Faculty of Psychology and Educational Sciences, Methodology of Educational Sciences

Research Group, KU Leuven

Supervisors: Dr E. Ceulemans, Prof. F. Tuerlinckx

Financed by FWO

1 October 2013 - 1 October 2017



Jed Cabrieto

Capturing time-varying response patterning and synchronicity through Switching PCA model

Methodology of Educational Research, Fac. of Psychology and Educational Sc., KU Leuven

Supervisors: Dr Eva Ceulemans, Prof. Francis Tuerlinckx, Dr Peter Kuppens

Financed by

1 October 2014 – 1 October 2018



Jolien Cremers

Circular data in longitudinal designs

Methods & Statistics, Faculty of Social Sciences, Utrecht University

Supervisors: Prof. Herbert Hoijtink & Dr Irene Klugkist

Financed by NWO Vidi

September 2014 – 1 September 2018



Mathijs Deen

Resampling methodology for longitudinal data analysis

Methodology and Statistics Unit, Institute of Psychology, Faculty of Social and Behavioural Sciences, Leiden University

Supervisors: Dr M. De Rooij & Prof. W.J. Heiser

Financed by Leiden University / Parnassia Groep

1 August 2013 - 1 August 2019



Laura Dekkers

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. H.M. Huizenga, Dr B.R.J. Jansen

Financed by

1 September 2013 – 1 September 2017



Dino Dittrich

Social network modeling using Bayesian statistics

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Prof. J.K. Vermunt, Prof. R.T.A.J. Leenders, Dr J. Mulder

Financed by Tilburg University

1 June 2014 – 1 June 2017



Giulio Flore

Predictive Unfolding Models for Single-Peaked Items with Binary and Graded Response Data

Methodology and Statistics, Social and Behavioural Sciences, Leiden University

Supervisors Prof. W.J. Heiser & Prof. M.J. de Rooij

Financed by Leiden University

14 February 2015 – 14 February 2019



Paulette C. Flore

The psychometrics of stereotype threat

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Dr J.M. Wicherts & Prof. J.K. Vermunt

Financed by NWO Talent Grant

1 September 2013 – 1 September 2017



Chris Hartgerink

Detecting potential data fabrication in the social sciences

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Prof. J.K. Vermunt, Prof. J.M. Wicherts, Dr M.A.L.M. Van Assen

Financed by Tilburg University

1 September 2014 – 1 September 2018



Abe Hofman

Analyzing developmental change with time-series data of a large scale monitoring system

Psychological Methodology, Department of Psychology, FMG, University of Amsterdam

Supervisors: Prof. H.L.J. Van der Maas, Dr I. Visser & Dr B. R. J. Jansen

Financed by NWO, Research Talent grant

1 September 2012 - 1 September 2017



Thomas Husken

Event history analysis for population size estimation of elusive populations

Methodology and Statistics, Faculty of Social Sciences, Utrecht University

Supervisors: Dr M.J.L.F. Cruyff & Prof. P.G.M van der Heijden

Financed by Utrecht University

1 September 2015 – 1 September 2019



Lianne Ippel

Streaming estimation of response heterogeneity

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Dr M.C. Kaptein and Prof. J.K. Vermunt

Financed by Tilburg University

1 October 2013- 31 August 2017



Maarten Kampert

Distance based analysis on (gen)omics data

Mathematical & Applied Statistics Group, collaboration with Netherlands Metabolomics

Center (Leiden Univ.), Dept. of Biological Psychology (VU Univ. Amsterdam), Biometris

(Wageningen University & Research Center; WUR)

Supervisor: Prof. J.J. Meulman

Financed by IBM / SPSS Leiden

1 December 2012 - 1 December 2018



Fayette Klaassen

Hypotheses formulation, evaluation, updating and replication for experimental univariate within person data

Methodology and Statistics, Faculty of Social Sciences, Utrecht University

Supervisors: Prof. Herbert Hoijtink & Prof. Irene Klugkist

Financed by NWO Talent Grant and Utrecht University
1 September 2015 – 1 September 2019



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



Kimberley Lek - *How to hedge our bets in educational testing: combining test results with teacher expertise*

Methodology and Statistics, Faculty of Social Sciences, Utrecht University
Supervisors: Dr Rens Van de Schoot & Prof. Herbert Hoijtink
Financed by NWO Talent Grant
1 September 2015 – 1 September 2019



Xinru Li

Meta-CART: An integration of classification and regression trees into meta-analysis

Mathematical Institute, Leiden University
Supervisors: Prof. Jacqueline J. Meulman & Dr Elise Dusseldorp
Financed by Leiden University
1 November 2014 – 1 November 2018



Merijn Mestdag

Modeling and control of dynamical within-person networks

Faculty of Psychology and Educational Sciences, Quantitative Psychology and Individual Differences, KU Leuven
Supervisors: Prof. F. Tuerlinckx, Prof. D. Borsboom & Dr P. Kuppens
Financed by FWO
1 October 2013 – 1 October 2017



Kees Mulder

Bayesian analysis of circular data in between-subjects designs

Methods & Statistics, Faculty of Social Sciences, Utrecht University
Supervisors: Prof. Herbert Hoijtink & Dr Irene Klugkist
Financed by NWO-Vidi
1 September 2014 – 1 September 2018

Erwin Nagelkerke

Diagnostics for latent class models with dependent univariate and multivariate observations

MTO, Tilburg School of Social and Behavioral Sciences, Universiteit van Tilburg
Supervisors: Prof. J.K. Vermunt & Dr D. Oberski
Financed by NWO, Research Talent Grant
1 February 2013 – 1 February 2017



Michèle Nuyten

Human factors in statistics

MTO, Tilburg School of Social and Behavioral Sciences, Universiteit van Tilburg
Supervisors: Dr J.M. Wicherts, Dr M.A.L.M. Van Assen & Prof. J.K. Vermunt
Financed by NWO, Vidi grant nr 452-11-004
1 December 2012 - 1 December 2017



Annemiek Punter

Psychometric modeling of cultural bias in International Large-Scale Assessments

Research Methodology, Measurement and Data Analysis, Faculty of Behavioural Sciences, University of Twente

Supervisors Prof. C.A.W. Glas, Prof. T.J.H.M. Eggen & Dr M.R.M. Meelissen

Financed by IEA (Int. Association for Evaluation of Educational Achievement)

1 January 2015 – 1 January 2018



Oisín Ryan

Not straightforward: Mediation and networks in continuous time

Methodology and Statistics, Faculty of Social Sciences, Utrecht University

Supervisors: Dr E.L. Hamaker & Prof. P.G.M. Van der Heijden

Financed by NWO Research Talent

1 September 2015 – 1 September 2019



Alexander Savi

Experimentation in online education: Increasing return on investment through A/B testing

Psychological Methods, Social and Behavioural Sciences, University of Amsterdam

Supervisors: Prof. Gunter J.K. Maris & Prof. Han L.J. van der Maas

Financed by NWO

1 February 2014 – 1 February 2018



Aniek Sies

Developing a statistical methodology for optimal treatment assignment

Quantitative Psychology and Individual Differences, Faculty of Psychology and Educational Sciences, KU Leuven, Belgium

Supervisor: Prof. Iven van Mechelen

Financed by KU Leuven

1 October 2014 – 1 October 2018



Robbie Van Aert

Meta-analysis in the presence of publication bias and researcher degrees of freedom

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Prof. K. Sijtsma, Dr M.A.L.M. van Assen & Dr J.M. Wicherts

Financed by NWO (Research Talent Grant)

1 September 2013 – 1 September 2017



Riet Van Bork - Empirical methods to distinguish network from latent variable constructs

Psychological Methods, Social and Behavioural Sciences, University of Amsterdam

Supervisors: Dr Mijke Rhemtulla & Prof. Denny Borsboom

Financed by UvA and European Research Council

1 November 2014 – 1 November 2018



Mattis Van den Bergh

Divisive latent class modeling

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Prof. J.K. Vermunt, Dr V.D. Schmittmann

Financed by NWO – Vici

1 May 2014 – 1 September 2017



Johnny Van Doorn

Bayesian inference for ordinal data in psychology

Psychological Methods, Social and Behavioural Sciences, University of Amsterdam

Supervisors: Prof. E.J. Wagemakers & Dr M. Marsman

Financed by NWO Graduate Programme

1 September 2015 – 1 March 2020



Sara Van Erp

Advancing structural equation modeling with unbiased Bayesian methods

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

Supervisors: Prof. J.K. Vermunt, Dr J. Mulder & Dr D.L. Oberski

Financed by NWO Research Talent Grant

1 September 2015 – 1 September 2019



Leonie Van Grootel

Not as we know it: Developing and evaluating synthesis methods that incorporate quantitative and qualitative research

Methods & Statistics, Faculty of Social Sciences, Utrecht University

Supervisors: Dr H.R. Boeije, Dr F. van Wesel & Prof. J. Hox

Financed by Utrecht University

1 August 2011 - 1 August 2017



Geert Van Kollenburg

Diagnostics for latent class models

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Prof. J.K. Vermunt & Dr J. Mulder

Financed by NOW, part of Vici grant Prof. dr J.K. Vermunt

1 July 2012 - 1 July 2017



Eva Van Vlimmeren

The mapping of national cultures: Examining the robustness of measurements of cross-national cultural dimensions

MTO, Tilburg School of Social and Behavioral Sciences, Universiteit van Tilburg

Supervisors: Prof. J.K. Vermunt & Dr G.D.B. Moors

Financed by NWO

1 January 2012 – 1 January 2017



Coosje Veldkamp

Human factors in statistics

MTO, Tilburg School of Social and Behavioral Sciences, Universiteit van Tilburg

Supervisors: Dr J.M. Wicherts, Dr M.A.L.M. Van Assen & Prof. J.K. Vermunt

Financed by NWO, Vidi grant nr 452-11-004

1 December 2012 - 17 January 2017



Davide Vidotto

Multiple imputation of nested missing data using extended latent class models

MTO, Tilburg School of Social and Behavioral Sciences, Universiteit van Tilburg

Supervisor: Prof. J.K. Vermunt

Project financed by NWO, Research Talent Grant

1 September 2013 - 1 September 2017



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

New Approaches in Survival Analysis

Mathematical Institute, Statistical Science for the Life and Behavioral Sciences, Leiden University

Supervisors Prof. Dr. J.J. Meulman & Dr. M. Fiocco

Financed by

1 September 2014 – 1 September 2018



Eva Zijlmans

Solutions for some psychometric problems of the reliability of psychological measurements

MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Supervisors: Prof. Dr. K. Sijtsma, Dr. J. Tijmstra & Dr. L.A. van der Ark

Financed by Tilburg University

1 September 2014 – 1 September 2018



Mariëlle Zondervan-Zwijnenburg

Formalization and evaluation of prior knowledge based on prior/posterior predictive inference

Methods & Statistics, Faculty of Social Sciences, Utrecht University

Supervisors: Prof. H. Hoijtink, Dr A. G. J. Van de Schoot

Financed by NWO Gravitation

1 July 2014 – 1 March 2019

5 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.

5.1 Professorships

Eva **Ceulemans** was appointed professor October 1st at KU University of Leuven on Quantitative data analysis.

5.2 Staff changes

Junior staff members admitted to IOPS in 2016

- Zsuzsa **Bakk** – Leiden University
- Lakshmi **Balachandran Nair** – Utrecht University
- Judith **Conijn** – University of Amsterdam
- Marjolein **Fokkema** – Leiden University
- Maurits **Kaptein** – Tilburg University
- Gabriela **Koppenol-Gonzalez** – Erasmus University Rotterdam
- Maarten **Marsman** – University of Amsterdam
- Reza **Mohammadi** – Tilburg University
- Maryam **Safarkhani** – Utrecht University
- Noémi **Schuurman** – Utrecht University
- Inga **Schwabe** – Tilburg University
- Bella **Struminskaya** – Utrecht University
- Marieke **Van Gerner-Haan** – Utrecht University
- Gerko **Vink** – Utrecht University
- Wouter **Weeda** – Leiden University
- Kate **Xu** – Erasmus University Rotterdam
- Robert **Zwitser** – University of Amsterdam

Senior staff members admitted to IOPS in 2016

- Wendy **Post** – University of Groningen
- Tom **Wilderjans** – Leiden University

From junior to senior

- Maarten **Cruyff** – Utrecht University
- Rens **Van de Schoot** – Utrecht University
- Floryt **Van Wesel** – Utrecht University

- Lourens **Waldorp** – University of Amsterdam

Junior staff members leaving IOPS in 2016

- Marianna **Avetisyan** – University of Twente
- Thomas **Klausch** – Utrecht University
- Mijke **Rhemtulla** – University of Amsterdam
- Josine **Verhagen** – University of Amsterdam
- Annemarie **Zand Scholten** – University of Amsterdam

Senior staff members leaving IOPS in 2016

- Anne **Boomsma** – University of Groningen (retirement)
- Arne **Evers** – University of Amsterdam (retirement)
- Kees **Van Putten** – Leiden University (retirement)

Staff movements within IOPS in 2016

- Kim **De Roover** from Leuven to Tilburg
- Suzanne **Jak** from Utrecht to UvA, Methods and Statistics
- Daniel **Oberski** from Tilburg to Utrecht
- Iris **Smits** from UvA-Pedagogy to Cito
- Joost **Van Ginkel** within Leiden from A&O to M&T
- Floryt **Van Wesel** from VU Amsterdam to Utrecht

Emeritus status

IOPS proudly keeps in touch with its emeritus members.

No staff members entered the emeritus status in 2016.

	1 Januari 2016	31 December 2016
Junior staff members	29	37
Senior staff members	68	74
Honorary emeritus members	20	20

5.3 Staff members

Leiden University

Institute of Psychology, Methodology and Statistics Unit

- Dr Zsuzsa **Bakk** (junior): z.bakk@fsw.leidenuniv.nl
- 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 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 Angélique **Cramer** (junior): a.o.j.cramer@uva.nl
- Dr Raoul **Grasman** (senior): r.p.p.p.grasman@uva.nl
- Prof. Gunter **Maris** (senior): g.k.j.maris@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

- Dr Hilde **Huizenga** (senior): h.m.huizenga@uva.nl
- Dr Brenda **Jansen** (senior): b.r.j.jansen@uva.nl
- Dr 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

- Dr Casper **Albers** (senior): c.j.albers@rug.nl
- Prof. Henk **Kiers** (senior): h.a.l.kiers@rug.nl
- Prof. Dr. Rob **Meijer** (senior): r.r.Meijer@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
- Prof. Cees **Glas**, c.a.w.glas@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 Marcel **Croon** (senior): m.a.croon@tilburguniversity.edu
- Dr Kim **De Roover** (junior): k.deroover@tilburguniversity.edu
- Dr Wilco **Emons** (senior): w.h.m.emons@tilburguniversity.edu
- Dr John **Gelissen** (senior): j.p.t.m.gelissen@tilburguniversity.edu
- Dr Maurits **Kaptein** (junior): m.c.kaptein@tilburguniversity.edu
- Dr Reza **Mohammadi** (junior): a.mohammadi@tilburguniversity.edu
- Dr Guy **Moors**, (senior): guy.moors@tilburguniversity.edu
- Dr Joris **Mulder** (junior): j.mulder3@tilburguniversity.edu
- Prof. Klaas **Sijtsma** (senior): k.sijtsma@tilburguniversity.edu

- Dr Verena **Schmittmann** (junior): v.d.schmittmann@tilburguniversity.edu
- Dr Inga **Schwabe** (junior): i.schwabe@tilburguniversity.edu
- Dr Jesper **Tijmstra** (junior): j.tijmstra@tilburguniversity.edu
- Dr Marcel **Van Assen** (senior): m.a.l.m.vanassen@tilburguniversity.edu
- Dr Katrijn **Van Deun** (senior): k.vandeun@tilburguniversity.edu
- Prof. Jeroen **Vermunt** (senior): j.k.vermunt@tilburguniversity.edu
- Dr Jelte **Wicherts** (senior): j.m.wicherts@tilburguniversity.edu

Utrecht University

Methodology & Statistics Department

- 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** (junior): r.m.kuiper@uu.nl
- Dr Peter **Lugtig** (junior): p.lugtig@uu.nl
- Dr Mirjam **Moerbeek** (senior): m.moerbeek@uu.nl
- Dr Daniel **Oberski** (junior): d.l.oberski@uu.nl
- Dr Maryam **Safarkhani** (junior): m.safarkhani@uu.nl
- Dr Noémi **Schuurman** (junior): n.k.schuurman@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
- Marieke **Van Gerner-Haan** (junior): Marieke.haan2@gmail.com
- Floryt **Van Wesel** (senior): f.vanwesel@uu.nl
- Gerko **Vink** (junior): 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
- Dr Wolf **Vanpaemel** (senior): wolf.vanpaemel@ppw.kuleuven.be
- Dr Tom **Wilderjans** (junior): tom.wilderjans@ppw.kuleuven.be

Statistics Netherlands (CBS)

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

- Dr 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.beguिन@cito.nl
- Dr Bas **Hemker** (senior), bas.hemker@cito.nl
- Dr Iris **Smits** (junior): iris.smits@cito.nl

5.4 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 Shahab **Jolani** (junior), Methodology and Statistics, Maastricht University: shahab.jolani@maastrichtuniversity.nl
- Dr Gabriela **Koppenol-Gonzalez** (junior) – Department of Psychology, Education & Child Studies, Erasmus University Rotterdam: koppenolgonzalez@fsw.eur.nl
- Dr Yfke **Ongena** (junior): Centre for Information and Communication Research, Faculty of Arts, University of Groningen: y.p.ongena@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), Research Methodology, 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

5.5 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. 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. Ivo **Molenaar**, molenaarivo@gmail.com
- 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**, wjvdlinden@outlook.com
- Prof. Hans **Van der Zouwen**, j.van.der.zouwen@fsw.vu.nl
- Dr Norman **Verhelst**, norman.verhelst@gmail.com

6 Scientific awards and grants

6.1 Awards and grants honored to IOPS staff members

6.1.1 Scientific awards

- **Oberski, Daniel** (2016). Psychometric Society Best Reviewer for Psychometrika Award. Granting Organisations University of Amsterdam
- **Van de Schoot, R.** (2016). Young Academy, KNAW Granting Organisations: KNAW

6.1.2 NWO Grants

NWO Veni, Vidi, Vici grants				
These are part of the NWO Innovational Research Incentives Scheme [<i>Vernieuwingsimpuls</i>]				
Hamaker, E. (2010), Utrecht Un.	Time for change: Studying individual differences in dynamics	Vidi	1 May 2011 – 1 May 2016	€ 600.000
Huizenga, H. (2013), UvA 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
Klugkist, I. (2013), Utrecht Un.	A Different Angle: New Tools for Circular Data	Vidi	November 2013 – November 2018	€ 800.000
Kuiper, R.M. (2016), Utrecht Un.	Studying time-lagged effects using ESM-data: Statistics lag behind, it is time to go continuously	Veni	December 2016 December 2020	€ 250.000
Molenaar, D. (2015)	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. (2013), Tilburg University	Testing competing theories	Veni	2013 - 2018	€ 250.000
Oberski, D. (2014), Tilburg University	Developing novel latent variable techniques that open up a treasure trove of register data for social science	Veni	1 January 2015 – 31 December 2017	€ 250.000
Van de Schoot, R. (2011), Utrecht Un.	Integrating background knowledge about traumatic stress experienced after trauma into statistical models assessing individual change over time	Veni	January 2011 – January 2016	€ 250.000
Vermunt, J.K. (2010), Tilburg University	Stepwise model-fitting approaches for latent class analysis and related methods	Vici	23 June 2011 – 22 June 2016	€ 1.500.000

Wicherts, J.M. (2012), Tilburg University	Human Factors in statistics	Vidi	September 2012 – September 2017	€ 800.000
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NWO Aspasia grants

With the Aspasia grants, NWO stimulates the promotion of female researchers in higher ranking.

Hamaker, E. (2011), Utrecht Un.	2011-2016	€ 100.000
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NWO Open Competition grants

The Open Competition is subsidy program for the advancement of innovative and high-quality scientific research in the social and behavioral sciences.

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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 (2013), Tilburg University	Meta-analysis in the presence of publication bias and researcher degrees of freedom	PhD student Robbie van Aert	1 Sept. 2013 – 1 Sept. 2017	€ 165.000
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. (2012), UvA Amsterdam	Network psychometrics	PhD student Sacha Epskamp	1 Aug. 2012 - 1 Aug. 2016	€ 167.576
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 Oísín Ryan	1 Sept. 2015 - 1 Sept. 2019	€ 219.170
Hojtink, H. (2013), Utrecht Un.	Processing within person experimental and longitudinal data using Bayesian updating	PhD student Anouck Kluytmans	1 Sept. 2013 – 1 Sept. 2016	€ 168.735
Hojtink, 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
Moors, G. (2012). Tilburg University	The mapping of national cultures: Examining the robustness of measurements of cross-national cultural dimensions.	PhD student Eva van Vlimmeren.	1 Sep 2012 – 8 Jan 2017	€ 208.193

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
Timmerman, M.E. & Meijer, R.R. (2012), Un. of Groningen	Understanding human behavioural processes with Bayesian dynamic models	PhD student: Tanja Krone	1 July 2012 – 1 March 2016	€ 161.363
Van der Ark, L.A. (2013), Tilburg University	Improving norms for psychological and educational tests	PhD student Hannah Oosterhuis	1 Sept. 2012 – 1 Sept. 2016	€ 168.735
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
Van der Maas, H.L.J. (2012), UvA Amsterdam	Analyzing developmental change with time-series data of a large scale educational monitoring system	PhD student: Abe Hofman	1 Sep. 2012 – 1 Sep. 2016	€ 168.576
Van Duijn, M.A.J., Snijders, T.A.B., & Niezink, N.M.D. (2013), Un. of Groningen	Co-Evolution of networks and real-valued actor attributes	PhD student: Niezink, N.M.D.	2013 – 2016	€ 166.235
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. (2013), Tilburg University	Multiple imputation of nested missing data using extended latent class models	PhD student Davide Vidotto	1 Sept. 2013 – 1 Sept. 2016	€ 165.000
Wicherts, J.M. (2013) Tilburg University	The psychometrics of stereotype threat	PhD student Paulette Flore	1 Sept. 2013 – 1 Sept. 2017	€ 165.000
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				
Fransé, R.K. & Raijmakers, M.E.J. (2015).	Facilitators in Museums Stimulate Family Conversations.	NWO - Museumbeurs	2015-2016	€ 50.000
Hoijtink, H. as one of a group of 20 principal investigators (2015)	Individual development: why some children thrive and others don't.	NWO-Gravity Scheme	2012-2016	€540.000 Of total € 27.600000
Schmand, B., Huizenga, H. & Murre, J. (2013), UvA Amsterdam	Advanced Neuropsychological Diagnostics Infrastructure (ANDI)	Investment Subsidy NWO Medium	1 Sept 2013- 31 Aug 2017	€ 450.000
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., Vollebbergh, W.,	Social networks processes and social development of children and adolescents	NWO-PROO	2013 -	€ 717.326

Harakeh, Z., Van Duijn, M., & Steglich, C. (2013)				
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6.1.3 International grants

International grants				
Altinisik, Y., Kuiper, R.M. & Hoijtink, H. (2014), Utrecht Un.	Research replication through the evaluation of prior knowledge in the form of informative hypotheses and sparse big data models	Turkish Government	2014-2018	€ 50.000
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
Gu Xin & Hoijtink, H. (2011), Utrecht Un.	Bayesian Evaluation of Inequality Constrained Hypotheses	Chinese Scholarship Council	2011-2016	€ 65.000
Hartgerink C., Wicherts, J. & Van Assen, M.	How valuable statistical tools are to detect data fabrication.	US federal government	Sept. 2016 Sept. 2017	\$100,000
Wagenmakers, E.J. (2011), UvA Amsterdam	Bayes or Bust: Sensible hypothesis tests for social scientists	Consolidator grant by the European Research Council	May 2012- May 2017	€1.500.000

Grants awarded to KU Leuven, University of Leuven				
Bartlema, E., Vanpaemel, W. (2012)	PhD position	Fund Scientific Research (FWO), Flanders, Belgium	1 Oct 2012- 30 Sept 2016	4 years PhD salary
Bulteel, K., Ceulemans, E. & Tuerlinckx, F. (2013)	PhD position	Fund Scientific Research (FWO), Flanders, Belgium	1 Oct 2013- 30 Sept 2017	4 years PhD salary
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
Ceulemans, E., Kuppens, P., & Tuerlinckx, F. (2013)	Switching component models for capturing emotional response patterning and synchronization processes	Fund Scientific Research (FWO), Flanders, Belgium	1 Jan 2014 – 31 Dec 2017	€ 310.000
Coomans, F., Tuerlinckx, F., Vanpaemel, W. (2015)	Kwantumkansrekening in cognitie: Een casestudie in beslissingsmodellen	Special Research Fund, KU Leuven	1 Oct 2015- 31 Aug 2016	1 year of postdoc salary
De Roover, K., Ceulemans, E. (2013)	postdoc grant	Fund Scientific Research (FWO), Flanders, Belgium	1 Oct 2013- 30 Sept 2016	3 years of postdoc salary

Mestdagh, M., Tuerlinckx, F., Kuppens, P. & Borsboom, D., (2013)	PhD position	Fund Scientific Research (FWO), Flanders, Belgium	1 Oct 2013-30 Sept 2017	4 years PhD salary
Tuerlinckx, F. (2012)	Understanding the dynamics of the individual through network analyses of Experience Sampling data	Grant by The National Fund for Scientific Research-Belgium [Fonds voor Wetensch. Onderzoek-Vlaanderen]	1 Jan. 2013 - 31 Dec. 2016	€ 296.518
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	1 Jan 2015 – 31 Dec 2019	€ 1.250.000
Tuerlinckx, F. (co-promotor) (2015)	TquanT	UK National Agency for Erasmus+	1 Sept 2015-31 Aug 2018	€ 27.765
Tuerlinckx, F. (co-promotor) (2012)	Steunpunt Toetsontwikkeling en Peilingen	Flemish Government	1 Jan 2013-31 Dec 2017	€ 6.631.250
Van Mechelen, I. (2012)	Developing crucial Statistical methods for Understanding major complex Dynamic Systems in natural, bio-medical and social sciences	Grant by Belgian Science Policy [Federaal Wetenschapsbeleid]	2012 - 2017	€ 430.000
Verdonck, S., Tuerlinckx, F. (2015)	postdoc grant	Special Research Fund, KU Leuven	7 Oct 2015-6 Oct 2016	1 year of postdoc salary
Verduyn, P., Van Mechelen, I. (2012)	postdoc grant	Fund Scientific Research (FWO), Flanders, Belgium	1 Oct 2012-31 Oct 2018	6 years of postdoc salary

Other Grants

Boeije, H. & Leferink, S. (2012), Utrecht University	Kwaliteitsverbetering in de hulpverlening aan slachtoffers door innovatie in effectmeting	Grant for PhD-project, funded by Fonds slachtofferhulp and Dept. of Methodology and Statistics, Utrecht Un.	Aug. 2012 – Aug. 2016	€ 120.000 by Fonds Slachtofferhulp and €120.000 by M&S, UU.
Candel, M. (2011), Maastricht Un.	Sample size calculation for nested cost-effectiveness RCTs (PhD student project)	ZonMw (The Netherlands Organization for Health Research and Development)	April 2012 - April 2016	€ 115.000
Jansen, B.R.J., Salemink, E., & Wiers, R. (2014), UvA Amsterdam	The missing factor in math anxiety: The role and modification of cognitive biases and executive functioning	Interne AIO-competitie Ontwikkelingspsychologie	2014-2018	€ 200.000
Keijsers, L., Ter Hillegers, M. Bogt, T., Van de Schoot,	Grant for Post-doc on disentangling normative irritability from early signs of depression among	Utrecht University, Youth & Identity Seed Project	2013 - 2016	€ 96.000

R., Vollebergh, W., Cahn, W.	adolescents with cell-phone micro-measures of daily mood swings			
Klugkist, I., Nielen, M. (DGK, Utrecht University)	Bayesian statistics applied to clinical trials from veterinary medicine	Grant for PhD-project, funded by Faculty of Veterinary Medicine, Utrecht Un. and Dept. of Methodology and Statistics, Utrecht Un.	Sept. 2013 – Sept. 2017	€ 97.500 by Fac. Veterinary Medicine, UU and € 97.500 by Dept. M&S, UU.
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 Onderwijs onderzoek (NRO)	1 Feb 2016 31 Jan 2020	€598.200
Raijmakers, M. Van der Maas, H. & Haarhuis H. (2011), UvA Amsterdam	1. Mental models: Guiding knowledge development in the individual child 2. Optimizing materials for experimentation	Research Grant from the Platform Beta Techniek [TalentenKracht]	1 Jan 2012 – 1 jan 2016	€ 417.000
Vera Toepoel (2016), Utrecht Un)	Knowledge Clips in Statistics	Project for designing video's to educate in statistics together with Peter Lugtig, Rens van der Schoot, Marieke Westeneng en Leonie van Tichem		
Van der Heijden, P., Bakker, B. (CBS), (main appl); Cruyff, M., Whittaker, J. (Lancaster Un.)	The estimation of population size and population characteristics using incomplete registries	Grant for PhD project, funded by CBS and Dept. of Methodology and Statistics, Utrecht Un.	Jan. 2012 – Jan. 2016	€ 100.000 by CBS and € 100.000 by Dept. M&S, Utrecht Un.
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

6.2 Awards and grants honored to IOPS PhD students

6.2.1 Scientific awards

In 2016, the following IOPS PhD students were honored with a scientific award:

- Zsuzsa Bakk: 2016 Distinguished Dissertation Award of the Classification Society
- Maria **Bolsinova**: Psychometric Society Award 2016 for her PhD thesis "Balancing simple models and complex reality. Contributions to item response theory in educational measurement." University Utrecht. Granting Organisations: Psychometric Society
- Dries **Debeer**: IOPS Best Presentation Award (Summer 2016)
- Sacha **Epskamp**: Leamer-Rosenthal Prize for Open Social Science (BITTS)
- Chris **Hartgerink**: the Right to Research Coalition (R2RC) "Next Generation Leadership Award" (at OpenCon2016 in Washington D.C.)
- Jonas **Haslbeck**: IOPS Best Presentation Award (Winter 2016)
- Adela **Isvoranu**: the Unilever Research Award
- Kimberley **Lek**: IOPS Best Poster Award (Summer 2016)
- Merijn **Mestdagh**: IOPS Best Paper Award 2015. *Fingerprint resampling: A generic method for efficient resampling*, published in Scientific Reports (2015, 5, 16970, 1-21)
- Michèle **Nuijten**: Leamer-Rosenthal Prize for Open Social Science (BITTS)
- Claudia **Van Borkulo**: Top Publication Award, Research Institute SHARE (November 2016)
- Nikky **Van Buuren**: IOPS Best Poster Award (Winter 2016)

6.2.2 Grants

- Chris **Hartgerink** (main applicant), J. Wicherts & M. Van Assen: \$100,000 by the US federal government to conduct research into how valuable statistical tools are to detect data fabrication. The entire research proposal was published upon submission of the grant application, in the spirit of Open Science (<https://doi.org/10.3897/rio.2.e8860>) and to allow for feedback on the research plans. The grant funds their research during the academic year 2016-2017.
- Adela **Isvoranu**: the NWO Research Talent Grant. Project: Psychosis: Towards a Dynamical Systems Approach.

7 Research output

7.1 Scientific publication

7.1.1 Dissertations by IOPS PhD students

- Bolsinova, M.** (2016). *Simple Models & Complex Reality: Contributions to item response theory in educational measurement*, Utrecht University.
- Bringmann, L.F.** (2016). *Dynamical Networks in Psychology: More than a pretty picture?* KU University of Leuven.
- De Klerk, S.** (2016). *Multi-Media Based Performance Assessment in Dutch Vocational Education*. ECABO.
- Debeer, D.** (2016). *Item-position effects and missing responses in large-scale assessments: Models and applications*. KU University of Leuven.
- Doove, L.L.** (2016). *Tree-based methodologies for the detection of treatment-subgroup interactions and the estimation of optimal treatment regimes in randomized controlled trials*. KU University of Leuven.
- Fagginger Auer, M.F.** (2016). *Solving multiplication and division problems: Latent variable modeling of students' solution strategies and performance*. Leiden University.
- Gerritse, S.C.** (2016). *An application of population size estimation to official statistics. Sensitivity of model assumptions and the effect of implied coverage*. Utrecht University.
- Gu, X.** (2016). *Bayesian Evaluation of Informative Hypothesis*. Utrecht University.
- Heylen, J.** (2016). *Modeling variability in time profiles: Teasing apart amplitude and shape*. KU University of Leuven.
- Jabrayilov, R.** (2016). *Improving Individual Change Assessment in Clinical, Medical and Health Psychology*. Tilburg University.
- Jongerling, J.** (2016). *There and back again: Studying inter-individual differences in intra-individual variability*. Utrecht University.
- Krone, T.** (2016). *Some Notes on Bayesian Time Series Analysis in Psychology*. University of Groningen.
- Meijering, J.** (2016). *Probing the Power of Apollo: Methodological Challenges and Opportunities of the Delphi Method for Developing Rankings*. Wageningen University.
- Minica, C.C.** (2016). *Family-Based Genetic Association Analysis: Methods and Applications to Addiction Phenotypes*. VU Amsterdam.
- Oosterwijk, P.R.** (2016). *Statistical properties and practical use of classical test-score reliability methods*. Tilburg University.
- Schuurman, N.K.** (2016). *Multilevel Autoregressive Modeling in Psychology: Snags and Solutions*. Utrecht University.
- Schwabe, I.** (2016). *Nature, Nurture and Item Response Theory – A Psychometric Approach to Behaviour Genetics*. University of Twente.

7.1.2 Other dissertations under supervision of IOPS staff members

- Hiemstra, D.** (2016). *Focus on your strengths?: The role of perceived relative strengths versus weaknesses in learning effort* [Groningen]: Rijksuniversiteit Groningen (**M.E. Timmerman**).
- Meijering, J.V.** (2016). *Probing the power of Apollo: Methodological challenges and opportunities of the Delphi method for developing rankings*. Wageningen University & Research (**H.Tobi**).

Lemme, Francesca. Efficient treatment allocation in 2x2 cluster randomised and multicentre trials. PhD ceremony Jan 2016, Maastricht University, promotores prof GJP van Breukelen, prof MPF Berger, copromotor dr MJJM Candel.

Manju, Abu. Optimal sample sizes for cost-effectiveness cluster randomized and multicentre trials. PhD ceremony Nov 2016, Maastricht University, promotor prof GJP van Breukelen, copromotor dr MJJM Candel.

Rietbergen, C. (2016). *Quantitative Evidence Synthesis with Power Priors* Utrecht University.

Van Geel, M.J.M., & Keuning, T. (2016). *Implementation and effects of a schoolwide data-based decision making intervention: a large-scale study*. Universiteit Twente. DOI: 10.3990/1.9789036541190.

Van der Scheer, E. (2016). *Data-based decision making put to the test*. Universiteit Twente. DOI: 10.3990/1.9789036541589.

7.1.3 Refereed article in a journal

Aardoom, J.J., Dingemans A.E., Spinhoven P., **Van Ginkel J.R.**, **De Rooij M.J.** & Van Furth E.F. (2016). Web-based fully automated self-help with different levels of therapist support for individuals with eating disorder symptoms: A randomized controlled trial, *Journal of Medical Internet Research*, 18(6): 13-27.

Abidi, L., Oenema, A., **Candel, M.J.J.M.**, van de Mheen, D. (2016). A theory-based implementation program for alcohol screening and brief intervention (ASBI) in general practices: Planned development and study protocol of a cluster randomised controlled trial. *Contemporary Clinical Trials*, 51, 78-87.

Agrusti, G., Poce, A., Scaramuzzo, G., Damiani, V., Agrusti F., Dobson, S., Veldkamp, B. (2016). LIBE project – Supporting Lifelong learning with Inquiry-based education. (LIBE Project – 543058-LLP-1-2013-IT-KA3-KA3MP). European Union Lifelong Learning Programma. DOI: 10.13140/RG.2.1.3098.9044.

Aktar, E., Mandell, D.J., De Vente, W., Majdandžić, M., **Raijmakers, M.E.J.** & Bögels, S. M. (2016). Infants' Temperament and Mothers', and Fathers' Depression Predict Infants' Attention to Objects Paired with Emotional Faces. *Journal of Abnormal Child Psychology*, 44(5), 975-990.

Albers, C.J., Kardaun, O.J.W.F., & Schaafsma, W. (2016). Assigning probabilities to hypotheses in the context of a binomial distribution. *Brazilian journal of probability and statistics*, 30(1), 127-144. doi:10.1214/14-BJPS264.

Anderson, C. J.*, Bahník, S.*, Barnett-Cowan, M.*, Bosco, F. A.*, Chandler, J.*, Chartier, C. R.*, Cheung, F.*, Christopherson, C. D.*, Cordes, A.*, Cremata, E. J.*, Della Penna, N.*, Estel, V.*, Fedor, A.*, Fitneva, S. A.*, Frank, M. C.*, Grange, J. A.*, Hartshorne, J. K.*, Hasselman, F.*, Henninger, F.*, van der Hulst, M.*, Jonas, K. J.*, Lai, C. K.*, Levitan, C. A.*, Miller, J. K.*, Moore, K. S.*, Meixner, J. M.*, Munafò, M. R.*, Neijenhuijs, K. I.*, Nilsson, G.*, Nosek, B. A.*, Plessow, F.*, Prenoveau, J. M.*, Ricker, A. A.*, Schmidt, K.*, Spies, J. R.*, Stieger, S.*, Strohming, N.*, Sullivan, G.B.*, van Aert, R. C. M.*, **van Assen, M. A. L. M.**, **Vanpaemel, W.**, Vianello, M.*, Voracek, M.*, & Zuni, K.* (2016). Response to comment on "Estimating the reproducibility of psychological science". *Science*, 351, 1037, 1-3. doi:10.1126/science.aad9163.

Anderson, C. J., Bahník, S., Barnett-Cowan, M., Bosco, F. A., Chandler, J., Chartier, C. R., ... Zuni, K. (2016). Response to comment on "Estimating the reproducibility of psychological science". *Science*, 351(6277), 1037. DOI: 10.1126/science.aad9163.

Asparouhov, T., **Hamaker, E.L.** & Muthén, B. (2016). Dynamic latent class analysis. *Structural Equation Modeling: A Multidisciplinary Journal*. DOI: 10.1080/10705511.2016.1253479.

Azevedo, C. L. N., Fox, G. J. A., & Andrade, D. F. (2016). Bayesian longitudinal item response modeling with restricted covariance pattern structures. *Statistics and computing*, 26(1), 443-460. DOI: 10.1007/s11222-014-9518-5.

Backhaus, R., van Rossum, E., Verbeek, H., Halfens, R.J.G., **Tan, F.E.S.**, Capezuti, E., Hamers, J.P.H. (2016). Quantity of staff and quality of care in Dutch nursing homes: a cross-sectional study: *Jour Nursing Home Res* 2, 90-93.

- Backhaus, R., van Rossum, E., Verbeek, H., Halfens, R.J.G., **Tan, F.E.S.**, Capezuti, E., Hamers, J.P.H. (2016). Work environment characteristics associated with quality of care in Dutch nursing homes: A cross-sectional study. *International Journal of Nursing Studies*, Volume 66, January 2017, Pages 15–22.
- Bakk, Z., & Vermunt, J. K. (2016). Robustness of stepwise latent class modeling with continuous distal outcomes. *Structural Equation Modeling*, 23(1), 20-31. DOI: 10.1080/10705511.2014.955104.
- Bakk, Z., Oberski, D.L. & Vermunt, J.K.** (2016). Relating Latent Class Membership to Continuous Distal Outcomes: Improving the LTB Approach and a Modified Three-Step Implementation. *Structural Equation Modeling*, 23(2), 278-289. DOI: 10.1080/10705511.2015.1049698.
- Bakker, M., Hartgerink, C. H. J., Wicherts, J. M., & Van Der Maas, H. L. J. (2016). Researchers' intuitions about power in psychological research. *Psychological Science*, 27(8), 1069-1077. DOI: 10.1177/0956797616647519.
- Balachandran Nair, L. & Gibbert, M.** (2016). Analyzing inconsistent cases in management fsQCA studies: A methodological manifesto. *Journal of Business Research*, 69(4), 1464-1470. DOI: 10.1016/j.jbusres.2015.10.126.
- Balachandran Nair, L. & Gibbert, M.** (2016). What makes a 'good' title and (how) does it matter for citations? A review and general model of article title attributes in management science. *Scientometrics*, 107(3), 1331-1359. DOI: 10.1007/s11192-016-1937-y.
- Barendse, M.T., Ligtvoet, R., Timmerman, M.E., & Oort, F. J.** (2016). Model fit after pairwise maximum likelihood. *Frontiers in Psychology*, 7, [528]. DOI: 10.3389/fpsyg.2016.00528.
- Bartel, K., Williamson, P., Van Maanen, A., Cassoff, J., Meijer, A.M., **Oort, F.**, ... Gradisar, M. (2016). Protective and risk factors associated with adolescent sleep: Findings from Australia, Canada, and The Netherlands. *Sleep Medicine*, 26, 97-103. DOI: 10.1016/j.sleep.2016.07.007.
- Basten, M., Tiemeier, H., Althoff, R.R., **Van de Schoot, R.**, Jaddoe, V.W.V., **Hofman, A.**, ... Van der Ende, J. (2016). The Stability of Problem Behavior Across the Preschool Years: An Empirical Approach in the General Population. *Journal of Abnormal Child Psychology*, 44(2), 393-404. DOI: 10.1007/s10802-015-9993-y.
- Beerens, H.C., de Boer B., Zwakhalen, S.M.G., **Tan, F.E.S.**, Ruwaard, D., Hamers, J.P.H., Verbeek, H. (2016). The association between aspects of daily life and quality of life of people with dementia living in long-term care facilities: a momentary assessment study: *International Psychogeriatrics*, Volume 28, Issue 8, pp. 1323-1331.
- Beland, S., Pichette, F. & **Jolani, S.** (2016). Impact on Cronbach's alpha of simple treatment methods for missing data. *The Quantitative Methods for Psychology*, 12(1), 57-73.
- Bennink, M., **Croon, M. A.**, Kroon, B., & **Vermunt, J. K.** (2016). Micro-macro multilevel latent class models with multiple discrete individual-level variables. *Advances in Data Analysis and Classification*, 10(2), 139-154. DOI: 10.1007/s11634-016-0234-1.
- Bexkens, A., **Jansen, B.R.J.**, Van der Molen, M.W., & **Huizenga, H. M.** (2016). Cool decision-making in adolescents with Behavior Disorder and/or Mild-to-Borderline Intellectual Disability. *Journal of Abnormal Child Psychology*, 44(2), 357-367.
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7.1.4 Non refereed articles in a journal

7.1.5 Book

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7.1.6 Book section

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- Albers, C.J., Krone, T., Timmerman, M.E.** (2016). Comparison of Estimators for Single-Case and Multilevel AR(1) Models. *International Meeting of the Psychometric Society*, Asheville, US
- Bhushan, N., Albers, C., & Steg, E.** (2016). Detecting patterns in household electricity consumption after behavioural interventions. Abstract from 4th European Conference on Behaviour and Energy Efficiency, Coimbra, Portugal.
- Bron, R., Endeldijk, M., & Veldkamp, B. P.** (2016). Behind the scenes in higher education: How university teachers collaboratively design a project-based and student-centred course. Paper presented at Higher Education Conference 2016, Amsterdam, Netherlands.
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- Egberink, I.J.L., & Hurks, P.P.M.** (2016). Psychometric issues and test quality in the Netherlands. 10th Conference of the International Test Commission, Vancouver, Canada.
- Kiers, H.A.L., Timmerman, M.E., & Ceulemans, E.** (2016) Obtaining blockwise sparse components by rotation, constraints or penalties. *Sensometrics Conference*, Brighton, UK, July 26-30.
- Milovanovic, M., & Bhushan, N.** (2016). Researching energy-related behavioural change. Abstract from Energysense research meeting, Groningen, Netherlands.
- Niessen, A., Meijer, R., & Tendeiro, J.** (2016). Using Trial-Studying Tests to Predict Academic Performance: A Work Sample Approach to Selection and Matching in Higher Education. Paper presented at 10th Conference of the International Test Commission, Vancouver, Canada.
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- Van der Ark, L. A.** (2016). Kwantitatieve onderzoeksmethodologie ter bevordering van de academisering van het onderwijs . In L. Houweling, H. Viëtor, H. de Deckere, & W. de Jong (Eds.), *De staat van de pedagogiek: Analytisch, opbrengstgericht en visionair* (pp. 37-50). Amsterdam, The Netherlands: SWP.
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- Voncken**, L., **Albers**, C.J., & **Timmerman**, M.E. (2016). Continuous Norming of Psychological Tests: A Comparison of Different Stepwise Model Selection Procedures. Abstract from 10th Conference of the International Test Commission, Vancouver, Canada.
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- Voncken**, L., **Albers**, C.J., & **Timmerman**, M.E. (2016). Model selection in continuous test norming with GAMLSS. Poster session presented at 26th Annual Meeting of the Interuniversity Graduate School of Psychometrics and Sociometrics Winter Conference, Groningen, The Netherlands.

7.2 Professional publication

7.2.1 Article in journal

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- Borsboom, D., & Wijsen, L. D. (2016). Frankenstein's validity monster: the value of keeping politics and science separated. *Assessment in Education*, 23(2), 281 - 283.
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- Dekkers, T.J., Popma, A., **Jansen**, B.R.J., Bexkens, A. & **Huizenga**, H.M. (2016). Risicogedrag bij adolescenten met ADHD. *Kind en Adolescent Praktijk*, 4, 38-41.
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- Kan, K - J., van der Maas, H. L. J., & Kievit, R. A. (2016). Process Overlap Theory: Strengths, Limitations, and Challenges. *Psychological Inquiry*, 27(3), 220 - 228.
- Marsman, M., Ly, A., & Wagenmakers, E - J. (2016). Four Requirements for an Acceptable Research Program. *Basic*

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- Niessen, A.S.M., & Meijer, R.R.** (2016). Work sample tests voor selectie en matching in het hoger onderwijs. *Examens*, (3), 21-25.
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- Raijmakers, M.E.J.**, Franse, R.K. & Van Schijndel, T.J.P. (2016). Creativiteit in onderzoekend leren. *Didactief*, 33, 24-26.
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- Van de Velde, D.J., Van Heuven, V.J., Levelt, C.C., **Van Ginkel, J.**, Beers, M., Braire, J.J., & Frijns, J.H.M. (2017). The perception of emotion and focus prosody with varying acoustic cues in cochlear implant simulations with varying filter slopes. *Journal of the Acoustical Society of America*, 141, 3349–3363. doi: 10.1121/1.4982198.
- Van der Maas, H. L. J., & Kan, K. J. (2016). Comment on “Residual group - level factor associations: Possibly negative implications for the mutualism theory of general intelligence” by Gilles E. Gignac (2016). *Intelligence*, 57, 81 - 83.
- Van Ginkel, J.R. & Kroonenberg, P.M.** (2017). Evaluation of multiple-imputation procedures for three-mode component models. *Journal of Statistical Computation and Simulation*, 87, 3059-3081. doi: 10.1080/00949655.2017.1355368.
- Van Schayck, O.C.P., Slok, A.H.M., Kotz, D., **Van Breukelen, G.**, Chavannes, N.H., Rutten-van Mölken, M.P.M.H., Kerstjens, H.A.M., Van der Molen, T., Asijee, G.M., Dekhuijzen, R., Holverda, S., Salomé, P.L., Goossens, L.M.A., Twellaar, M., In 't Veen, J.C.C.M. (2016). Effectiviteit van de ‘Ziektelastmeter COPD: Een clustergerandomiseerde gecontroleerde trial. *Nederlands Tijdschrift voor de Geneeskunde*, 160, D955.
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7.2.2 Report

- Fukkink, R.G., van Otterloo, S., Cohen, L., Van de Wouden, M. & **Zijlstra, B.J.H.** (2016). Verschillende stadsdelen, verschillende schoolloopbanen? Amsterdam: Hogeschool van Amsterdam.
- Gerritse, S.C.**, Bakker, B.F.M., De Wolf, P.P. & **Van der Heijden, P.G.M.** (2016). *Under coverage of the population register in the Netherlands, 2010*. (CBS Discussion paper; Vol. 2016/02). Den Haag/Heerlen: Statistics Netherlands.
- Lensvelt-Mulders, G.J.L.M., **Lugtig, P.J.**, **Elevelt, A.**, Bos, P. & helms, A. (2016). *Aan de grenzen van het meetbare: De methodologische kwaliteit van internationale studies naar de omvang van aan prostitutie gerelateerde mensenhandel met nadruk op Noordwest Europa*. The Hague: WODC, Ministerie van Veiligheid en Justitie.
- Lynn, P. & **Lugtig, P.J.** (2016). *Total Survey Error for Longitudinal Surveys*. Colchester, UK: ISER.
- Oomens, M., Scholten, F., & Luyten, J. W. (2016). Evaluatie Wet Eindtoetsing PO, Tussenrapportage (conceptversie). Oberon onderzoek / Universiteit Twente.
- Schouten, B., **Bais, F.** & **Toepoel, V.** (2016). *Estimating survey questionnaire profiles for measurement error risk*. CBS.
- Schröder, J., Blohm, M., **Struminskaya, B.**, Pforr, K., Silber, H. & Bosnjak, M. (2016). *Leitfaden zur Erstellung einer Leistungsbeschreibung für die Ausschreibung von Interviewer-administrierten Befragungen*. Mannheim: GESIS – Leibniz-Institut für Sozialwissenschaften. DOI: 10.15465/gesis-sg_021.
- Schuurman, N.K.** (2016). *Performance of the Normal VAR Model for Skewnormal and Truncated Normal Residuals*

Using AutovarCore. Universiteit Utrecht/Rijksuniversiteit Groningen.

Van Dijk, J. & **Van der Heijden**, P.G.M. *On the potential of Multiple Systems Estimation for estimating the number of victims of human trafficking across the world: Written for the UNODC, where it appeared as Research Brief 'Multiple Systems Estimation for estimating the number of victims of human trafficking across the world'.*

Warrens, M.J., De Raadt, A., Vugteveen, J., Van Rijn, N., Korpershoek, H., Guldemon, H., **Timmermans**, A.C. & Opdenakker, M-C. (2016) Overgangen en aansluitingen in het onderwijs: Deelrapportage 4: draaien aan de knoppen. Een simulatiestudie naar de effecten van enkele beleidsparameters op de aansluiting po-vo. Groningen: GION onderwijs/onderzoek, 104 p.

7.3 Popular publications

Van Assen, A., Dickscheit, J., **Post**, W. & Grietens, H. (2016). Kinder- en Jeugdcoaching: effectief en preventief?!

7.4 Other results

Boeschoten, L., **Oberski**, D. L., & **de Waal**, A. G. (2016). *Estimating classification error under edit restrictions in combined survey-register data.* (CBS Discussion Paper). Statistics Netherlands.

Calor, S.M., Dekker, R., Van Drie, J.P., **Zijlstra**, B.J.H. & Volman, M.L.L. (2016). Comparison of mathematics discussion and conventional lessons in a collaborative setting. Paper presented at 13th International Congress on Mathematical Education (ICME), Hamburg, Germany.

Frans, N., **Post**, W., Huisman, M., Oenema-Mostert, C.E. & Minnaert, A.E.M. (2016). Evaluating the predictive validity and stability of standardized assessment in Early Childhood Education.

Hartgerink, C. H. J., **van Assen**, M. A. L. M., & **Wicherts**, J. M. (2016). *High p-values as a sign of data fabrication/falsification.* Abstract from 4th World Conference on Research Integrity, Rio de Janeiro, Brazil.

Hoijtink, H.J.A. (Author). (2016). Website on Informative Hypotheses: <http://informative-hypotheses.sites.uu.nl/>.

Junger, M., Wiegersma, S., de Vries, T., & Veldkamp, B. P. (2016). Slachtofferschap bij cybercrime: pilotonderzoek. Enschede: Universiteit Twente.

Kalverboer, M., Rip, J., Zijlstra, E. & **Post**, W. (2016). Unaccompanied minors in the Netherlands: in which type of care facility do they flourish best and what do we know about unaccompanied minors in foster families? 1p.

Knorth, E.J. & **Post**, W. (2016). Methodological issues in quantitative and qualitative research designs, 1-5.

Van Assen, A., Dickeschiet, J., **Post**, W. & Grietens, H. (2016). Child outcomes of home-visiting for families with complex and multiple problems.

Van Assen, A., Dickeschiet, J., **Post**, W. & Grietens, H. (2016). Child outcomes of home-visiting for families with complex and multiple problems.

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Van Rooijen, M., Korpershoek, H., **Warrens**, M.J. & Opdenakkers, M-C. (2016) De po-vo overgang: Bevindingen op basis van empirisch onderzoek en simulatie.

Veer, I. M., Luyten, J. W., van Tuijl, C., & Slegers, P. J. C. (2016). Effectonderzoek Pilot startgroepen voor peuters: eindrapportage 2016. Ministerie van Onderwijs, Cultuur en Wetenschap.

Vischer, A-F., Grietens, H., Knorth, E.J. & **Post**, W. (2016). Decision making on preservation of families in multi-problem situations: Family-, parent-, and child-related factors, 506-507.

Vischer, A-F., Grietens, H., Knorth, E.J. & **Post**, W. (2016). To preserve the family or not to preserve the family; that's the question, 15 p.

- Wicherts, J. M., & Buttliere, B.** (2016). *Two large surveys on psychologists' views on peer review and replication*. Abstract from 4th World Conference on Research Integrity, Rio de Janeiro, Brazil.
- Zevulun, D., Kalverboer, M., Zijlstra, E., Post, W. & Knorth, E.J.** (2016). Returned asylum-seeking children: How are children who stayed in European host countries faring after return to their country of origin?, 292-293.
- Zevulun, D., Kalverboer, M., Zijlstra, E., Post, W. & Knorth, E.J.** (2016). The rearing environment and well-being of returned asylum-seeking adolescents in Kosovo and Albania, 13 p.

7.4.1 Editorial activities

- De Leeuw, E.D.** (2016). *Ontwikkelingen in het Marktonderzoek 2016. 41e Jaarboek van de MOA*. Haarlem: Spaarenhout.
- Padilla, J. L., & Lugtig, P.** (2016). Trends and challenges for methodology. *Methodology*, 12(3), 73-74. DOI: 10.1027/1614-2241/a000109.
- Weeda, W.D.**, Associate Editor, *Frontiers in Brain Imaging Methods* (Research Topic: Spatial Models and region selection for Functional and Effective Connectivity).
- Casper Albers** (Editor). *Computers & Education* 1-Nov-2015 → 31-Oct-2017
- Henk Kiers** (Editor). *Psychometrika*. 1994 → ...
- Marieke Timmerman** (Editor). *Psychometrika*. 2007 → 2020
- Rob Meijer** (Editor). *Journal of Personality Assessment*. 2014 → 2017

7.4.2 Software and test manuals

- Fox, J.P. (Author), Klotzke, K. (Author), & Veen, D. (Author).** (2016). GLMMRR: Generalized Linear Mixed Model (GLMM) for Binary Randomized Response Data: R package.

7.4.3 (Paper) presentation

- Cariou, V. & Wilderjans, T.F.** (2016, July). Consumers' segmentation combining different attributes on products with constrained CLV3W. Paper presented at the 13th International Conference of the Sensometric Society (Sensometrics2016), July 26-29, Brighton, UK (presenter: V. Cariou).
- Ceulemans, E. & Wilderjans, T.F.** (2016, January). Modeling heterogeneity in three-way data: A clusterwise perspective. Invited lecture at the Workshop on Tensor Decompositions and Applications (TDA2016), January 18-22, Leuven, Belgium (presenter: E. Ceulemans & T. F. Wilderjans).
- Van Ginkel, J.R.** (2017). *F-tests and estimates for R^2 for multiple regression in multiply imputed datasets: a cautionary note on earlier findings*. Presentation given at the 20th International Meeting of the Psychometric Society, Zürich, July, 2017.
- Van Ginkel, J.R., Linting, M., Rippe, R.C.A., & Van der Voort, A.** (2016). *Missing data*. Presentation given at the *najaarsbijeenkomst* 2016 of the Social Science Section of the Dutch Statistical Society, Leiden, October, 2016.
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- Zijlstra, B.J.H.** (2016). Different specifications of reciprocity in social network analysis. Paper presented at 81st Annual Meeting of the Psychometric Society (IMPS) 2016, Asheville, NC, United States.

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8 Finances

8.1 Financial statement 2016

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 2016. The participation fee for 2016 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 Interuniversity Graduate School.

This resulted in a credit balance for the year 2016 of € 2.406,-

8.2 Summary of receipts and expenditures in 2016

Receipts		Expenditures		
		Salaries IOPS office		
		Secretary, 0,5 fte	26.478,00	
Contribution participating institutions	42.900,00	Salary director	16.126,00	
Graduate Program 2013	190.000,00	Course		
University of Amsterdam	-142.500,00			
Leiden University	-47.500,00	Subtotal		42.604,00
		Conference	1200,00	
		Printed matter	30,00	
		Hosting website	216,00	
		Travel	806,00	
		Representation costs	450,00	
Subtotal Receipts	42.900,00	Subtotal		2702,00
Negative financial outcome 2016	2.406,00			
Total receipts	42.900,00	Total expenditures		45.306,00

8.3 Balance sheet 2016

IOPS Own Funds 2016			
Debet	Euro	Credit	Euro
Own Funds 31-12-2016	67.656,73	Own Funds 01-01-2016	70.062,87
		Results 2016	-2.406,00
Total Debet	67.656,73	Total Credit	67.656,73

Appendix 1: Contact details of IOPS institutes

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/Claudia Regoor 071 527 3761 secr.psy.ms@fsw.leidenuniv.nl
Education and Child Studies Institute of Education	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: Ineke van Osch 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: Birgit Olthof-Regeling, T. 053 489 3555 Birgit.Olthof@utwente.nl
Tilburg University Tilburg School of Social and Behavioral Sciences	
Methodology and Statistics	P.O. Box 90153, 5000 LE Tilburg Secretary: Marieke Timmermans 013 466 2544 m.c.c.timmermans@tilburguniversity.edu
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: Jasmine Vanuytrecht +32 16 32 60 12 Jasmine.Vanuytrecht@ppw.kuleuven.be
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: Rianne van der Werff (T 026- 3521075) Rianne.vanderWerff@cito.nl

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 Amsterdam Secretary: Sherida Slijmgaard 020 598 8951, s.r.slijmgaard@vu.nl
Department of Biological Psychology	Van der Boechorststraat 1, 1081 BT Amsterdam 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 Eijzen 043 388 2395 e.vaneijdsen@maastrichtuniversity.nl
Erasmus University Rotterdam	
Department of Econometrics	P.O. Box 1738, 3000 DR Rotterdam Secretary: Tineke Kurtz 010 408 1370 / 1377 kurtz@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	
Research Methodology Group	P.O. Box 8130, 6700 EW, Wageningen Secretary: Nicolette Tauecchio 0317 48 5702 nicolette.tauecchio@wur.nl

Appendix 2: IOPS Summer Conference 2016



UNIVERSITY OF TWENTE.

31th IOPS Summer Conference, June 9-10, 2016

Conference location: University of Twente, Conference Hotel Drienerburght
Campuslaan 5, 7522 NB Enschede

Conference dinner: Hotel De Broeierd
Hengelosestraat 725, 7521 PA Enschede

Program prior to conference - Thursday June 9th 2016

10.30 – 12.00 IOPS Board Meeting (Conference Hotel Drienerburght)

11.30 - 12.00 IOPS PhD student meeting (Conference Hotel Drienerburght)

Program Thursday, June 9th 2016

12.00 - 13.00 Registration / Lunch (Conference Hotel Drienerburght)

13.00 - 13.20 Official opening by Rob Meijer and welcome by Local Organizer Jean-Paul Fox

13.20 - 13.45 **Silvia de Haan- Rietdijk**, Utrecht University
It's only a matter of time. Tricky issues in modeling experience sampling (ESM) data
Discussants: Jolanda Kossakowski & Daniel Oberski

13.45 – 14.10 **Abe Hofman**, University of Amsterdam
Analyzing developmental change with time-series data of a large scale educational monitoring system
Discussants: Laura Boeschoten & Timo Bechger

14.10 - 14.35 **Sara van Erp**, Tilburg University
Prior Sensitivity Analysis in Default Bayesian Structural Equation Modeling
Discussants: Johnny van Doorn & Casper Albers

31th IOPS Summer Conference June 9-10, 2016



UNIVERSITY OF TWENTE.

14.35 - 15.20 **Break / Poster Session**

Laura Boeschoten, Tilburg University

Latent Class Multiple Imputation for Multiply Observed Variables in a Combined Dataset

Fayette Klaassen, Utrecht University

A Population of Within-Person-populations: Aggregating Multiple N = 1 Studies

Kimberley Lek, Utrecht University

How to Construct Individualised Confidence Intervals

Johnny van Doorn, University of Amsterdam

Bayesian Ordinal Analysis: Applications of the Polychoric Correlation Coefficient in Psychology

15.20 – 15.45 **Davide Vidotto**, Tilburg University

Bayesian Multilevel Latent Class Models for Multiple Imputation of Nested Categorical Data

Discussants: Yasin Altinisik & Herbert Hoijsink

15.45 - 16.45 **Joris Mulder**, Tilburg University (**Invited Speaker**)

Some Recent Developments of Bayesian Hypothesis Testing in Social Research

16.40-16.50 **Best Paper Award 2016 by Willem Heiser**

16.50 – 17.15 **Plenary meeting IOPS staff and students**

18.00 **Conference dinner at "Hotel De Broeierd"**

Friday, June 10th

09.00 - 09.30 **Registration / Coffee**

09.30 - 09.55 **Dries Debeer, KU Leuven**

Item-position Effects and Missing Responses in Large-Scale Assessments: Models and Applications

Discussants: Daniela Crisan & Robert Zwitser

09.55 - 10.20 **Giulio Flore, Leiden University**

A Comparative Analysis of Psychometric Unfolding Models

Discussants: Annemiek Punter & Jelte Wicherts

10.20 – 10.45 **Robert Hillen, Tilburg University**

*Unraveling categorical and continuous differences on psychological attributes:
Which methods should we use and which not?*

Discussants: Joost kruis & Stéphanie van den Berg

10.45 – 11.30 **Break / Poster Session**

Nitin Bhushan, University of Groningen

Learning Household Energy Consumption Profiles from Data : A Dynamic Process Methodology

Thomas Husken, Utrecht University

Time-varying Covariates in Population Size Estimation with the Recurrent Events Model

31th IOPS Summer Conference June 9-10, 2016



UNIVERSITY OF TWENTE.

Joost Kruis, University of Amsterdam

Three Representations of the Ising Model.

Iris Yocarini, Erasmus University Rotterdam

Decision Accuracy of Combining Multiple Tests in a Higher Education Context'

11.30 – 11.55 **Jurian Meijering**, Wageningen University

Probing the Power of Apollo: Methodological Challenges and Opportunities of the Delphi Method for Developing Rankings

Discussants: Lianne Ippel & Lourens Waldorp

11.55 – 12.20 **Oisin Ryan**, Utrecht University

Mediation, Time and Causality: Lessons from Continuous-Time Modeling

Discussants: Thomas Husken & Francis Tuerlinckx

12.20 – 13.10 **Jean-Paul Fox**, University of Twente

Bayesian Multivariate Multilevel Models for Pretest Posttest Data

13.10 – 13.20 **IOPS Best Presentation and Poster Award**

13.20 – 13.25 **Closing conference by Rob Meijer**

13.25 **Takeout Lunch**



UNIVERSITY OF TWENTE.

Joris Mulder, Tilburg University (Invited Speaker)

Title:

Some Recent Developments of Bayesian Hypothesis Testing in Social Research

Abstract:

Bayes factors are increasingly being used in the social sciences to test hypotheses coming from substantive theories. Bayes factors have several useful properties, such as its intuitive interpretation as the relative evidence in the data between two hypotheses, and the fact that it can straightforwardly be used for multiple hypothesis testing with complex (in)equality constrained on the parameters of interest. In this presentation I will discuss some recent developments in Bayesian hypothesis testing in social research. Topics that will be discussed are information (in)consistency, testing correlation structures, and testing random effects variances.

Appendix 3: IOPS Winter Conference 2016



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26th IOPS Winter Conference, December 15-16, 2016

Conference location: Van Swinderen Huys
Oude Boteringestraat 19, 9712 GC Groningen

Dinner: Humphrey's Restaurants
Vismarkt 42, 9711 KV Groningen

Program prior to the conference Thursday 15 December

10:30-12:00 **IOPS Board Meeting (Board Room Van Swinderen Huys)**

12:00-13:00 **Registration/Lunch**

Program Thursday 15 December

13:00-13:15 **IOPS PhD student meeting**

13:15-13:30 **Official opening by Rob Meijer**

13:30-13:55 **Presentation Joost Agelink van Rentergem Zandvliet**, University of Amsterdam
ANDI for Normative Comparisons in Neuropsychology
Discussant: Lieke Voncken

13:55-14:20 **Presentation Yasin Altinisik**, Utrecht University
A Generalization of the AIC Evaluating Informative Hypotheses for Contingency Tables
Discussant: Sanne Smid

14:20-14:45 **Presentation Hilde Augusteijn**, Tilburg University
The effect of publication bias on the Q-test and the assessment of heterogeneity
Discussant: Fayette Klaassen

14:45-15:15 **Break**

15:15-16:15 **Poster Session**

Daniela Crisan, University of Groningen
Practical consequences of misfit in unidimensional IRT models

Zhengguo Gu, Tilburg University
Some Thoughts on Monitoring Individual Change in Mental Health Care and Education

Annemiek Punter, University of Twente
Handling cultural differential item functioning in the modeling of parental involvement



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Sanne Smid, Utrecht University

A systematic review: Bayesian vs Maximum Likelihood estimation for small samples

Nikky van Buuren, University of Twente

Bayesian Networks and Personalized Learning Recommendations

Lieke Voncken, University of Groningen

Model selection in continuous test norming with GAMLSS

Lisa Wijnen, University of Amsterdam

The History of Psychometrics: A Genealogical Tree of Advisor-Student Relations

Beibei Yuan, Leiden University

The delta machine: Classification based on Distances towards Prototypes

- 16:15-17:15 **Invited speaker Don van Ravenzwaaij**, University of Groningen
Response time modeling and its different faces: On keeping it simple, modeling joint data, and reconceptualizing evidence
- 17:15-17:30 **IOPS plenary meeting**
- 17:30-18:30 **Drinks**
- 18:30- **Conference dinner at Humphrey's**

Program Friday 16 December

- 09:00-09:30 **Registration/Coffee**
- 09:30-09:55 **Presentation Jonas Haslbeck**, University of Amsterdam
Estimating Time-Varying Mixed Graphical Models
Discussant: Joost Agelink van Rentergem Zandvliet
- 09:55-10:20 **Presentation Dino Dittrich**, Tilburg University
Network autocorrelation modeling: Bayesian estimation and hypothesis testing techniques
Discussant: Kees Mulder
- 10:20-10:50 **Break**
- 10:50-11:15 **Presentation Lianne Ippel**, Tilburg University
Data streams for social scientists: row-by-row estimation of statistical models
Discussant: Beibei Yuan



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- 11:15-11:40 **Presentation Sara Steegen**, KU Leuven
Increasing transparency through a multiverse analysis
Discussant: Hilde Augusteijn
- 11:40-12:25 **Presentation IOPS Best Paper Award 2016 Winner: Merijn Mestdagh**, KU Leuven
Fingerprint resampling: A generic method for efficient resampling
Discussant: Sara van Erp
- 12:25-13:25 **Lunch**
- 13:25-13:50 **Presentation Daan van Renswoude**, University of Amsterdam
Gazepath: An eye-tracking analysis tool that accounts for individual differences and data quality
Discussant: Lisa Wijsen
- 13:50-14:15 **Presentation Laura Bringmann**, University of Groningen
Dynamical networks in psychology: More than a pretty picture?
Discussant: Nikky van Buuren
- 14:15-14:30 **Closing by Rob Meijer**

